Journal of Physical and Outdoor Education
Vol. 8 No. 1, April 2026, pp. 147-156

# *Utilization of Smartphone Applications in Improving Basketball Jump Shoot Skills*

**Irpan Abdurahman[1], Asep Hadi Hambali[2], Lutfi Nuryasa[3]**

*[1,2,3]Program Studi PJKR, STKIP Bina Mutiara Sukabumi, Jl. Selakaso Kulon, Pasirhalang, Kec. Sukaraja, Kabupaten Sukabumi, Jawa Barat 4319, Indonesia*

**Abstract**

Proper training techniques are essential for developing basketball skills, particularly the *Jump Shoot*, which requires arm muscle strength and shooting accuracy. This study aimed to analyze the effect of arm muscle strength exercises using the *Home Workout No Equipment* application on students' *Jump Shoot* performance in extracurricular basketball activities. The research employed a quasi-experimental method with a *One Group Pretest –Posttest Design* conducted over five weeks. The subjects were twelve male students selected through purposive sampling. The research instrument consisted of a *Jump Shoot* skill test administered before and after the treatment. The results showed an increase in the mean score from 4.83 in the *pretest* to 7.50 in the *posttest*. Statistical analysis indicated that the data were normally distributed and homogeneous, with a significant difference between *pretest* and *posttest* results. These findings suggest that arm strength training using a *smartphone*-based application has a positive effect on improving basketball *Jump Shoot* skills. Therefore, *smartphone* workout applications without equipment can serve as an effective alternative to enhance basic sports techniques in school settings.

**Keywords:** arm muscle strength, *smartphone* application, *Jump Shoot*, basketball

## *INTRIDUCTION*

Basketball is a very popular sport and demands a good mastery of basic techniques, one of which is the jump shot. This technique requires muscle strength, hand-eye coordination, and body stability to execute the shot accurately and consistently. Jump shot skills are a crucial indicator of offensive success in basketball because they determine the

Correspondence author: Irpan Abdurahman, STKIP Bina Mutiara Sukabumi, Indonesia.
Email: irpanabd@gmail.com

effectiveness of the resulting score. According to Okazaki, Rodacki, and Satern (2015), the ability to execute a good jump shot depends not only on technique but also on arm muscle strength and biomechanical coordination. The standard hoop height of 3.05 meters requires players to have optimal thrust to direct the ball accurately into the hoop (FIBA, 2024).

In the context of school learning, particularly in extracurricular basketball activities, many students still struggle to produce accurate shots due to weak arm muscle strength and a lack of structured training programs. This situation highlights the need for innovation in training models that are more flexible, engaging, and tailored to the individual student's needs. In line with technological developments, various smartphone applications can now be utilized as digital-based physical training tools. This technology provides students with the opportunity to perform exercises independently with visual guidance and instant feedback, thereby helping them effectively improve their movement technique.

One relevant application is Home Workout No Equipment, a physical exercise application that provides guidance on strengthening the arm, shoulder, and upper body muscles through video tutorials. Previous research has shown that using smartphone applications in exercise training can increase students' motivation, training efficiency, and motor skills (Rahman et al., 2022; Putra & Yulianto, 2021). Based on these findings, this study focused on implementing arm muscle strength training using the Home Workout No Equipment application to improve jump shooting skills in students participating in extracurricular basketball at SMKN 1 Gunung Guruh.

Therefore, the purpose of this study was to determine the effect of arm muscle strength training assisted by the Home Workout No Equipment application on improving students' basketball jump shooting skills. The results of this study are expected to contribute to the development of technology-based training models that are effective, efficient, and easy to implement in the school environment, while also serving as an innovative alternative in physical education learning that is adaptive to the advancements of the digital era.

## *METHOD*

This study used a quasi-experimental method with a One Group Pretest-Posttest Design. This design involves administering treatment to one group of subjects, then taking measurements before (pretest) and after (posttest) treatment to determine any differences in outcomes after the intervention..

