



PROFESSIONAL FITNESS TESTS FOR FEMALE BASKETBALLERS OF THE HO CHI MINH CITY TEAM, VIETNAM

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Abstract:

The research was implemented to find suitable professional fitness tests for female athletes of the Ho Chi Minh City basketball team. There were sixteen female basketballers from the team participated in the study. By using the methods of document reference, surveys, and statistical analysis, the study selected 14 fitness tests in total which comprised eleven pedagogical tests and three biomedical ones. All of them aim to thoroughly measure physical attributes needed in basketball, regarding speed, strength, flexibility, agility, general endurance, and professional endurance.

Keywords: test, professional fitness, basketballers, Ho Chi Minh City, Vietnam

1. Introduction

The sport of basketball originated in the United States in 1891 and subsequently gained popularity across the Americas, Europe, Asia, and globally. It was included in the Olympic Games as early as 1936 and became an official competition at events such as the Asian Games and Southeast Asian Games (SEA Games).

Basketball is classified as a high-intensity intermittent sport [1], [2] due to its nature as a team-based activity involving direct opposition on a shared playing field. The game is played by two teams on a court measuring 28 x 15 meters, with each team

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consisting of five players on the court and no restrictions on player exchanges [3]. What a basketballer must do on the court is to defend his team's basket from the opposing team and try to score points by shooting the ball into their basket, as outlined by FIBA (2001) [3], [4]. A standard basketball match comprises four quarters, each lasting 10 minutes (excluding stoppage time). There is a two-minute break between the first and second quarters, and a 15-minute break between the second and third quarters. Teams are also allowed two timeouts (each lasting one minute) in the first and second quarters, three timeouts in the third and fourth quarters, and one timeout in each overtime period (each lasting 5 minutes), according to FIBA (2001) [3], [5].

Basketball athletes today are required to perform proficient skills and subtle tactics, good mental fortitude, and notably, a high level of physical fitness, since the sport involves a wide array of movements such as walking, running, jumping, stopping, pivoting, catching, shooting, and defending, all of which are executed under pressure in competitive environments. The diversity of these physical activities aims to enhance the practitioners' nervous system, motor skills, metabolism, and other functions of body parts. Hence, engaging in basketball, in particular, facilitates the holistic advancement of motor abilities including strength, speed, endurance, flexibility, creativity, and coordination.

In basketball games, players tend to engage in offensive moves within their opponent's area or switch to a defensive posture within their own area. It could be stated that the majority of player actions occur within one-half of the field, with particularly intense activity concentrated in the area spanning from the basketball vicinity to the three-point zones, typically measuring between 1.00m and 1.20m. This requires basketballers to possess not only technical proficiency and tactical acumen but also robust physical capabilities to withstand continual pressure. Consequently, it is imperative to conduct thorough assessments of athletes' physical fitness and establish precise and comprehensive evaluation standards.

2. Materials & Methods

2.1 Research Methods

- Document References: Synthesizing relevant national and international research work on professional fitness assessments.
- Surveys: Consulting with experts and trainers to select professional fitness tests.
- Statistical Analysis: Analysing the data collected from the survey (T-test) and checking the reliability of the tests with the correlation coefficient (Pearson).

2.2 Participants

- 16 female basketball athletes from Ho Chi Minh City participated in the study. Their average age was 23.5 ± 3.54 years, with the oldest participant being 30 years old and the youngest 20 years old. On average, their height was 169.25 ± 4.77 cm, and their weight averaged 64.75 ± 5.56 kg.

2.3 Surveyees

20 individuals, four of whom are experts and managers, ten are coaches and six are basketball coaches in Ho Chi Minh City, Can Tho, and Soc Trang.

3. Results

The study implemented three steps to identify the professional fitness assessments for the female basketballers in the Ho Chi Minh City team, as follows.

Step 1: Collecting fitness tests from local and foreign documents;

Step 2: Surveying with experts to determine the appropriate tests;

Step 3: Checking the tests' reliability.

3.1 A synthesis of professional fitness tests in basketball from national and international materials

The professional fitness tests were chosen due to their feasibility of the measurement and comparison among different individuals, regions, and countries [6].

The study, as a result, laid forth the following three criteria for test selection, as follows:

- 1) They are recommended by highly reputable domestic and foreign documents to ensure reliability.
- 2) They can be tested with the available means in the nation.
- 3) They are accompanied by a specific scale or accurate data of the national and international basketball teams to serve for comparison (kindly note that the data of the top athletes in the world are rarely published).

