The Effects of Teaching Badminton Practice on Improving Badminton Capabilities of Sports Department Students

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Abstract: The purpose of this study is to find out how effective the teaching of badminton practice is at improving the ability of students majoring in sports at Jakarta State University (UNJ). Twenty students majoring in sports (15 men; 5 women) attended the teaching of badminton practice for 16 meetings with the same teaching method and length of practice. The portion of practical training for men and women is not distinguished. The effectiveness of teaching badminton practice is assessed from the results of the final test for service, lob, chop, smash, netting, and footwork compared to the initial test for all techniques. Significant improvement was obtained only in the practice of chop and netting techniques although other techniques also improved. With this, it can be concluded that teaching badminton practice at Jakarta State University is able to improve the badminton abilities of students majoring in sports, especially for chop and netting techniques.

Keywords: badminton practice teaching; improvement of badminton skills; sports department students

1. INTRODUCTION

Badminton is one of the most popular sports in Indonesia, both from the lower to upper economic circles, men, women, children to the elderly. Badminton is not only a game but also a sport that is fun, cheap, easy, and makes us healthy [25]. They play badminton with various goals, both for entertainment, maintaining fitness and health, and also sports for achievement [22]. Badminton is a skill-based sport, which is full of technique, speed of decision making and creative play [20]. The game involves most of the body, and considered the fastest racket sport in the world, and hence, it demands from the player's quickness in planning, performing movements, temporal and spatial accuracy in the racket position for interception of the projectile (shuttlecock) [5].

According to Abdillah and Lismadiana [1], sports coaching including badminton, at the club or school level generally begins in the early age period between the ages of 6-12 years. Its existence as a coaching layer that plays a role in perpetuating the regeneration process, is very

important, especially since clubs and schools are the initial centers of early athlete development and make one of the most fundamental strategies in efforts to improve sports performance.

Badminton teaching that exists today, mostly only limited to playing badminton with friends and family. It is not clear what techniques and skills must be learned and trained properly. In order for someone to be able to play badminton properly, every badminton player must be able to hit him from above and from below as well. In the game of badminton there are several stroke techniques that must be mastered. Yunwei & Shiwei states that there are several types of stokes that must be mastered such as service, lob, dropshot, smash, netting, underhand, and drive [26]. All types of punches must be carried out using the correct grip and footwork [2][6]. The basic technique that the developer described above is the result of the assessment by considering effective, efficient, and ease of movement.

Based on Yunwei & Shiwei, the basic technique in badminton consists of [26]; (1) racket grip consisting of American grip, forehand grip, backhand grip, and combination grip, (2) service consisting of short service forehand, long service forehand, and short service backhand, (3) upper stroke) consisting of overhead lob forehand and overhead drop forehand, (4) blows from below (underhand stroke) consisting of underhand lob forehands, netting forehands, underhand lob backhand, and netting backhand. The techniques that have not been mentioned in the discussion above are incorporated in advanced techniques and achievement techniques.

The initial stage for mastering badminton techniques is to start with an introduction. The process of introducing basic techniques can be done by giving a direct explanation along with examples of movements in front of the player or by utilizing instructional media as a learning tool, such as providing reading books / knowledge about badminton, watching training videos, viewing pictures / posters (sequences of implementation) etc. The next step is to master badminton techniques by trying / demonstrating the techniques taught repeatedly (the training stage) [17].

In general, in the game of badminton there are several stroke techniques that must be mastered. Dinata states that there are 7 types of strokes that must be mastered by a badminton player, namely service, lob, dropshot, smash, netting, underhand, and drive [6].

The service stroke is the first blow that starts a badminton game. This stroke can be done both with the forehand and with the backhand [16]. A lob stroke (clear) is a stroke in a badminton game that is carried out with the aim of flying the shuttlecock as high as possible towards the back of the field line [3]. There are 2 types of lob strokes, namely the overhead lob and underhand lob.