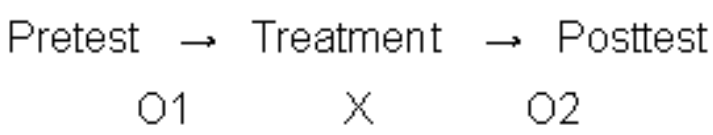


**Figure 1.** ***One Group Pretest –Posttest Design*** **(Sugiyono, 2022)**

Description:

O1 Initial measurement (pretest)

X: Treatment (arm muscle strength training using the Home Workout No Equipment app)

O2: Final measurement (posttest)

This research design was chosen because it is suitable for measuring the effects of a treatment without directly involving a comparison group. The treatment in this study was arm muscle strength training using the Home Workout No Equipment application for five weeks, three times per week.

**Population and Sample**

The population in this study was all male students participating in extracurricular basketball activities at SMKN 1 Gunung Guruh, Sukabumi Regency, in the 2024/2025 academic year. The research sample consisted of 12 male students selected using a purposive sampling technique with the following criteria: (1) actively participating in extracurricular basketball activities for at least one semester, (2) no upper limb injuries, and (3) willingness to participate in the entire training program until the end of the study.

**Data Collection Techniques and Research Instruments**

Data were collected through a Jump Shoot skill test administered twice: before (pretest) and after (posttest) the training program. The data collection instrument used was a Jump Shoot ability test, which measures the number of successful shots within a specified time limit. The exercise program was provided in a structured manner through video tutorials in the Home Workout No Equipment application, which focused on strengthening the arm, shoulder, and upper body muscles without the use of assistive devices. Each exercise session lasted 30–45 minutes and was directly monitored by the researcher to ensure appropriate exercise implementation. Data Analysis The measurement data were analyzed using descriptive and inferential statistical approaches. Descriptive analysis was used to describe the mean, standard deviation, minimum, and maximum values of the pretest and posttest results. Furthermore, a normality test was performed using the Kolmogorov–Smirnov method and a homogeneity test with the Levene Statistic to ensure the data met parametric assumptions. After that, a hypothesis test was conducted using a Paired Sample t-test with a significance level of 0.05 to determine the difference in pretest and posttest results after the treatment was administered. All data analysis was performed

using the latest version of SPSS statistical software.

## *RESULTS AND DISCUSSION*

### Results

This study was conducted on twelve male students participating in extracurricular basketball activities at SMKN 1 Gunung Guruh, Sukabumi. The primary objective of this study was to determine the effect of arm muscle strength training using the Home Workout No Equipment application on improving basketball jump shooting skills. The training program was conducted for five weeks, three times per week, using training guides provided in the smartphone application.

The results showed an increase in jump shooting skill scores after the treatment. Based on descriptive analysis, the average pretest score of 8.08 increased to 11.50 in the posttest, with standard deviations of 1.443 and 1.782, respectively. This improvement indicates that the arm muscle strength training provided through the application improved students' shooting abilities, both in terms of thrust strength and shot accuracy. The measurement data are presented in Table 1 below.

**Table 1. Descrptive Statistics of Jump Shoot Ability**

| Variable | N | Min | Max | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Jump Shoot Ability (*Pretest*) | 12 | 5 | 11 | 8.08 | 1.443 |
| Jump Shoot Ability (*Posttest*) | 12 | 8 | 15 | 11.50 | 1.782 |

The Paired Sample t-test statistical test shows a calculated t-value of -5.933, smaller than the t-table of -1.677 at a significance level of 0.05. Thus, there is a significant difference between the pretest and posttest results, which means that arm muscle strength training using the Home Workout No Equipment application has an effect on improving students' basketball Jump Shoot skills. Visualization of the increase in average values can be seen in Figure 2.