The following table (Table 1) presents 18 professional fitness tests, including 15 pedagogical tests and 03 functional assessment tests.

Table 1: List of eighteen professional fitness tests for female basketballers based on national and international research works

| Test | | Research works |
|------|---------------------|--|
| 1 | 20-meter sprint (s) | Le Nguyet Nga (2007)[7], Nguyen Ngoc Hai (2004)[8], Nguyen Le Pham Huynh (2006)[9], Dang Ha Viet (1999)[10], Dang Ha Viet (2007)[11], Mancha-Triguero, D. <i>et al.</i> (2019) [12], Delextrat A, Cohen D. (2008)[13], Gomes JH (2017)[14], Pareja-Blanco F <i>et al.</i> (2016)[15], García-Gil M (2018)[16], Scanlan AT <i>et al.</i> (2014)[17], Jakovljevic ST <i>et al.</i> (2012)[18], Brittenham (1996)[19], Ellis <i>et al.</i> (2000)[20]. |
| 2 | Vertical | Le Nguyet Nga (2007)[7], |

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| | | |
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| | jump (cm) | Nguyen Ngoc Hai (2004) [8], Nguyen Le Pham Huynh (2006) [9], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Mancha-Triguero, D. <i>et al.</i> (2019) [12], Matavulj D <i>et al.</i> (2001) [21], Ostojic SM <i>et al.</i> (2006) [22], Wen, N. <i>et al.</i> (2018) [23], Gál-Pottyondy <i>et al.</i> (2021) [24]. |
| 3 | Running vertical jump (cm) | Le Nguyet Nga (2007) [7], Nguyen Ngoc Hai (2004) [8], Mancha-Triguero, D. <i>et al.</i> (2019) [12], Gál-Pottyondy <i>et al.</i> (2021) [24]. |
| 4 | Weight lifting (kg) | Nguyen Le Pham Huynh (2006) [9], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Ostojic SM <i>et al.</i> (2006) [22], Wen, N. <i>et al.</i> (2018) [23]. |
| 5 | Bench press (kg) | Nguyen Le Pham Huynh (2006) [9], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Ostojic SM <i>et al.</i> (2006) [22], Wen, N. <i>et al.</i> (2018) [23]. |
| 6 | Two-handed overhead basketball throw (m), | Nguyen Ngoc Hai (2004) [8], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11]. |
| 7 | Sit-and-reach test (cm) | Le Nguyet Nga (2007) [7], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Baechle <i>et al.</i> (2000) [25], Brittenham (1996) [19]. |
| 8 | T-test (s) | Le Nguyet Nga (2007) [7], Nguyen Le Pham Huynh (2006) [9], Nguyen Thi Minh Cam (2010) [26], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Mancha-Triguero, D. <i>et al.</i> (2019) [12], Delextrat A, Cohen D. (2008) [13], Pion J <i>et al.</i> (2015) [27], Jakovljevic ST <i>et al.</i> (2012) [18], Bloomfield J <i>et al.</i> (2007) [28], García-Gil M (2018) [16], Scanlan AT <i>et al.</i> (2014) [17], Gál-Pottyondy <i>et al.</i> (2021) [24], Baechle <i>et al.</i> (2000) [29], Ellis <i>et al.</i> (2000) [20], Hoffman (2002) [30]. |
| 9 | Hexagonal obstacle jump (s) | Le Nguyet Nga (2007) [7], Nguyen Le Pham Huynh (2006) [9], Dang Ha Viet (1999) [10], |

