

Analysis physical condition of the position women's basketball players perennial foundation of Perbaspa Kediri District

Yohana Cindi Florensa^{*1}, Imam Hariadi¹, Moch. Yunus¹, Yulingga Nanda Hanief¹

¹Departemen Sports Coaching Education, Faculty of Sport Science, Universitas Negeri Malang, Indonesia

^{*}Corresponding author: yohanacindiflorensa1999@gmail.com

Abstract

This study aims to determine: (1) physical condition of arm muscle strength, (2) speed, (3) agility, (4) leg muscle power, (5) endurance, (6) physical condition of women's basketball players Perbaspa Perbaspa Foundation Kediri Regency based on player position. This type of research is quantitative descriptive research with data collection techniques using survey methods with test and measurement techniques. The population in this study were all female basketball players at the Perbaspa Abadi Foundation, Kediri Regency, consisting of 15 players. The sampling technique in this study is total sampling. The test instruments used were the push up test, 30 meter sprint, dogging run, vertical jump and multistage fitness test. The results showed that the physical condition of women's basketball players at the Abadi Perbaspa Foundation, Kediri Regency in the components of arm muscle strength, 12 players (80%) were in the poor category, the speed of 5 players (33%) was in the medium category, the agility of 15 players (100%) was in the very category. good, leg muscle power of 11 players (73%) is in the poor category, endurance of 13 players (87%) is in the very poor category. The results of the physical condition based on the player's position show that the dominant physical condition of the point guard position (PG1) is speed and agility, the shooting guard position (SG2) speed and agility, small forward agility (SF3), power forward position (PF4) arm muscle strength, speed and agility, middle position (C5) speed and agility. Physical condition is one aspect that cannot be underestimated, because basketball players have positions and tasks where each task requires different components of physical condition, so coaches need to know what physical components are needed to improve performance.

Keywords: *Basketball; Physical Condition; Agility*

Received: 23 September 2023

Revised: 10 October 2023

Accepted: 13 October 2023

Published: 23 October 2023

INTRODUCTION

Basketball is a game or group sport consisting of two teams competing against each other to win points by putting the ball into the opponent's ring to score points. Each team consists of five people, each of whom occupies the position of point guard (PG1), shooting guard (SG2), small forward (SF3), power forward (PF4), and centre (C5) (Oliver, 2007). From each position of basketball players, there are differences in tasks that have their own characteristics, especially in terms of physical condition needs. Syaputra (2018) the dominant physical condition components in basketball sports are strength, endurance, speed, agility, and power. Every position of a basketball player is expected to have good arm muscle strength because in a basketball game using hands when dribbling, shooting, and scoring points towards the opponent's ring (Trisno et al., 2022). While the point guard, shooting guard, and small forward positions must have good speed and agility skills, because the point guard position oversees organizing team attacks to get scoring opportunities by controlling and providing passes to teammates. The point guard position also acts as the first layer of defence

and grabs the ball from the opponent. The shooting guard position has creativity in the ability to shoot from various positions and has good dribbling and passing skills. The small forward position is an aggressive player when attacking through the opponent's defence, this position has the consistency of shots made from outside the free shot line, as well as the ability of agility in carrying the ball (dribble). The point guard, shooting guard, and small forward positions move in each zone and require multidirectional movement quickly and purposefully both in defence and attack. Asadi (2013) if players do not have good agility, it will interfere with player mobility which has an impact on performance on the field. Players who occupy the power forward and centre positions are expected to have good leg muscle power because the task of the power forward position is responsible for catching bouncing balls that fail to enter the ring (rebound). Meanwhile, the centre position when carrying out attacks is tasked with receiving and shooting the ball, but when the defensive position is tasked with being the last defender. The position of power forward and centre basketball players tends to use leg muscle explosive power more dominantly, so that players can take shots, block, and rebound in attack and defence (Nugroho & Yuliandra, 2021). Endurance is the main capital in every sport including in basketball games, this game is played for 4 quarters, each quarter is 10 minutes. Within this period, it is hoped that players can play without feeling excessive fatigue. Therefore, all players must have good anaerobic and aerobic endurance to maintain performance during the game. Without having good anaerobic endurance, players cannot perform an activity or match with high intensity that is explosive (M. F. A. Nugraha & Rismayanthi, 2019).

There has been a lot of research on the physical condition of basketball athletes. Such as research conducted by (Rustiawan et al., 2021) reports that the physical condition of Spartan Basketball Cup players is in the moderate category and even tends to be lacking. Arifin & Hariyanto, (2019) reported that the State Senior High School 1 Sidayu Men's Basketball Team obtained physical condition results in the moderate category. Prihanto & Wismanadi, (2016) reported that the physical condition of Trimurti Surabaya High School basketball club male athletes was in the moderate category. However, these studies are limited to overall physical analysis.

However, there has been no research investigating the physical condition of basketball players based on position, including arm muscle strength, speed, agility, leg muscle power, and endurance. Each position has a task that requires different physical condition components. The purpose of this study is to find out what are the dominant physical conditions of the Abadi

Perbaspa Foundation Women's Basketball Players of Kediri Regency based on the player's position.

METHOD

The type of research in this study is descriptive quantitative. The research took place at the Perbaspa field on Sunday, January 22, 2023. The population in this study were 15 players of Women's Basketball Players of Abadi Perbaspa Foundation of Kediri Regency. The sample in this study were all Perpetual Foundation Women's Basketball Players of Perbaspa Kediri Regency. The sampling technique in this study used total sampling, so that all players were used as samples (Sugiyono, 2021). The test instrument used to obtain data from the elements of arm muscle strength, speed, agility, leg muscle power, and endurance in the form of tests, namely: a) push up test to determine the strength of the player's arm muscles, b) 30 meters sprint to find out how fast the player can cover the distance in a short time, c) dogging run to determine the player's agility in changing body position, d) vertical jump to determine the player's leg muscle power, e) multistage fitness test to determine the player's endurance.

RESULTS AND DISCUSSION

Table 1. Data Description of Female Basketball Players of Abadi Perbaspa Foundation Kediri Regency.