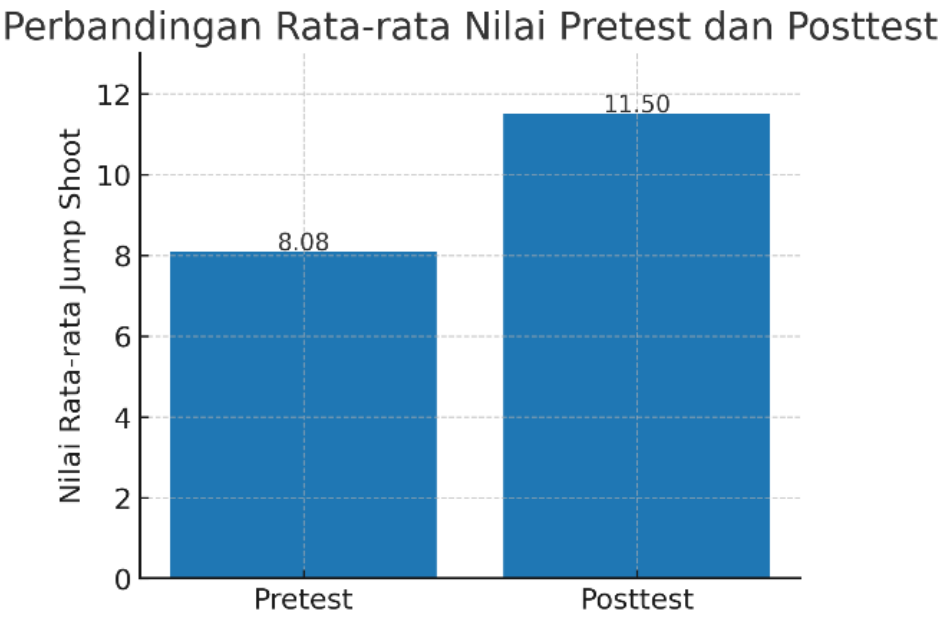


Figure 2. Comparison of Average Pretest and Posttest Scores

These results demonstrate that the application of app-based technology in physical training can have a positive effect on improving sports technical skills. App-guided training not only helps students improve arm muscle strength but also provides visual feedback through easy-to-follow movement guides. This allows students to better understand body position, balance, and hand-eye coordination when performing a jump shot.

**Discussion**

These findings align with research by Rahman, Suryadi, and Wibowo (2022), which found that using smartphone-based training apps significantly improves muscle strength and motor skills. This finding is further supported by research by Irawati and Aziz (2025), which showed that upper and lower body muscle strength significantly contributes to shooting accuracy in basketball. A similar finding was expressed by Okazaki, Rodacki, and Satern (2015), who stated that effective jump shooting technique is strongly influenced by arm muscle strength, body stability, and good biomechanical control.

Furthermore, these findings support research by Boonhan and Boonhan (2023), which found that explosive exercises such as plyometric training can improve vertical thrust strength and body stability when shooting the ball toward the basket. The Home Workout No Equipment app-based workout contains several elements similar to plyometric exercises, such as push-ups, triceps dips, and arm extensions, which strengthen the shoulder and arm muscles. From a practical perspective, this app-based training program has the advantage of being able to be performed anywhere without the need for special equipment.

This provides a solution to limited school facilities and helps students continue training independently. Therefore, this approach has novelty because it integrates digital technology into traditional physical training to improve basic sports technical skills, particularly in basketball.

From a physiological perspective, structured and routine training over five weeks has the potential to create neuromuscular adaptations, where muscles become more efficient at generating the explosive power required for the jump shot. Fitriyanto and Ma'mun (2022) explain that increasing muscle strength through regular training can improve the body's ability to regulate coordination and speed of muscle contraction. Therefore, the results of this study are not only empirically relevant but also supported by biomechanical theory and sports physiology.

The use of the app specifically improves movement efficiency during the critical phases of the jump shot: Preparation Phase: The app helps ensure the base (foot position) is aligned to generate maximum vertical propulsion. Execution Phase: Using the angle tool, athletes can ensure their elbows form a 90-degree angle. This is crucial for creating a curved ball trajectory (arc), thus increasing the chance of the ball entering the hoop. Follow-through Phase: Video recording helps athletes ensure their wrist remains active (snap) after the ball is released, which is often the determining factor in long-range shot accuracy.

The Role of Visual Feedback in Technique Improvement. The improvement of jump shot skills in this study was significantly influenced by the visual feedback feature provided by the app. Unlike abstract verbal instructions from coaches, the smartphone app allows athletes to view slow-motion footage of their own movements and compare them with video models of correct technique. Biomechanically, a jump shot is a complex movement that requires coordination between the jump (elevation) and the release of the ball (release speed). With the help of a motion analysis app, players can identify specific errors in the B.E.E.F. (Balance, Eyes, Elbow, Follow-through) components, such as an excessively wide elbow angle or an unbalanced foot position upon landing. This aligns with observational learning theory, where visual information accelerates the formation of motor memory in the brain.