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| | | |
|----|---|---|
| | | Dang Ha Viet (2007) [11], Matavulj D <i>et al.</i> (2001) [21], Baechle <i>et al.</i> (2000) [25], Brittenham (1996) [19]. |
| 10 | Drill test (s) | Le Nguyet Nga (2007) [7], Nguyen Ngoc Hai (2004) [8], Nguyen Le Pham Huynh (2006) [9], Nguyen Thi Minh Cam (2010) [26], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Mancha-Triguero, D. <i>et al.</i> (2019) [12], Delextrat A, Cohen D. (2008) [13], Jakovljevic ST <i>et al.</i> (2012) [18], Scanlan AT <i>et al.</i> (2014) [17], Carvalho, H. M. <i>et al.</i> (2011) [31], Carvalho, H. M <i>et al.</i> (2017) [32], Fatouros, I. G. <i>et al.</i> (2011) [33], Gál-Pottyondy <i>et al.</i> (2021) [24], Baechle <i>et al.</i> (2000) [25], Hoffman <i>et al.</i> (2002) [30]. |
| 11 | Maximum ball passes in 30 seconds (points) | Le Nguyet Nga (2007) [7], Nguyen Ngoc Hai (2004) [8], Nguyen Le Pham Huynh (2006) [9], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Tang Phan Huy (1992) [34], Baumgartner <i>et al.</i> (1995) [35], Safrit <i>et al.</i> (1994) [36]. |
| 12 | Two-point basketball shooting from 5 positions in 1 minute (points) | Le Nguyet Nga (2007) [7], Nguyen Ngoc Hai (2004) [8], Nguyen Le Pham Huynh (2006) [9], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11]. |
| 13 | Three-point basketball shooting from 5 positions in 1 minute (points) | Le Nguyet Nga (2007) [7], Nguyen Ngoc Hai (2004) [8], Nguyen Le Pham Huynh (2006) [9], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11]. |
| 14 | Defensive slide (s) | Le Nguyet Nga (2007) [7], Nguyen Le Pham Huynh (2006) [9], Nguyen Thi Minh Cam (2010) [26], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Mancha-Triguero, D. <i>et al.</i> (2019) [12], Delextrat A, Cohen D. (2008) [13], Bloomfield J <i>et al.</i> (2007) [28], Scanlan AT <i>et al.</i> (2014) [17], Gál-Pottyondy <i>et al.</i> (2021) [24], Tang Phan Huy (1992) [34], Baumgartner <i>et al.</i> (1995) [35]. |

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| | | |
|----|--|---|
| | | Safrit <i>et al.</i> (1994) [36]. |
| 15 | Dribbling (s) | Le Nguyet Nga (2007) [7], Nguyen Ngoc Hai (2004) [8], [Nguyen Le Pham Huynh (2006) [9], Nguyen Thi Minh Cam (2010) [26], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Mancha-Triguero, D. <i>et al.</i> (2019) [12], Gál-Pottyondy <i>et al.</i> (2021) [24], Tang Phan Huy (1992) [34], Baumgartner <i>et al.</i> (1995) [35], Safrit <i>et al.</i> (1994) [36]. |
| 16 | VO ₂ max (ml/kg/minute). | Nguyen Thi Minh Cam (2010) [26], [Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Mancha-Triguero, D. <i>et al.</i> (2019) [12], Apostolidis N <i>et al.</i> (2004) [37], Gottlieb, R. <i>et al.</i> (2022) [38], Akalan, C. <i>et al.</i> (2004) [39], Hudain, M. A. <i>et al.</i> (2023) [40], Ardiansah, D. <i>et al.</i> (2018) [41], Gál-Pottyondy <i>et al.</i> (2021) [24], William <i>et al.</i> (2000) [42], William <i>et al.</i> (2001) [43]. |
| 17 | Relative Peak Power Output (RPP) (w/kg), | Nguyen Thi Minh Cam (2010) [26], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Mancha-Triguero, D. <i>et al.</i> (2019) [12], Inbar. O. <i>et al.</i> (1996) [44], Delextrat A <i>et al.</i> (2008) [13], Apostolidis N <i>et al.</i> (2004) [37], Gharbi Z <i>et al.</i> (2015) [45], Zupan MF <i>et al.</i> (2009) [46], Gál-Pottyondy <i>et al.</i> (2021) [24], Macdougall <i>et al.</i> (1991) [47]. |
| 18 | Relative Aerobics Capacity (RAC) (w/kg), | Nguyen Thi Minh Cam (2010) [26], Dang Ha Viet (1999) [10], Dang Ha Viet (2007) [11], Mancha-Triguero, D. <i>et al.</i> (2019) [12], Inbar. O. <i>et al.</i> (1996) [44], Delextrat A <i>et al.</i> (2008) [13], Apostolidis N <i>et al.</i> (2004) [37], Gharbi Z <i>et al.</i> (2015) [45], Zupan MF <i>et al.</i> (2009) [46], Gál-Pottyondy <i>et al.</i> (2021) [24], Macdougall <i>et al.</i> (1991) [47]. |

As seen in Table 1, 18 tests were chosen for professional fitness assessments, including 15 pedagogical tests and 03 functional tests as follows.