The drop shot (chop) on badminton is a deceptive shot that seems to be smashing, when in fact it only causes the shuttlecock to go beyond the net and fall in the opponent's area. A drop shot in a badminton game is an important element to support an athlete e's achievement, because a good drop shot can be a deadly stroke, especially in a single game, this is often the case where the strokes are high and far backward making it difficult for the opponent to reach the shuttlecock inside effort to restore the shuttlecock properly, and if the ability of the drop shot cannot be mastered properly then the punch will be easily returned by the opponent [18]. The ability to respond quickly and effectively doing drop shot or smash is a key factor to successful performance in addition to service plays a vital role in winning a point [9].

Difference with a dropshot, a smash is an overhead stroke aimed at the opponent's area in a swoop and done with full force. According to Tsai et al. [24], the forehand overhead stroke or smash stroke is belief as one of the most typical and powerful badminton techniques.

Netting is a stroke that is done so that the ball is closer to the net, so the opponent is difficult to return it. The underhand technique is the opposite of the overhead stroke. If an overhead shot

hits the shuttlecock that is still above the head, then the underhand shot hits the shuttlecock that is under the shoulder. And the last is a drive stroke, a flat shot with medium speed, slightly higher over, parallel, or under the head. Drive shot can be done from the rear if the cock is not high enough to be smashed, or from the middle, and can also be from the front or near the net [6].

Understanding and mastery of the correct badminton technique will help the athlete to do the right punch, therefore the trainer should pay more attention to the athletes who have eye-hand and high-hand coordination, therefore the athletes who have high-hand eye coordination better in drop shot comparison of athletes with low eye-hand coordination [14].

In the game of badminton there is a technique called footwork. This technique is a technique to set foot steps to be more effective when playing badminton in the court [10]. Footwork is a basic badminton technique to produce high quality shots, therefore it must be done in a good and correct position [7][19].

Seeing the phenomena that exist today, we would like to know more about the effects of teaching badminton practices taught at Jakarta State University (UNJ). How effective is the teaching of badminton practice obtained by students majoring in sports in improving their abilities in playing badminton? In the process of teaching this practice of badminton, students not only get technical training and badminton skills, but also get physical training like a professional badminton athlete / player. Physical training is very important in every sport including badminton, because it is the main foundation in technical, tactics and further mental development. All bio-motor components must be able to be developed to support athlete achievement. With excellent physical capital, of course athletes will be able to master the next stage of training [8].

Badminton practice teaching is expected to be able to make students majoring in sports at the State University of Jakarta have the ability and skills of badminton approaching or even equivalent to professional badminton players.

2. MATERIALS AND METHODS

2.1. Research Methods and Assessment Guidelines

The research method used in this study is qualitative by looking at and describing the results of the abilities of students majoring in sports after undergoing teaching badminton practice for one semester at UNJ. The design in this study is "Test-Retest" [23]. Research instruments whose reliability was tested, were conducted by testing the instrument several times with respondents. So, in this study the instruments are the same, the respondents are the same, but the research time is different. Guidelines for assessment in teaching this practice are based on the guiding of the assessment of basic physical components for badminton players / athletes and mastery of basic badminton techniques well in accordance with badminton theory. The following guidelines for the assessment of physical components used in this study.

Table 1. Basic physical components for athletes / badminton players (men)