No	Variabel	N	Mean	Min	Max	SD
1	Arm muscle strength	15	27.67	20	36	5.50
2	Speed	15	4.62	5.23	6.68	0.44
3	Agility	15	6.84	6.09	7.5	0.48
4	Leg muscle power	15	33.06	22	44	6.71
5	Endurance	15	24.6	21.3	32.5	3.10

Description:

N : Number of Players
Mean : Average Value
Min : Lowest Score
Max : Highest Score
SD : Standard Deviation

Table 1. Is data from the results of the physical condition test of the Abadi Foundation Women's Basketball Players Perbaspa Kediri Regency which shows that in the arm muscle strength component using the push up test obtained an average of 27.67 in the deficient category. Speed using the 30 meters sprint test obtained an average of 4.62 in the good category. Agility using the dogging run test obtained an average of 6.84 in the excellent category. Leg muscle power using the vertical jump test obtained an average of 33.06 in the

deficient category. Endurance using the multistage fitness test obtained an average of 24.6 in the very poor category.

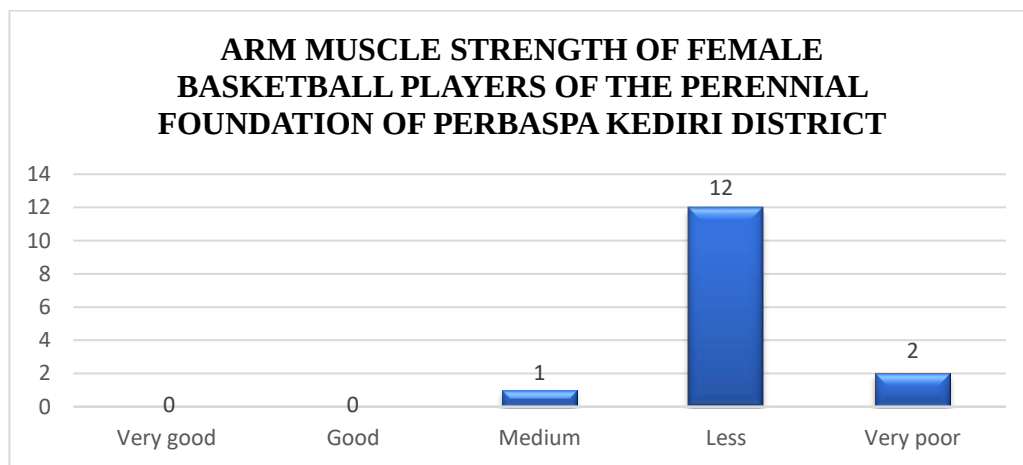


Figure 1. Graph of Arm Muscle Power Strength of Female Basketball Players of Abadi Perbaspa Foundation, Kediri Regency

The results of the arm muscle strength test for female basketball players of the Abadi Perbaspa Foundation of Kediri Regency obtained results in the less category as many as 12 players (80%).

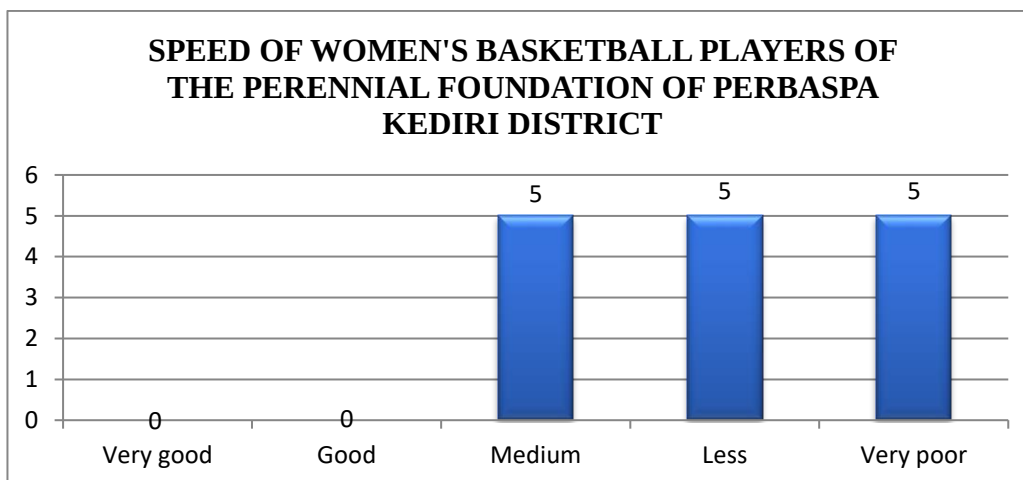


Figure 2. Speed Chart of Female Basketball Players of Abadi Foundation Perbaspa Kediri Regency

The results of the speed test of the Perpetual Foundation Women's Basketball Players of Perbaspa Kediri Regency obtained results with a moderate category of 5 players (33%), a category of less than 5 players (33%) and a category of very less as many as 5 players (33%).

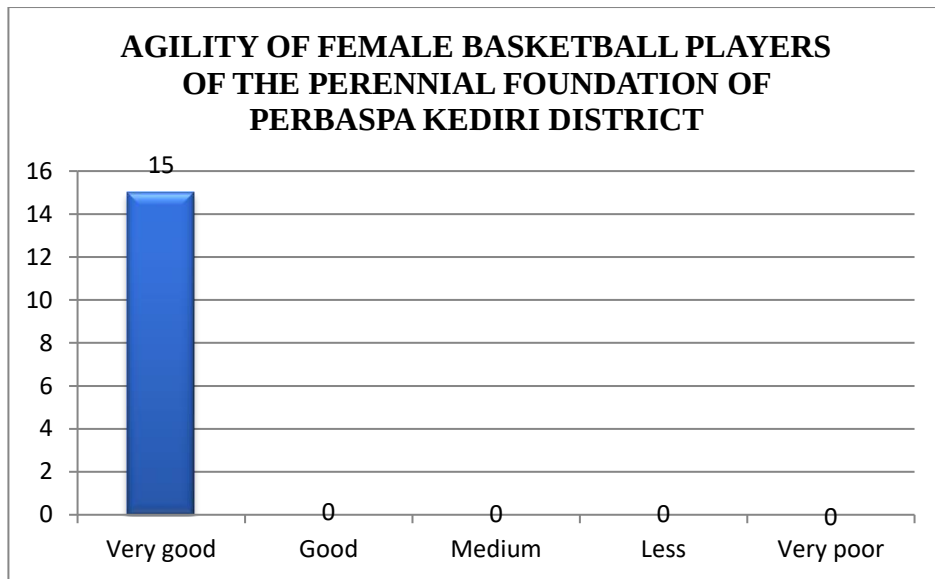


Figure 3. Agility Graph of Female Basketball Players of Abadi Perbaspa Regency Foundation