- **Pedagogical tests:** 20-meter sprint (s), vertical jump (cm), running vertical jump (cm), weight lifting (kg), bench press (kg), sit-and-reach test (cm), two-handed overhead basketball throw (m), T-test (s), hexagonal obstacle jump (s), drill test (s), maximum ball passes in 30 seconds (points), two-point basketball shooting from 5 positions in 1 minute (points), three-point basketball shooting from 5 positions in 1 minute (points), defensive slide (s), dribbling (s).
- **Functional tests:** Relative Peak Power Output (RPP) (w/kg), Relative Aerobics Capacity (RAC) (w/kg), VO_{2max} (ml/kg/minute).

3.2 Surveys with experts, coaches, and lecturers

Based on the obtained results, the researcher implemented the surveys with experts and basketball trainers (see Appendix 3). The surveys occurred at two separate time points, with a 20-day interval between them. They also included the same set of tests, subjects, and answering approach as follows.

- Very Necessary: 5 points,
- Necessary: 4 points,
- Neutral: 3 points,
- Unnecessary: 2 points,
- Very Unnecessary: 1 point.

A total of 20 responses were gathered in the first survey which were made by four experts and managers (representing 20% of the total), ten coaches (50%), and six basketball lecturers (30%).

In the second survey, the study collected 19 valid answers which were of four experts and managers (21.05%), ten coaches (52.63%), and five lecturers (26.32%). Both interviews received 39 votes, including eight experts and managers (20.51%), 20 coaches (51.28%), and 11 basketball lecturers (28.21%).

The results of the two surveys were then analysed with the index χ^2 to discover how similar they were. Table 2 displays the outcomes.

Table 2: Comparison of the two surveys' results

| Test | | 1st | | 2nd | | χ^2 | P |
|------|--|--------------|-------|--------------|-------|----------|--------|
| | | N = 20 | | N = 19 | | | |
| | | Total scores | % | Total scores | % | | |
| 1 | 20-meter sprint (s) | 86 | 86.00 | 78 | 82.11 | 0.22 | > 0.05 |
| 2 | Vertical jump (cm) | 92 | 92.00 | 88 | 92.63 | 0.05 | > 0.05 |
| 3 | Running vertical jump (cm) | 76 | 76.00 | 71 | 78.89 | 0.09 | > 0.05 |
| 4 | Weight lifting (kg) | 78 | 78.00 | 70 | 77.78 | 0.08 | > 0.05 |
| 5 | Bench press (kg) | 78 | 78.00 | 70 | 77.78 | 0.08 | > 0.05 |
| 6 | Two-handed overhead basketball throw (m) | 78 | 78.00 | 70 | 77.78 | 0.08 | > 0.05 |
| 7 | Sit-and-reach test (cm) | 86 | 86.00 | 78 | 82.11 | 0.22 | > 0.05 |
| 8 | T-test (s) | 96 | 96.00 | 93 | 97.89 | 0.06 | > 0.05 |
| 9 | Hexagonal obstacle jump (s) | 85 | 85.00 | 80 | 84.21 | 0.04 | > 0.05 |
| 10 | Drill Test (s) | 95 | 95.00 | 91 | 95.79 | 0.03 | > 0.05 |

| | | | | | | | |
|----|---|----|-------|----|-------|------|--------|
| 11 | Maximum ball passes in 30 seconds (points) | 86 | 86.00 | 78 | 82.11 | 0.22 | > 0.05 |
| 12 | Two-point basketball shooting from 5 positions in 1 minute (points) | 91 | 91.00 | 86 | 90.53 | 0.07 | > 0.05 |
| 13 | Three-point basketball shooting from 5 positions in 1 minute (points) | 96 | 96.00 | 93 | 97.89 | 0.06 | > 0.05 |
| 14 | Defensive slide (s) | 96 | 96.00 | 93 | 97.89 | 0.06 | > 0.05 |
| 15 | Dribbling (s) | 96 | 96.00 | 93 | 97.89 | 0.06 | > 0.05 |
| 16 | VO ₂ max (ml/kg/minute). | 96 | 96.00 | 93 | 97.89 | 0.06 | > 0.05 |
| 17 | Relative Peak Power Output (RPP) (w/kg), | 95 | 95.00 | 91 | 95.79 | 0.03 | > 0.05 |
| 18 | Relative Aerobics Capacity (RAC) (w/kg), | 95 | 95.00 | 91 | 95.79 | 0.03 | > 0.05 |

Table 2 shows that the results of both surveys have $\chi^2_{\text{calculated}} < \chi^2_{\text{table}} = 3.84$ at $P > 0.05$, providing that the difference between the two comparative values is not statistically significant at the $P > 0.05$ threshold. Hence, it could be inferred that the experts, managers, coaches, and lecturers were highly consistent in their responses.