No	Component	Measurement technique	Category				
			Less	Enough	Good	Very good	Excellent
1	Strength						
	- Arm and shoulder muscles	Hand Dynamometer	23 – 29	30 – 36	37 – 43	44 – 50	≥ 51
	- Leg muscles	Leg Dynamometer	77 – 145	146 – 214	215 – 282	≥ 283	- ≥ 143.5
	- Back muscles	Back Dynamometer	59 – 74.5	80 – 100.5	106 – 126	122.5 – 143	
2	Muscular endurance						
	- Arm muscle	Push-ups	4 – 11	12 – 19	20 – 28	29 – 37	≥ 38
		Sit-Ups					≥ 90
	- Abdominal muscles		10 – 20	30 – 49	50 – 69	70 – 89	
	- Leg muscles	Squat-Jumps					≥ 88
			4 – 24	25 – 45	46 – 66	67 – 87	
3	Speed	Run 50 meter	9 – 8	7.9 – 6.9	6.8 – 5.8	5.7 – 4.7	≤ 4.6
4	Flexibility	Flexometer	1 – 5	6 – 11	12 – 17	18 – 23	≥ 24
5	Power						
	- Arm muscles	Medicine ball pull	2.63 – 3.67	3.68 – 4.52	4.53 – 5.37	5.38 – 6.22	≥ 6.23
	- Leg muscles	Vertical Jump	38 – 45	46 – 52	53 - 61	62 – 69	≥ 70
6	General Endurance (Cardio Vascular)	Astrand (VO2 max) mL/Kg/mnt	≤ 36	37 – 45	46 – 54	55 – 67	≥ 68
7	Agility	Beam side step	≤ 37	38 – 41	42 – 45	45 – 49	≥ 50

Table 2. Basic physical components for athletes / badminton players (women)

Category

No	Component	Measurement technique	Less	Enough	Good	Very good	Excellent
1	Strength						
	- Arm and shoulder muscles	Hand Dynamometer	9 – 17	18 – 26	27 – 35	36 – 44	≥ 45
	- Leg muscles	Leg Dynamometer	6 – 64	65 – 123	124 – 182	183 – 241	≥ 242
	- Back muscles	Back Dynamometer	29.5 – 39	39.5 – 49.5	50 – 60	60.5 – 70	≥ 70.5
2	Muscular endurance						
	- Arm muscle	Push-ups	1 – 4	5 – 9	10 – 15	16 – 20	≥ 21
	- Abdominal muscles	Sit-Ups	10 – 28	29 – 47	48 – 68	69 – 87	≥ 88
	- Leg muscles	Squat-Jumps	12 – 22	23 – 33	34 – 44	45 – 55	≥ 56
3	Speed	Run 50 meter	9.9 – 9.2	9.1 – 8.4	8.3 – 7.6	7.5 – 6.9	≤ 6.8
4	Flexibility	Flexometer	2 – 6	7 – 11	12 – 18	19 – 23	≥ 24
5	Power						
	- Arm muscles	Medicine ball pull	1.81 – 2.37	2.38 – 2.94	2.95 – 3.51	3.52 – 4.03	≥ 4.04
	- Leg muscles	Vertical Jump	29 – 32	33 – 37	38 – 43	44 – 47	≥ 48
6	General Endurance (Cardio Vascular)	Astrand (VO2 max) mL/Kg/mnt	≤ 29	30 – 38	39 – 47	48 – 52	≥ 53
7	Agility	Beam side step	≤ 33	34 – 37	38 – 41	41 – 45	≥ 46

The physical assessment process of students majoring in UNJ sports is carried out exactly the same as that undertaken by professional badminton players / athletes when they want to take part in certain championship or tournament. This physical assessment is important because badminton game requires excellent physical condition to be able to undergo all the mastery training techniques and skills properly. Components of physical conditions include: strength,

endurance, muscle explosive power, speed, coordination, flexibility, agility, balance, accuracy and reaction [15].