The results of the agility test for female basketball players of the Abadi Perbaspa Foundation of Kediri Regency obtained results in the excellent category as many as 15 players (100%)

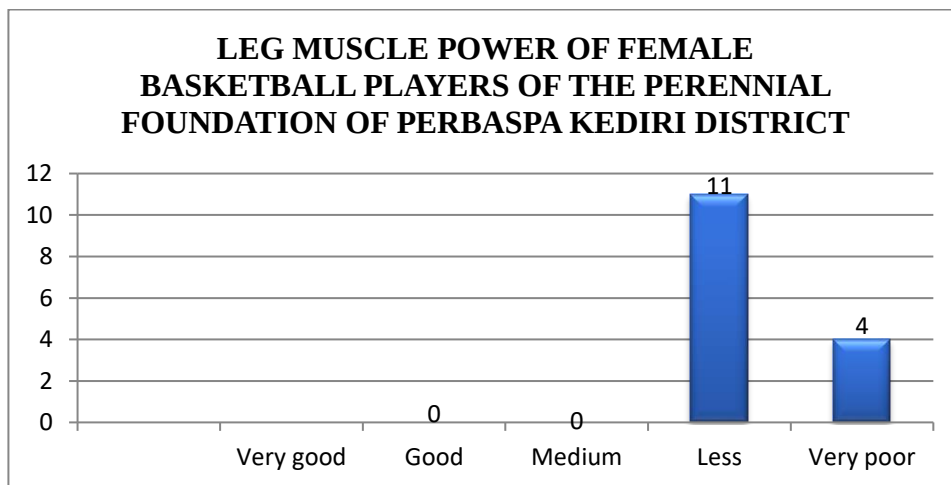


Figure 4. Graph of Limb Muscle Power of Female Basketball Players of Abadi Perbaspa Foundation, Kediri Regency

The results of the leg muscle power test for female basketball players of the Perbaspa Abadi Foundation, Kediri Regency, obtained results in the less category as many as 11 players (73%).

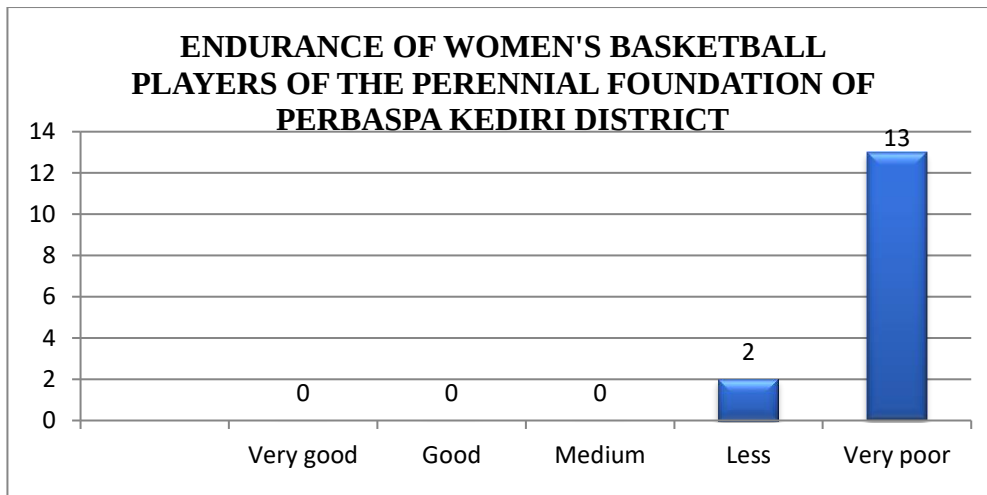


Figure 5. Graph of Endurance of Female Basketball Players of Abadi Perbaspa Foundation, Kediri Regency

The results of the endurance test for female basketball players of the Perbaspa Abadi Foundation, Kediri Regency, obtained results in the category of very poor as many as 13 players (87%).

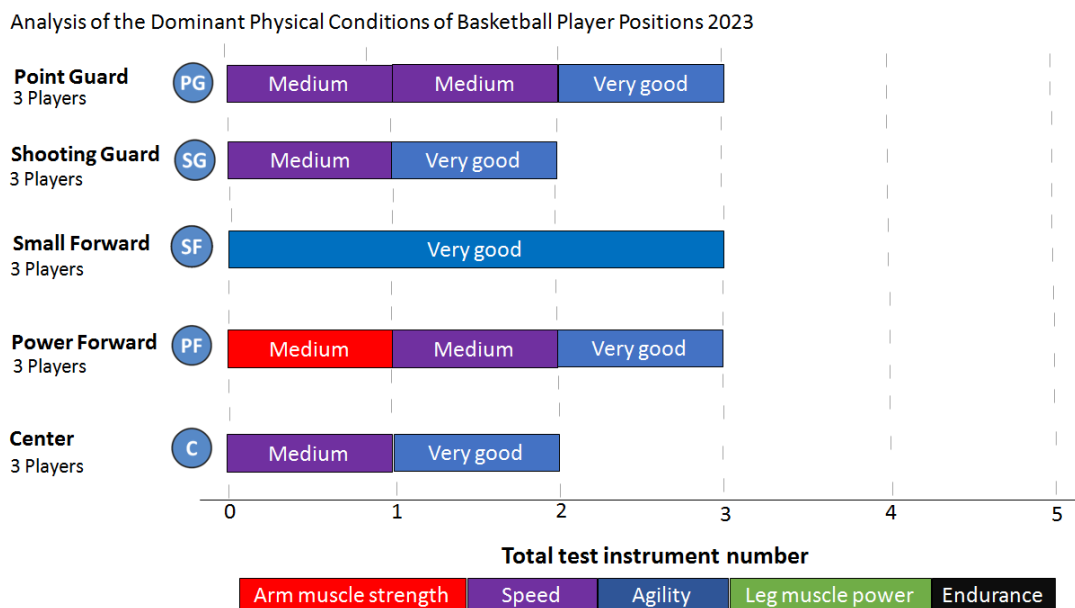


Figure 6. Physical Condition of Female Basketball Players of Abadi Foundation Perbaspa Kediri Regency Based on Position

Description of Physical Condition of Point Guard Position

There are 3 players in charge of occupying the point guard position, all point guard players have speed in the medium category as many as 2 players with the lowest time value (5.23s) while the category is less there is 1 player getting the lowest time record (5.47s). The agility of all point guard position players is in the excellent category by obtaining the lowest time (6.09s).