Specifically, executing a perfect jump shot requires harmonious coordination between lower body strength and hand accuracy. Here's a detailed guide to the jump shot technique, divided into five main phases:

1. Preparation and Balance. Everything starts with the feet. Without a solid foundation, the shot will lose power. Foot Position: Place your feet shoulder-width apart. Your dominant foot (right if you're right-handed) is slightly in front of your other foot.

Knee Bend: Bend your knees to gather energy (like a spring). This position is called the triple threat position. Gaze: Your eyes should be locked on the target (the hoop). Focus on the back of the hoop or the nearest net hook.

2. Holding the Ball (The Grip) Hand position determines your control and rotation of the ball. Lead Hand: Place your dominant hand on top of the ball with your fingers spread wide. Ensure there's a small gap between your palm and the ball (the ball should only touch your fingers and the top pad of your palm). Balance Hand: Place your non-dominant hand next to the ball. Its function is only to keep the ball from falling, not to propel it. Elbow: Ensure the elbow of your lead hand forms a 90-degree angle and is directly toward the hoop (neither in nor out).

3. The Lift Phase The jump provides vertical power so your hands only need to focus on accuracy. Vertical Jump: Jump straight up. Don't jump forward or backward excessively to maintain balance. Lift Point: Lift the ball from your chest up to your forehead simultaneously with the jumping motion. Synchronization: Power should flow from your feet, up to your waist, and then to your arms in one smooth, fluid motion.

4. The Release Point This is the essence of the jump shot. The release occurs when you are at the highest point of your jump. Apex: Release the ball just before or as you reach the highest point of your jump. Arm Movement: Straighten your arm toward the ring at a launch angle of about 45-50 degrees to create an arc. Flick of the Wrist: Quickly bend your wrist forward (like grabbing a cookie from a tall jar). Your index or middle finger should be the last to touch the ball to impart backspin.

5. Follow-Through Movement. Don't immediately withdraw your hand after the ball is released. Pose: Hold your hand position after throwing until the ball touches the ring. Your arm should be straight and your wrist bent downward. Landing: Land with both feet simultaneously (balanced) at approximately the same point as you jumped. This prevents injury and maintains consistency.

Unlike conventional methods, the app has frame-by-frame and slow-motion features. You can measure the exact elbow angle (e.g., exactly 90 degrees) or the highest point of the jump using a digital line. Conventional methods, on the other hand, rely on the coach's vision. The human eye has difficulty capturing detailed movements that occur in milliseconds, so corrections are often approximate (subjective). The app's feedback is more objective than conventional methods. Athletes see concrete evidence of their mistakes through the screen, as their perception of their movements is synchronized with the reality of the video. Conventional (Verbal & Abstract): The coach gives instructions such as "bend

your elbows more deeply." Without seeing themselves, athletes often feel they have followed the instruction when, in fact, the mechanics haven't changed.

Furthermore, conventional methods, unlike apps, offer high-quality training that can be performed anytime. Athletes can record themselves on any field and receive instant evaluation without a coach. Conventional training, on the other hand, relies heavily on schedules and the physical presence of coaches. Without supervision, athletes risk repeating incorrect movements, which reinforces bad habits. Apps offer a progress monitoring feature (data tracking) that stores a weekly recording history. Athletes can compare videos from last month to the current month to see tangible changes in mechanics. In contrast, with conventional training, the evaluation process is often simply memorized or recorded manually in journals, which lack a visual representation of technical changes. The time efficiency of training using smartphone apps accelerates motor learning. Because corrections are provided immediately after the movement (immediate feedback), the brain adapts neuromuscular coordination more quickly. Conventional training, on the other hand, requires athletes to take longer to understand complex technical errors due to limited communication channels.

The results of this study support previous findings that Android-based learning media have a high level of validity and effectiveness in physical education. Smartphone apps act as "virtual coaching assistants," providing access to information without the constraints of time and place. Players tend to be more motivated to practice independently because apps often present material in an interactive and easy-to-understand format. This high level of motivation is directly proportional to the number of repetitions performed, resulting in a gradual increase in shooting accuracy. The use of this technology eliminates athletes' dependence on face-to-face sessions with coaches.