Then the study chose the tests with a total score greater than 84 points in the first survey and 79.8 points in the second survey (very necessary). Finally, 14 tests were chosen, including 11 pedagogical tests and 03 functional tests, for the professional fitness assessment of the Ho Chi Minh City female basketballers.

- **Pedagogical tests:** 20-meter sprint (s), vertical jump (cm), sit-and-reach test (cm), hexagonal obstacle jump (s), T-test (s), drill test (s), maximum ball passes in 30 seconds (points), two-point basketball shooting from 5 positions in 1 minute (points), three-point basketball shooting from 5 positions in 1 minute (points), defensive slide (s), dribbling (s).
- **Functional tests:** Relative Peak Power Output (RPP) (w/kg), Relative Aerobics Capacity (RAC) (w/kg), VO₂max (ml/kg/minute).

3.3 Reliability of the tests

Reliability is the degree of confidence that the measured result (through a test) accurately reflects the real status of a specific physical capacity. The reliability of a test is defined by the degree of resemblance between the results obtained repeatedly on the same object under the same condition. A highly reliable test is one in which each person's test results are consistent across multiple tests under the same condition.

The same test is performed on the same object under the same condition, yet its results can fluctuate slightly. The primary causes of the variation include:

- Changes in the state of the participants (fatigue, motivation, focus, etc.)
- Changes in external conditions (temperature, wind, humidity, power source...) and/or unstandardized instruments of measurement – associated with the term "natural error in measurement".
- Changes in the state of the person conducting the measurement or evaluation.
- Unstandardized testing techniques.

A popular way to determine the reliability of a test is to repeat it (Retest). This approach is designed to explore the degree of similarity or correlation between the two tests. The first (test) and the second time (re-test) were performed under the same condition with the interval sufficient for the full recovery. It is important to note that the measurement should not be mistaken for the real changes in the mark under study. The ideal respite is often one to seven days. The two sets of findings (test and retest) are then compared using quantitative or ranked correlation analysis based on the measurement mark's attributes. The correlation coefficient is used as *the reliability coefficient*.

The study didn't check the reliability of the functional tests, as their dependability had been confirmed with modern instruments. Hence, only pedagogical tests needed to be assessed to ensure the reliability of their application in the evaluation of the professional fitness of female basketballers. They were tested twice at five-day intervals and same condition. Then the reliability coefficient (r) of the tests was determined. Table 3 below shows the results.

Table 3: Reliability coefficient of the professional fitness evaluation of the female athletes of the Ho Chi Minh City basketball team

| No. | Test | 1st | | 2nd | | Reliability coefficient (Pearson) | |
|-----|---|-----------|------|-----------|------|-----------------------------------|------|
| | | \bar{X} | S | \bar{X} | S | r | sig |
| 1 | 20-meter sprint (s) | 3.73 | 0.20 | 3.72 | 0.19 | 0.99 | .001 |
| 2 | Vertical jump (cm) | 48.56 | 4.41 | 49.19 | 3.95 | 0.95 | .001 |
| 3 | Hexagonal obstacle jump (s) | 15.91 | 0.27 | 15.90 | 0.25 | 0.98 | .001 |
| 4 | Sit-and-reach test (cm) | 20.88 | 3.90 | 20.94 | 3.68 | 0.98 | .001 |
| 5 | T-test (s) | 11.55 | 0.27 | 11.55 | 0.25 | 0.99 | .001 |
| 6 | Drill Test (s) | 33.19 | 1.84 | 33.18 | 1.83 | 0.99 | .001 |
| 7 | Maximum ball passes in 30 seconds (points) | 50.50 | 2.03 | 50.56 | 2.19 | 0.98 | .001 |
| 8 | Two-point basketball shooting from 5 positions in 1 minute (points) | 16.00 | 2.31 | 16.13 | 2.36 | 0.97 | .001 |
| 9 | Three-point basketball shooting from 5 positions in 1 minute (points) | 9.63 | 1.63 | 9.88 | 1.75 | 0.97 | .001 |
| 10 | Defensive slide (s) | 11.69 | 0.45 | 11.70 | 0.44 | 0.99 | .001 |
| 11 | Dribbling (s) | 8.67 | 0.39 | 8.66 | 0.37 | 0.99 | .001 |