Description of Physical Condition of Shooting Guard Position

There are 3 players in charge of occupying the shooting guard position, players who are in the shooting guard position have speed in the category of very less 1 player, less 1 player, moderate as much as 1 player obtained the lowest time record (5.57s). The agility of all shooting guard players is in the excellent category by obtaining the lowest time (6.24s).

Description of Physical Condition of Small Forward Position

There are 3 players who are assigned to occupy the small forward position, players who are in the small forward position have agility in the excellent category by obtaining the lowest time (7.26s).

Description of Physical Condition of Power Forward Position

There are 3 players in charge of occupying the power forward position, 1 player who is in the power forward position has arm muscle strength by getting the highest score (36 times). Speed in the moderate category is 1 player by getting the lowest time (5.03s). Agility of all power forward players in the excellent category by obtaining the lowest time (6.35s).

Description of Physical Condition of Center Position

There are 3 players assigned to the center position, 1 player who is in the center position has speed in the medium category by obtaining the lowest time (5.32s). The agility of the entire center players is in the excellent category by obtaining the lowest time (6.35s).

The results of the data analysis of the Perpetual Foundation Women's Basketball Players Perbaspa Kediri Regency show that arm muscle strength is in the deficient category, meaning that this component must be improved. revealed that arm muscles greatly affect the technique of playing basketball such as dribble, passing and shooting (A. Aziz, 2018; A. A. Aziz, 2016). As research conducted by (Ahmad et al., 2023a) reported that the arm muscle strength of extracurricular basketball participants of State Senior High School 1 Pacet Mojokerto was in the good category at 33.33%. It is hoped that the coach will provide training that can increase the strength of the player's arm muscles, which will support technical ability and success in achieving victory when competing, because basketball is one of the games using hands.

The next measured test component is speed which shows that the Abadi Perbaspa Foundation Female Basketball Players of Kediri Regency obtained results in the medium category, meaning that this component needs to be improved again. Nur et al., (2022) speed is the ability to move the body by making sequential movements in a short time. If the player does not have good speed, then the opponent is easier to block the attack. Therefore, in basketball games, reaction speed and speed of movement are needed, because good speed will produce effective movements both in controlling the game and when controlling the ball.

(Sanjaya et al., 2018). Research conducted by (Anas et al., 2019) reported that the speed of the South Sulawesi PON XIX team basketball athletes was 41.7% in the moderate category. Similar research was also conducted by (Wicaksono & Kusuma, 2021) reporting that the speed of CLS Surabaya female athletes obtained a result of 43.80 in the excellent category. The coach must continue to pay attention and improve the ability of the speed component of each player, by providing speed training which of course can affect the player's running ability (speed).

The results of the agility of Female Basketball Players of the Abadi Perbaspa Foundation of Kediri Regency obtained results in the excellent category, meaning that this component is good and must be maintained. Irawadi (2011) agility is the ability to change the direction of body movement in a short time without losing body balance, the more agile the movement of one's feet, the easier it is to move places. If a basketball player does not have good agility, it will have an impact on techniques and tactics in basketball games, making it easy for opponents to block (Nala, 2011). Research conducted by (Marliansyah et al., 2021) shows that the level of agility of extracurricular basketball participants at Public Junior High School in Sekayu 3 is in the moderate category of 65%. With the agility that players have, it will be easier to make movements to cut the opponent's bait and run to create the formation flow.

The results of leg muscle power for female basketball players of the Abadi Perbaspa Foundation of Kediri Regency are included in the deficient category, meaning that this component needs to be improved. Ashar (2020) states that power is the result of strength and speed involving dynamic and explosive muscle contractions, resulting in maximum muscle strength in a short duration. In basketball games, all players must have good leg muscle strength abilities to support success in doing lay ups, blocks, jump shoots, and rebounds. Yuliandra et al., (2020) states that basketball players who have good explosive power will have an impact on the results of controlling the ball in the air (rebound). Haryono & Pribadi, (2013) leg power is an important factor to improve player achievement, with the higher the vertical jump ability, the greater the athlete's leg power. Research conducted by (Mulyadi & Nikon, 2019) reported that the leg muscle explosiveness of Sekolah Menengah Kejuruan Negeri 1 Pulau Punjung basketball athletes in the medium category was 72%. Setia & Winarno, (2021) also reported that the leg muscle explosiveness of the State University of Malang women's basketball team was in the medium category. It is necessary to provide leg muscle power training so that players can do well, make movements that require leg muscle power when competing.

The results of the endurance test for female basketball players of the Abadi Perbaspa Foundation of Kediri Regency are in the very poor category, meaning that this component

needs to be improved. Kusuma & Sugyanto, (2020) endurance is the condition of the body when doing activities for a long time without feeling excessive fatigue. Maulana (2018) reveals that aerobic endurance and anaerobic endurance are an ability to work the heart and lungs and blood vessels that have optimal function in rest and exercise conditions, taking and delivering oxygen to active body tissues used in metabolic processes in the body. With good endurance, a player will be able to play and practice for a longer time than players who have lower physical fitness. A good level of endurance can affect skill development and reduce fatigue, endurance conditions can affect thinking ability and concentration in the game. Indrayana & Hasibuan, (2021) reported that the aerobic endurance (VO2Max) of the Paal 5 Jambi Basketball Lovers Community was in the medium category with an average of 35.35. It is necessary to provide training to increase player endurance, so that players can play for a long time and avoid the risk of injury.