The following is the flow of physical tests that must be conducted and undertaken by students majoring in sports during teaching badminton practice at Jakarta State University.
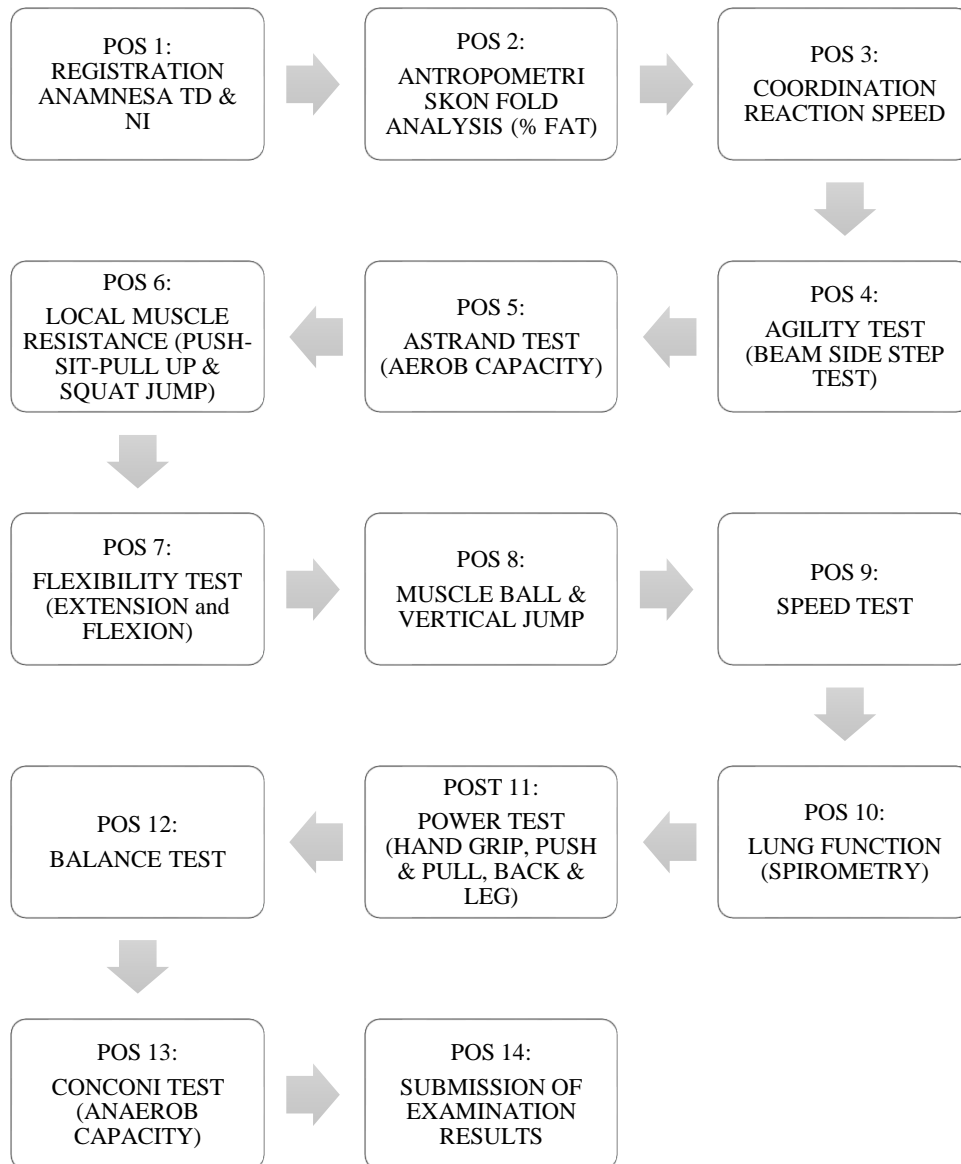

Figure 1. Battery Flow Physical Condition Test / Physiology Test of Badminton Player

2.2. Research Subject

The subjects of this study were twenty students majoring in sports at Jakarta State University (15 men; 5 women) who took courses on badminton in the even semester of the 2018-2019 school year. All subjects received written and verbal explanations on the study informing them of all risks and benefits associated with participation. Before data collection, written informed consent was obtained. This study was approved by the research ethics committee of high institute of Sports and physical education of Jakarta State University, and was consistent with

the institutional ethical requirements for human experimentation in accordance with the declaration of Helsinki

2.3. Research Duration

This research lasted for 4 months (16 meetings / face-to-face) starting from March 3 to June 28, 2019. The teaching process is conducted every Friday from 8.00 - 9.40 or equivalent to 100 minutes of learning. All students are required to attend all lectures from the beginning in March to June 2019.