Table 3 indicates that all fitness tests possess a reliability coefficient greater than 0.9 and sig = 0.001. It can be concluded that fitness tests are sufficiently reliable.

Through the steps of documentation synthesis, surveys, and checking the reliability, the research identified 14 professional fitness tests for female athletes Ho Chi Minh City basketball team, including:

- **Pedagogical tests:** 20-meter sprint (s), vertical jump (cm), sit-and-reach test (cm), hexagonal obstacle jump (s), T-test (s), drill test (s), maximum ball passes in 30 seconds (points), two-point basketball shooting from 5 positions in 1 minute

(points), three-point basketball shooting from 5 positions in 1 minute (points), defensive slide (s), dribbling (s).

- **Functional tests:** Relative Peak Power Output (RPP) (w/kg), Relative Aerobics Capacity (RAC) (w/kg), VO_{2max} (ml/kg/minute).

4. Discussion

The study selected 14 professional fitness assessment tests that were believed to thoroughly cover important factors in basketball practice, such as speed [20-meter sprint (s), defensive slide (s), dribbling (s)], strength [vertical jump (cm), hexagonal obstacle jump (s)], flexibility [sit-and-reach test (cm)], agility [T-test (s), the maximum ball passes in 30 seconds (points), two-point basketball shooting from 5 positions in 1 minute (points), three-point basketball shooting from 5 positions in 1 minute (points)], aerobic endurance [VO_{2max} (ml/kg/minute)], anaerobic endurance [drill test (s), Relative Peak Power Output (RPP) (w/kg), Relative Aerobics Capacity (RAC) (w/kg)].

The finding also revealed that the fourteen selected tests are often recommended by domestic and foreign experts (Table 1) such as Le Nguyet Nga (2007)[7], Nguyen Ngoc Hai (2004)[8], Nguyen Le Pham Huynh (2006)[9], Dang Ha Viet (1999) [10], Dang Ha Viet (2007)[11], Delextrat A, Cohen D. (2008)[13], Brittenham (1996)[19], Mancha-Triguero, D *et al.* (2019) [12], Gál-Pottyondy *et al.* (2021) [24]. The reason for this might be that the tests are believed to assess all of the physical attributes needed for basketball, including strength, speed, flexibility, agility, general stamina, and professional endurance. Furthermore, the research findings are also consistent with two other scholars. First, Mancha-Triguero, D., and his *et al.* Has compiled 40 research works related to physical fitness assessment for basketball athletes up to November 2018, concluding that other researchers tended to focus on physical qualities. Several typical physical qualities in basketball could be mentioned such as aerobic endurance (21 authors), anaerobic endurance (16 authors), jumping ability (17 authors), speed, and dexterity (14 authors) [12]. Second, Gál-Pottyondy *et al.* (2021) also compiled 93 research papers (PubMed, GoogleScholar, SportDiscuss) from 2000 - 2020, discovering 18 fitness tests that have been applied to professional basketball athletes to evaluate their strength and jumping capability, agility, and flexibility, general and professional endurance [24].

5. Conclusion

14 tests have been discovered to serve the aim of assessing the professional physical fitness among female basketballers of the Ho Chi Minh City team, as follows:

- Speed: 20-meter sprint (s), Defensive slide (s), Dribbling (s), Strength: Vertical jump (cm), Hexagonal obstacle jump (s),
- Flexibility: Sit-and-reach test (cm) Agility: T-test (s), Maximum ball passes in 30 seconds (points), Two-point basketball shooting from 5 positions in 1 minute (points), Three-point basketball shooting from 5 positions in 1 minute (points)

- Endurance: Drill Test (s), VO_{2max} (ml/kg/minute), Relative Peak Power Output (RPP) (w/kg), Relative Aerobics Capacity (RAC) (w/kg)

Conflict of Interest Statement

The authors declare no conflicts of interest.

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