It can be seen that the results of the grouping of physical conditions based on the position of the Perpetual Foundation Women's Basketball Players Perbaspa Kediri Regency, in the point guard position are more dominant in the components of speed and agility, when viewed from the task of the point guard position when playing less physical contact with opponents, in contrast to the forward and center positions which have more physical contact. In the game, the point guard position is the most important key to building the organization and controlling the intensity of the game to break through the opponent's defense. Point guards are the fastest players in solving game situations and have good ball control (Anugrarista & Noeriswandi, 2021). Based on this task, it is expected that the point guard position has good speed and agility to support success in penetrating the opponent's defense quickly. Speed and agility play an important role, especially in basketball games, one of which is when the player is guarded by an opponent. Players must be able to move quickly to change direction or escape. Thus, explosive movements will allow a player to control the ball and be able to pass through the opponent's obstacles, as well as break through the opponent's defense (Rahim, 2020). Muhyi (2009) explains that in basketball games speed is used when a player dribbles the ball while running quickly, it will provide a great opportunity to pass opponents. Saputri (2022) at Menggala Basing Club shows that there is a significant relationship between agility and speed on dribbling ability. If the player does not have the elements of speed and agility, the player will find it difficult to dribble so that the movement of the ball can be easily read and captured by the opponent. It is necessary to provide training to increase the speed of the point guard position players so that they can carry out their duties.

It can be seen that the results of the grouping of physical conditions based on the position of the Perpetual Foundation Women's Basketball Players Perbaspa Kediri Regency, in the shooting guard position are more dominant in the components of speed and agility. Judging from the task of the shooting guard position which has the ability to shoot from various positions as well as good creativity in dribbling, passing and stealing the ball (Novandayany & Wicaksono, 2022). Based on this task, it is expected that the shooting guard position has good arm muscle strength in order to produce dribble, shooting, passing, and agility movements to be able to dribble and snatch the ball from opponents. The components of arm muscle strength and agility are very supportive in achieving the success of their duties and success when the game takes place. Devira & Witarsyah, (2019) arm muscle strength in basketball games is needed when performing passing movements. Fatahillah (2018) basketball players who have good agility, the faster the skills when dribbling without losing balance. Hudri et al., (2021) reports that there is a significant relationship between arm muscle explosiveness and shooting ability in POPDA athletes in Central Aceh Regency of 0.98. Adinata (2022) reported that there is a relationship between agility and endurance of arm muscle strength on the dribble ability of basketball athletes with the results of $F_{hitung} = 12.93 > F_{tabel} = 3.59$. It can be concluded from the results of these two studies that arm muscle strength and agility can affect the results of dribble, shooting and player mobility. It is necessary to provide training on the components of the arm muscle strength of the shooting guard position players so that they can carry out their duties.

It can be seen that the results of the physical condition grouping based on the position of the Abadi Perbaspa Foundation Women's Basketball Players in Kediri Regency, in the small forward position, are more dominant in the agility component. When viewed from the main task of the small forward position which is a player with the ability to carry the ball and score well, and has the ability to penetrate the opponent's defense, this position is also required to do a lot of pivoting and running movements (. et al., 2021). Based on these tasks, the small forward position requires not only the agility component to support its duties, but also arm muscle strength, and speed. Small forwards are required to master shooting skills. Wismanadi (2017) in order to get a good shot (shooting), basketball players must have strong arm muscles, so that players can push the ball to the ring point. Shooting is one of the techniques in basketball that produces accuracy shots to put the ball into the ring (P. D. Nugraha & Pratama, 2019). (Kevin et al., 2022) reported that arm muscle strength with the results of the basketball game of semester V students of FIK Universitas Negeri Manado in 2021 has a significant and relatively strong relationship with a Person Correlation value of 0.767. Arm muscle strength has an

important role in success in basketball games. Thus if the strength of the arm muscles decreases, the results also decrease and vice versa, if the strength of the arm muscles increases, the results obtained will also increase.

It can be seen that the results of the grouping of physical conditions based on the position of the Perpetual Foundation Women's Basketball Players Perbaspa Kediri Regency, in the power forward position are more dominant in the components of arm muscle strength and agility. When viewed from the main task of the power forward position is to catch the bouncing ball from the ring both in defense and attack. In the defensive position this position is also tasked with blocking attacks from opponents and helping the center player get rebounds and score points from under the ring (Ahmad et al., 2023b). Based on these tasks, it is expected that the power forward position has good arm strength and leg muscles to support both defensive and offensive basketball games. Oktavianus et al., (2018) power plays an important role in basketball games to perform rebounding, blocking, and underring movements. This position more often makes jumping movements, therefore leg muscle power has an important role in the game carrying out its duties. Yenes, (2018) reports that there is a contribution of leg muscle explosive power to the jump shoot ability of FIK UNP basketball players. It is hoped that the coach can provide leg muscle strength training for all players, especially power forward players, to be able to carry out their duties.

It can be seen that the results of the grouping of physical conditions based on the position of the Perpetual Foundation Women's Basketball Players Perbaspa Kediri Regency, in the center position are more dominant in the components of speed and agility. When viewed from the main task of the center position in an attacking position to receive the ball and shoot the ball into the ring while when defending this position becomes a defensive player and can fight for rebounds and blocks (Trninić & Dizdar, 2000). Based on this task, it is expected that the limb muscle power of the center position is in good condition to be able to make high jumps when rebounding and blocking, because during the match the center position more often performs rebounding movements when teammates or opponents shoot. The center and power forward positions are occupied by players who are tall and during the game this position is always near the ring. Hence the reason why rebounding must be mastered (Situmorang, 2016). By providing training to improve the explosive ability of the leg muscles of players who occupy the center position to support success in carrying out their duties, such as research conducted by (Abady & Winata, 2022) reports that tip-in training has a significant effect on the results of increasing leg muscle power in basketball games.