2.4. Research Procedure

Students must complete all physical training and badminton practice once a week for 16 weeks. Physical training here is a systematic sporting activity over a long period of time, progressively and individually enhanced that leads to the functional and psychological traits of humans to achieve their stated goals [4]. All students are monitored during practice to ensure that all training materials and practices provided are carried out correctly or not. This research data was taken before and after the students underwent the teaching of badminton practice. Preliminary data in the form of badminton abilities and skills of each student were obtained on the first day following this teaching (March 3, 2019), then the final data was obtained at the end of teaching (June 28, 2019). These two data are compared carefully with a comparative analysis of results to answer the question 'does teaching badminton practice affect the improvement of badminton skills of students majoring in sports'.

3. RESULTS

3.1. Descriptive Statistic of Subject

The following are the results of the initial test of all students majoring in sports who take part in teaching badminton practice programs. This initial test is a preliminary test before the teaching process of badminton practice begins. All students involved in this study were asked about their age and measured their height, weight, Hb levels, BMI, and fat levels.

Based on the data from preliminary test, all students have normal, healthy Hb, BMI, and Fat levels. The age of the students who are still 18-19 years old indicates that they are only in their first year or second year. With an average height of 178.35 cm and a body weight of 66.70 kg, making these students ideal for becoming a player or badminton athlete.

3.2. Physical Test Results

The results of the physical condition tests of the students involved in this study are set out in the following table.

Table 3. Descriptive statistics of the results of physical test from all respondents

	N	Minimum	Maximum	Mean	Std. Deviation
Hand_and_shoulder_strength	20	40	50	46.95	3.426
Leg_strength	20	240	285	270.30	17.260

	N	Minimum	Maximum	Mean	Std. Deviation
Back_muscle_strength	20	68	141	121.25	30.870
Hand_muscular_endurance	20	19	39	33.10	7.927
Leg_muscular_endurance	20	53	88	78.55	14.107
Abdomen_muscular_endurance	20	83	90	86.90	1.944
Speed	20	4.9	7.5	5.670	.7109
Flexibility	20	20	24	22.30	1.129
Hand_power	20	3.89	5.98	5.3900	.85403
Leg_power	20	43	68	60.80	9.300
endurance vo2max	20	51	70	62.80	6.948
Agility	20	42	49	46.25	2.124
Valid N (listwise)	20				

Table 4. Descriptive statistics of the results of physical test from men respondents

	N	Minimum	Maximum	Mean	Std. Deviation
Hand_and_shoulder_strength	15	47	50	48.80	1.014
Leg_strength	15	276	285	279.93	2.520
Back_muscle_strength	15	135	141	138.60	1.724
muscular endurance	15	36	39	37.53	.990
Leg_muscular_endurance	15	85	88	86.47	1.060
Abdomen_muscular_endurance	15	85	90	87.60	1.549
Speed	15	4.9	5.7	5.307	.2576
Flexibility	15	20	24	22.13	1.060
Hand_power	15	5.67	5.98	5.8687	.08288

	N	Minimum	Maximum	Mean	Std. Deviation
Leg_power	15	62	68	65.93	1.944
endurance vo2max	15	64	70	66.60	1.882
Agility	15	45	49	47.20	1.373
Valid N (listwise)	15				

Table 5. Descriptive statistics of the results of physical test from women respondents

	N	Minimum	Maximum	Mean	Std. Deviation
Hand_and_shoulder_strength	5	40	42	41.40	.894
Leg_strength	5	240	242	241.40	.894
Back_muscle_strength	5	68	70	69.20	.837
muscular endurance	5	19	20	19.80	.447
Leg_muscular_endurance	5	53	56	54.80	1.095
Abdomen_muscular_endurance	5	83	87	84.80	1.483
Speed	5	6.5	7.5	6.760	.4336
Flexibility	5	21	24	22.80	1.304
Hand_power	5	3.89	4.02	3.9540	.06025
Leg_power	5	43	47	45.40	1.517
endurance vo2max	5	51	52	51.40	.548
Agility	5	42	45	43.40	1.140
Valid N (listwise)	5				

According to the data from the test, all female students have very good strength categories, even 3 women reach the perfect category for leg muscle strength. As for male students, almost all of them had a good rating category with the exception of 2 very good categories.