Each player position requires a different level of fitness and body composition. In general, the determination of a player's position can be determined from his physical condition (Erga & Nataliani, 2021). However, what causes the physical condition in each position to be different is not yet known exactly why. Gani et al., (2020) one of the factors supporting the physical condition of a basketball player is not only seen from his anthropometry but also from the provision of training programs and nutrition. By providing a training model according to the needs and conditions of the player's body, and applying systematic training principles, it aims to improve the player's ability to achieve maximum performance in the match (Zafar Sidik, 2019). Habibie et al., (2019) reported that the provision of multilateral training has an effect on supporting the physical condition of basketball players. Gumantan & Fahrizqi, (2020) reported that there was a significant effect on the physical fitness of extracurricular participants after being given plyometric training with a $t_{count} = 11.903 > t_{table} = 1.729$. If the physical condition is in good condition, it will have an impact on increasing the work ability of the heart circulatory system, increasing stamina, strength, speed, and being able to perform various variations of training movements. Apart from training, nutritional intake also has an important role in supporting player performance (Zahra & Muhlisin, 2020). Nutrition helps fulfill everyone's energy to carry out daily activities (Nata & Tirtayasa, 2019). Kurdi & Qomarrullah, (2020) reported that providing nutrition to amateur athletes had a relationship with the level of physical condition but was not significant. Dinata et al., (2022) also reported that providing nutrition in the form of creatine monohydrate supplements followed by exercise is an effective way to increase anaerobic endurance by 11.89%. By providing and paying attention to adequate nutritional intake in players, it will have a good impact on the ability of players when training and competing. So what kind of food and how much food is consumed greatly affects physical condition.

CONCLUSION

Based on the results and discussion obtained, it can be concluded that the physical condition of the Abadi Perbaspa Foundation Women's Basketball Players of Kediri Regency in the arm muscle strength component is included in the deficient category, speed in the moderate category, agility in the excellent category, leg muscle power in the deficient category, and endurance in the very poor category. Meanwhile, when viewed from the grouping of the physical condition of the Perpetual Foundation Women's Basketball Players of Perbaspa Kediri Regency based on position, each position is occupied by three players, indicating that the dominant physical condition of the point guard position (PG1) is speed and agility, the shooting

guard position (SG2) is dominant in the speed and agility components of small forward (SF3) dominant in agility, the power forward position (PF4) is dominant in the components of arm muscle strength, speed and agility, the centre position (C5) is dominant in speed and agility. It can be concluded that the results of the research on the physical condition of the Perpetual Foundation Women's Basketball Players of Perbaspa Kediri Regency based on the player's position are more dominant in speed and agility, while the components of arm muscle strength, leg muscle power, and endurance are lacking. Each player has different strengths and abilities, one of which is based on his physical condition, because the effectiveness of a player in the team is also seen from his physical condition.

REFERENCES

- . C., Griadhi, I. P. A., & Muliarta, I. M. (2021). Faktor-Faktor Yang Memengaruhi Terjadinya Ankle Sprain Pada Siswa Sma Pemain Basket Di Denpasar. *E-Jurnal Medika Udayana*, 10(3), 68. <https://doi.org/10.24843/mu.2021.v10i3.p11>
- Abady, A. N., & Winata, D. C. (2022). Perbedaan Pengaruh Latihan Tip in Dengan Under the Basket Shoot Terhadap Peningkatan Power Otot Tungkai Pada Siswa Putra Ekstrakurikuler Madrasah Aliyah Negeri 1 Medan Tahun 2020. *Jurnal Suluh Pendidikan*, 10(1), 1–6. <https://doi.org/10.36655/jsp.v10i1.640>
- Adinata, L. O. (2022). *Hubungan Kelincahan dan Daya Tahan Kekuatan Otot Lengan dengan Kemampuan Dribble Atlet BolaBasket Club Parmato Kota Solok*.
- Ahmad, A., Tomi, A., Sugiarto, T., & Wahyudi, U. (2023a). Survei Kondisi Fisik Peserta Ekstrakurikuler Bolabasket di SMA Negeri 1 Pacet Mojokerto. *Sport Science and Health*, 5(3), 300–309. <https://doi.org/10.17977/um062v5i32023p300-309>
- Ahmad, A., Tomi, A., Sugiarto, T., & Wahyudi, U. (2023b). Survei Kondisi Fisik Peserta Ekstrakurikuler Bolabasket di SMA Negeri 1 Pacet Mojokerto. *Sport Science and Health*, 5(3), 300–309. <https://doi.org/10.17977/um062v5i32023p300-309>
- Anas, N., Suwardi, S., & Herman, H. (2019). Analisis Physical Fitnes Atlet Bolabasket Tim PON Ke XIX Sul-Sel. In *SPORTIVE: Journal Of Physical Education, Sport and Recreation* (Vol. 2, Issue 2). <https://doi.org/10.26858/sportive.v2i1.9397>
- Anugraris, ella, & Noeriswandi. (2021). *Teknik dan Pembelajaran dalam Bola Basket*. Media Sains Indonesia. <https://books.google.com/books?hl=en&lr=&id=o6QvEAAQBAJ&oi=fnd&pg=PA1&dq=bola+basket&ots=RV9PIPzbyg&sig=5Tpgxk4B4HT06jx1B8gzc8PWRYU>
- Arifin, N. M., & Hariyanto, A. (2019). Analisis Kondisi Fisik Tim Basket Putra Sma Negeri 1 Sidayu. *Jurnal Prestasi Olahraga*. <https://ejournal.unesa.ac.id/index.php/jurnal-prestasi-olahraga/article/view/30250%0Ahttps://ejournal.unesa.ac.id/index.php/jurnal-prestasi-olahraga/article/view/30250/27720>
- Asadi, A. (2013). Effects of in-season short-term plyometric training on jumping and agility performance of basketball players. *Sport Sciences for Health*, 9(3), 133–137. <https://doi.org/10.1007/s11332-013-0159-4>
- Ashar, B. (2020). Kontribusi Daya Ledak Otot Tungkai Terhadap Kemampuan Smash Bolavoli. *INSPIREE: Indonesian Sport Innovation Review*, 1(2), 100–107.

<https://doi.org/10.53905/inspiree.v1i2.10>

- Aziz, A. (2018). Hubungan Kekuatan Otot Lengan dan Koordinasi Mata Tangan Terhadap Keterampilan Passing Chest Pass Di Ekstrakurikuler Bolabasket Siswa SMP Hayatan Hayyibah Tahun 2017/2018. In *Seminar Nasional Pendidikan Jasmani UMMI ke-1 Tahun 2018*.
- Aziz, A. A. (2016). Faktor Fisik dan Teknik pada Kemampuan Dribble Atlet Ekstrakurikuler Bola Basket Putra Tingkat SMA. *Universitas Negeri Yogyakarta*, 183(2), 2–7.
- Devira, Y., & Witarsyah. (2019). The Effect of Weight Training Using Tools on Chest Pass Ability. *Jurnal Performa Olahraga*, 4(02), 129–136. <https://doi.org/10.24036/jpo108019>
- Dinata, W. W., Susanto, N., Sari, A. P., & Bahtra, R. (2022). Pengaruh Pemberian Suplemen Creatine Monohydrate Terhadap Peningkatan Daya Tahan Anaerobik Atlet Bola Basket. *Journal of Sport Sciences and Fitness*, 8(1), 56–62.
- Erga, A., & Nataliani, Y. (2021). Seleksi Fitur pada Pengelompokan Posisi Pemain Basket menggunakan Fuzzy C-Means. *JOINTECS (Journal of Information Technology and Computer Science)*, 6(2), 77. <https://doi.org/10.31328/jointecs.v6i2.2346>
- Fatahillah, A. (2018). Hubungan Kelincahan dengan Kemampuan Dribbling pada Siswa Ekstrakurikuler Bola Basket. In *Gelanggan Olahraga: Jurnal Pendidikan Jasmani dan Olahraga (JPJO)* (Vol. 1, Issue 2). <https://doi.org/10.31539/jpjo.v1i2.131>
- Gani, R. A., Winarno, M. E., Aminudin, R., Dimyati, A., & Mahardika, D. B. (2020). Pengaruh gaya mengajar resiprokal terhadap keterampilan teknik grab start. *Jurnal Keolahragaan*, 8(1), 98–107. <https://doi.org/10.21831/jk.v8i1.31167>
- Gumantan, A., & Fahrizqi, E. B. (2020). Pengaruh Latihan Fartlek dan Cross Country Terhadap Vo2max Atlet Futsal Universitas Teknokrat Indonesia. *SPORT-Mu: Jurnal Pendidikan Olahraga*, 1(01), 1–9. <https://doi.org/10.32528/sport-mu.v1i01.3059>
- Habibie, M., Widiastuti, W., & Nuriani, S. (2019). Pengaruh Metode Latihan Dan Kordinasi Mata – Kaki Terhadap Keterampilan Shooting Dalam Sepakbola. *Multilateral Jurnal Pendidikan Jasmani Dan Olahraga*, 18(1), 25–31. <https://doi.org/10.20527/multilateral.v18i1.6564>
- Haryono, S., & Priyadi, F. S. (2013). Pengembangan Jump Power Meter Sebagai Alat Pengukur Power Tungkai. *Media Ilmu Keolahragaan Indonesia*, 2(1), 15–27. <https://doi.org/10.15294/miki.v2i1.2550>
- Hudri, A., Abdurrahman, & Ifwandi. (2021). Hubungan Daya Ledak Otot Lengan Dengan Ketepatan Shooting Pada Atlet Popda Bola Basket Kabupaten Aceh Tengah Tahun 2020. *Jurnal Ilmia Mahasiswa Pendidikan Jasmani, Kesehatan, Dan Rekreasi*, 7, 127–132.
- Indrayana, B., & Hasibuan, M. U. Z. (2021). Tinjauan Kondisi Fisik (Vo2max) Pada Komunitas Pencinta Basket Paal 5 Jambi. *Journal Coaching Education Sports*, 2(2), 195–204. <https://doi.org/10.31599/jces.v2i2.737>
- Irawadi, H. (2011). Kondisi Fisik dan Pengukurannya. In *Kondisi Fisik dan Pengukurannya*.
- Kevin, S., Berhimpong, M., & Pangemanan, M. (2022). Hubungan Kekuatan Otot Lengan Dengan Hasil Shooting Permainan Bola Basket Pada Mahasiswa Putra FIK Unima 2021. *Jurnal Pendidikan Kesehatan Dan Rekreasi UNIMA*, 03(01), 22–27. <https://doi.org/10.53682/jo.v3i1.4224>
- Kurdi, K., & Qomarrullah, R. (2020). Hubungan Kecepatan Reaksi Tangan dan Koordinasi Mata Tangan Pada Servis Tennis Lapangan Mahasiswa Universitas Cenderawasih. *Jurnal*