The test results of muscle endurance, both the arm muscles, leg muscles, and abdominal muscles of all women students get a very good category, there is even 1 that gets the perfect category for leg muscle endurance with a value of 56. For male students, 7 people got the perfect category for arm muscle endurance (≥ 38), with the rest very good. There are 2 people who get the perfect category for leg muscle endurance (≥ 88), with the other getting a very good category. Likewise, with the results of the endurance of the abdominal muscles, showing 2 students get a perfect predicate (≥ 90) and the other is very good.

Four out of five female students get perfect scores on the running speed test, which is ≤ 6.8 seconds per 50 meters. As for male students, none of them got the perfect score for this running speed test, even though all of them were in the excellent category.

Four out of five female students get perfect scores on the running speed test, which is ≤ 6.8 seconds per 50 meters. As for male students, none of them got the perfect score for this running speed test, even though all of them were in the very good category.

For the test of arm and leg muscle power, none of the female students got perfect scores, all of them got very good grades. Power test conducted by male students also did not get perfect results, all of them got a good score for the arm muscle power test and very good for the leg muscle power test.

The results of the general endurance test of female students showed that none of them got a perfect score, all of them got a very good category. Whereas in male students, there were 4 people who received perfect scores (≥ 68), while others received very good grades.

Especially for the agility test, none of the female students or male students get perfect scores. Even so, all of them have scored very well on this agility test.

If we compare the data from tables 9 and 10, we will find that the average results of physical tests of male students are almost all better than the average results of physical tests of female students. This is normal and natural, as we know that the physical conditions of men and women are indeed different and are distinguished according to the physical abilities table in the previous chapter.

The average physical test results show that all students have the appropriate body conditions as a badminton player, even to become an athlete. The most striking average is the running test results of female students, which results in 80% of the total number of students able to get a perfect score.

3.3. Practice Test Results for Badminton Skills and Techniques

By comparing the results of students' ability tests, before and after the teaching badminton practice, a comparison of test results obtained as follows:

Table 6. Descriptive statistics of pre-test and post-test of badminton skill from all participants

	N	Minimum	Maximum	Mean	Std. Deviation
PRE_TEST_SERVE	20	70	80	72.50	4.443
POST_TEST_SERVE	20	70	100	80.50	9.854
PRE_TEST_LOB	20	70	80	76.50	4.894
POST_TEST_LOB	20	80	90	84.00	4.757
PRE_TEST_CHOP	20	70	80	77.00	4.702
POST_TEST_CHOP	20	80	90	89.00	3.078
PRE_TEST_SMASH	20	70	70	70.00	0.000
POST_TEST_SMASH	20	70	100	80.50	9.854
PRE_TEST_NETTING	20	70	80	74.00	5.026
POST_TEST_NETTING	20	80	90	89.00	3.078
PRE_TEST_FOOTWORK	20	70	85	75.00	6.070
POST_TEST_FOOTWORK	20	70	100	80.50	9.854
Valid N (listwise)	20				

From table 6, we can see that there are no abilities from students majoring in sports who follow the practice of badminton whose abilities / skills and techniques decrease after the post test is conducted. Two students who scored 100 after the post-test on behalf of Hermansyah

and M. Sunandar. This shows a very significant increase when compared to their scores at the pre-test which is just got 70. We can also find that for all students who participated in this program, the average test results increased in all badminton skills / techniques without exception. This shows that the program was successful in its implementation.