- Terapan Ilmu Keolahragaan*, 5(1), 22–27. <https://doi.org/10.17509/jtikor.v5i1.25060>
- Kusuma, D. W. C. W., & Sugyanto, H. (2020). Pengaruh sirkuit training terhadap peningkatan VO2 max atlet bola basket. *Lentera Pendidikan Indonesia: Jurnal Media, Model, Dan Pengembangan Pembelajaran*, 1(1 SE-), 14–21. <https://doi.org/10.36312/lpi.v1i1.2>
- Marliansyah, I., Sukardi, S., & Akhbar, M. T. (2021). Survei Kelincahan pada Siswa Ekstrakurikuler Bola Basket di SMP Negeri 3 Sekayu. *SPORT-Mu: Jurnal Pendidikan Olahraga*, 2(1), 27–38. <https://doi.org/10.32528/sport-mu.v2i1.9046>
- Maulana, A. A. (2018). Daya Tahan Aerobik dan Anaerobik Atlet Porda Bola Basket Putra Kabupaten Indramayu. *Jurnal Universitas Negeri Yogyakarta*, 1, 48–49. <https://journal.student.uny.ac.id/index.php/ikora/article/download/14635/14207>
- Muhyi, M. (2009). Meningkatkan Kebugaran Jasmani Melalui Permainan dan Olahraga Bola Basket. In *Surabaya: PT. Grasindo*.
- Mulyadi, H., & Nikon, B. (2019). Tinjauan Kondisi Fisik Atlet Bolabasket. *Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*, 2(2), 26–32. <https://doi.org/10.31539/jpjo.v2i2.482>
- Nala, I. G. N. (2011). *Prinsip Latihan Fisik Olahraga*. i–184.
- Nata, I. W. S., & Tirtayasa, K. (2019). Gambaran Umum Asupan Gizi Atlet Atletik, Kempo, dan Tarung Derajat yang Telah Melakukan Latihan Intensif Dalam Persiapan Kompetisi Pra-PON Bali Tahun 2015. *E-Jurnal Medika Udayana*, 8(12). <https://ojs.unud.ac.id/index.php/eum/article/view/55836>
- Novandayany, R. U., & Wicaksono, A. (2022). Analisis Keputusan Tom Thibodeau Dalam Pertukaran Pemain Nba Pada Second Draft Pick 2020/2021 Tim New York Knicks. *Unnes Journal of Sport Sciences*, 6(1), 1–8. <https://doi.org/10.15294/ujoss.v6i1.53035>
- Nugraha, M. F. A., & Rismayanthi, C. (2019). Profil Daya Tahan Aerobik Posisi Guard, Forward, Dan Center Atlet Bola Basket. *Medikora*, 16(1). <https://doi.org/10.21831/medikora.v16i1.23480>
- Nugraha, P. D., & Pratama, E. B. (2019). Survei Pembinaan Prestasi Atlet Bolabasket Kelompok Umur Di Bawah 16 Dan 18 Tahun. *Journal Sport Area*, 4 (1), 240–248. [https://doi.org/sportarea.2019.vol4\(1\).2394](https://doi.org/sportarea.2019.vol4(1).2394)
- Nugroho, R. A., & Yuliandra, R. (2021). Analisis Kemampuan Power Otot Tungkai Pada Atlet Bolabasket. *Sport Science and Education Journal*, 2(1). <https://doi.org/10.33365/ssej.v2i1.988>
- Nur, A., Lam Akhmady, A., & Bakar, A. (2022). Pengaruh Latihan Interval Sprint Dan Acceleration Sprint Terhadap Kecepatan Lari Sprint 200 Meter. *Babasal Sport Education Journal*, 2, 2. <https://doi.org/10.32529/bsej.v2i1.1756>
- Oktavianus, I., Bahtiar, S., & Bafirman. (2018). Bentuk Latihan Pliometrik, Latihan Beban Konvensional Memberikan Pengaruh Terhadap Kemampuan Three Point Shoot Bolabasket. *Jurnal Performa Olahraga*, 3(01), 21–29. <https://doi.org/10.24036/jpo38019>
- Oliver, J. (2007). *Dasar-Dasar Bola Basket*.
- Prihanto, K., & Wismanadi, H. (2016). Analisis kondisi fisik atlet putra klub bola basket SMA Trimurti Surabaya. *Jurnal Kesehatan Olahraga*, 06(2), 465–472. <https://jurnalmahasiswa.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/view/17821>

- Rahim, A. F. (2020). Pengaruh Ladder Drill Exercise Terhadap Kecepatan Dan Kelincahan Pemain Futsal. In *Jurnal Sport Science* (Vol. 10, Issue 2). <https://doi.org/10.17977/um057v10i2p153-157>
- Rustiawan, H., Taufik, A. R., & Sudrazat, A. (2021). Analisis Kondisi Fisik Pemain Spartan Basketball Club. *Jurnal Wahana Pendidikan*, 8(1), 1. <https://doi.org/10.25157/wa.v8i1.4565>
- Sanjaya, I. K. A., Yoda, I. K., & Sudarmada, I. N. (2018). Pengaruh Pelatihan Star Run Terhadap Kecepatan Dan Kelincahan. *Jurnal Ilmu Keolahragaan Undiksha*, 6(3), 35–42. <https://doi.org/10.23887/jiku.v6i3.8832>
- Saputri, O. (2022). Hubungan Kelincahan Dan Kecepatan Terhadap Kemampuan Dribbling Bola Basket Pada Atlet Club Basing-Basing Menggala. *Jurnal Ilmu Keolahragaan*, 33(1), 1–12.
- Setia, D. Y., & Winarno, M. E. (2021). Survei Tingkat Kebugaran Jasmani Tim Bola Basket. *Sport Science and Health*, 3(3), 107–116. <https://doi.org/10.17977/um062v3i32021p107-116>
- Sugiyono. (2021). *Statistika Untuk Penelitian*.
- Syaputra, A. (2018). *Kontribusi Power dan Kelenturan Pergelangan Tangan Terhadap Hasil Shooting Permainan Bolabasket Siswa Ekstrakurikuler SMKN Pertanian Terpadu Provinsi Riau*.
- Trisno, Mongsidi, W., & Saman, A. (2022). Hubungan Kekuatan Otot Lengan Dengan Kemampuan Chest Pass Pada Permainan Bola Basket Siswa Sman 15 Bombana. *Journal Olympic (Physical Education, Health and Sport)*, 2(2), 69–75. <https://doi.org/10.36709/olympic.v2i2.23>
- Trninić, S., & Dizdar, D. (2000). System of the performance evaluation criteria weighted per positions in the basketball game. In *Collegium Antropologicum* (Vol. 24, Issue 1).
- Wicaksono, G. T., & Kusuma, D. A. (2021). Analisis Hasil Tes Sprint 30 Meter Dan Bleep Test Atlet Putri Ku 14 Club Basket CLS Surabaya. *JOSSAE : Journal of Sport Science and Education*, 6(1), 1. <https://doi.org/10.26740/jossae.v6n1.p1-8>
- Wismanadi, H. (2017). Hubungan Tingkat Kecemasan Dengan Performa Atlet Tim Bolabasket Putra Kota Surabaya Dalam Persiapan Pekan Olahraga Provinsi Iv Di Kota Madiun. *JOSSAE : Journal of Sport Science and Education*, 2(1), 25. <https://doi.org/10.26740/jossae.v2n1.p25-26>
- Yenes, R. (2018). Pengaruh Daya Ledak Otot Tungkai Dan Keseimbangan Terhadap Kemampuan Jump Shot Atlet Bolabasket FIK UNP. *Jurnal Performa Olahraga*, 3(02), 119–119.
- Yuliandra, R., Nugroho, R. A., & Gumantan, A. (2020). The Effect of Circuit Train-ing Method on Leg Muscle Explosive Power. *Journal of Physical Education*, 9(3), 157–161. <http://journal.unnes.ac.id/sju/index.php/peshr>
- Zafar Sidik, D. P. L. (2019). Pelatihan Kondisi Fisik. In *PT REMAJA Rosdakarya*.
- Zahra, S., & Muhlisin, M.-. (2020). Nutrisi Bagi Atlet Remaja. *Jurnal Terapan Ilmu Keolahragaan*, 5(1), 81–89. <https://doi.org/10.17509/jtikor.v5i1.25097>