Table 7. Descriptive statistics of pre-test and post-test of badminton skill from men participants

	N	Minimum	Maximum	Mean	Std. Deviation
PRE_TEST_SERVE	15	70	80	73.33	4.880
POST_TEST_SERVE	15	70	100	82.33	10.154
PRE_TEST_LOB	15	70	80	76.67	4.880
POST_TEST_LOB	15	80	90	84.67	4.806
PRE_TEST_CHOP	15	70	80	76.67	4.880
POST_TEST_CHOP	15	80	90	89.33	2.582
PRE_TEST_SMASH	15	70	70	70.00	0.000
POST_TEST_SMASH	15	70	100	82.33	10.154
PRE_TEST_NETTING	15	70	80	74.00	5.071
POST_TEST_NETTING	15	80	90	89.33	2.582
PRE_TEST_FOOTWORK	15	70	85	76.67	6.172
POST_TEST_FOOTWORK	15	70	100	82.33	10.154
Valid N (listwise)	15				

Table 7, show a comparison of pre-test and post-test scores of male students who take part in teaching badminton practice. There are 3 maximum post-test values of 100 for serve, smash, and footwork. Although only 2 people on behalf of Hermansyah and M. Sunandar won it, this is enough to prove that badminton skills can be mastered and improved very well through teaching badminton practices at UNJ.

Table 8. Descriptive statistics of pre-test and post-test of badminton skill from women participants

	N	Minimum	Maximum	Mean	Std. Deviation
PRE_TEST_SERVE	5	70	70	70.00	0.000
POST_TEST_SERVE	5	70	85	75.00	7.071
PRE_TEST_LOB	5	70	80	76.00	5.477
POST_TEST_LOB	5	80	90	82.00	4.472
PRE_TEST_CHOP	5	70	80	78.00	4.472
POST_TEST_CHOP	5	80	90	88.00	4.472
PRE_TEST_SMASH	5	70	70	70.00	0.000
POST_TEST_SMASH	5	70	85	75.00	7.071

PRE_TEST_NETTING	5	70	80	74.00	5.477
POST_TEST_NETTING	5	80	90	88.00	4.472
PRE_TEST_FOOTWORK	5	70	70	70.00	0.000
POST_TEST_FOOTWORK	5	70	85	75.00	7.071
Valid N (listwise)	5				

In contrast to the results in Table 7, Table 8 illustrate the results of the pre-test and post-test of 5 female students who participated in this program. Indeed, there is no perfect score and there is no significant increase, except for lob, chop, and netting where the average results of the post-test can penetrate beyond 80. All students succeed in showing increased ability in their post-test, despite serving, smash, footwork results are still unsatisfactory.

4. DISCUSSION

Badminton is a sport that requires a variety of stroking techniques and strategies to win the match. Badminton players require good stroke techniques, excellent physical structure and good body physic to reach the maximum performance [11]. Players must be trained in accordance to these three skills in order to achieve maximum performance. Winners are usually players who commit few unforced errors [12][13].

The results of the comparison of the values of the results of the pre-test with this post-test, represent 6 basic badminton skills / abilities taught through direct practice for 1 semester. This value represents every student who follows the teaching of badminton practice and will be used as the value of a badminton practice course. All students in this study were declared to have passed by their supervisors, because there was indeed no one who got below the standard score.

If you look at the results of physical tests conducted at the beginning of the study, then juxtaposed with the results of the relevant student scores in mastering badminton skills and basic techniques, then we will find that perfect results on physical tests do not guarantee we are able to master all skills very well. An example is student number 16 with the name Dudi Hanzar. He got 4 perfect scores during a physical test, but not a single perfect score when pre-test or post-test. There is even a value at the post-test, namely the value of the lob punch, the same as the value at the pre-test. With this, we can know that perfect physical ability is no guarantee that we can master all badminton techniques and skills easily.

If we return to the initial problem of the research, we can see from the results of the comparison of pre-test and post-test scores that all the processes carried out in teaching badminton practice indeed have implications for the improvement of students' badminton skills.

5. CONCLUSIONS

From the results of research and discussion that have been described previously, it can be concluded that teaching badminton practice with pre-test and post-test methods in which there is a physical test, is very effective in improving the abilities and techniques of badminton from students majoring in sports at Jakarta State University. It is expected that in the future, the teaching model of badminton practice is not only for one sport, namely badminton, but also for other sports that are also taught at the university.

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