One interesting finding is that apps equipped with AI or sensor analysis technology can provide instant corrections. This minimizes the occurrence of "automated incorrect movements." When a player makes a mistake in the angle of their shot, the app provides a signal or numerical data that forces them to immediately adjust on their next attempt. This trial and error process, guided by accurate data from the app, makes motor learning more efficient than conventional training methods that rely solely on instinct or the coach's visual perception.

## *CONCLUSION*

Based on the results of the research that has been conducted, it can be concluded that arm muscle strength training using the Home Workout No Equipment application has a significant effect on improving Jump Shoot skills in male students participating in the basketball extracurricular at SMKN 1 Gunung Guruh. The training program implemented for five weeks with a frequency of three times per week has been proven to be able to significantly increase the average shooting ability of students. The results of this study indicate that the use of smartphone-based training applications without special equipment can be an alternative training method that is effective, flexible, and easy to implement in the school environment. In addition to improving muscle strength and shooting accuracy, the application of digital technology in sports training can also foster learning motivation and support the physical education learning process that is more adaptive to technological developments.

## *REFERENCES*

Almeida, M. A., & Silva, J. P. (2020). The impact of strength training on basketball shooting accuracy. *International Journal of Sports Science and Coaching*, 15(4), 512–520. https://doi.org/10.1177/1747954120940182

Arikunto, S. (2021). *Prosedur penelitian: Suatu pendekatan praktik*. Jakarta: Rineka Cipta.

Boonhan, P., & Boonhan, S. (2023). The effect of plyometric training on jump shot ability at various distances. *Academic Journal of Thailand National Sports University*, 15(2), 63–76. https://he02.tci-thaijo.org/index.php/TNSUJournal/article/view/258549

Fédération Internationale de Basketball (FIBA). (2024). *Official basketball rules 2024*. Switzerland: FIBA.

Fitriyanto, R., & Ma'mun, A. (2022). The effect of arm strength exercises on upper body explosive power among young athletes. *Journal of Physical Education and Sports*, 10(3), 143–151. https://doi.org/10.15640/jpes.v10n3a6

Hidayat, M., & Suryana, D. (2022). Effectiveness of *smartphone*-based training applications on students' physical fitness. *Jurnal Teknologi Pendidikan Indonesia*, 9(1), 55–63. https://doi.org/10.52391/jtpi.v9i1.2031

Irawan, R., & Pratama, Y. (2023). Hubungan kekuatan otot lengan dengan ketepatan shooting pada permainan bola basket. *Jurnal Pendidikan Jasmani dan Olahraga*, 8(1), 45–53.

Kurniawan, A., & Firmansyah, H. (2020). Pengaruh latihan kekuatan otot terhadap hasil

tembakan *Jump Shoot* dalam permainan bola basket. *Jurnal Olahraga Kompetitif*, 12(2), 87–95. https://doi.org/10.26858/jok.v12i2.16911

Nugroho, A., & Wicaksono, T. (2021). Digital media utilization in physical education learning during the pandemic era. *Journal of Educational Technology and Instruction*, 4(2), 110–118. https://doi.org/10.21009/jeti.v4i2.19987

Okazaki, V. H., Rodacki, A. L., & Satern, M. N. (2015). A review on the basketball jump shot. *Sports Biomechanics*, 14(2), 190–205. https://doi.org/10.1080/14763141.2015.1052541

Pratama, D., & Kusnadi, R. (2022). Technology-based learning in physical education: Opportunities and challenges. *International Journal of Physical Activity and Sports*, 6(1), 88–97. https://doi.org/10.15294/ijpas.v6i1.46520

Putra, H., & Yulianto, A. (2021). Kontribusi kekuatan otot lengan terhadap akurasi tembakan bola basket. *Jurnal Olahraga Prestasi*, 17(2), 99–108.

Rahman, M., Suryadi, D., & Wibowo, F. (2022). Pemanfaatan aplikasi latihan berbasis *smartphone* untuk meningkatkan keterampilan motorik siswa. *Jurnal Teknologi Pendidikan*, 10(3), 225–234.

Rizky, A., & Nurdin, E. (2023). Application-based learning for improving basketball shooting skills. *Asian Journal of Sport Science*, 14(1), 76–84. https://doi.org/10.5958/ajss.2023.14.1.9

Setiawan, F., & Ramadhani, R. (2023). Penggunaan video feedback dalam pembelajaran teknik shooting bola basket. *Jurnal Pendidikan Olahraga dan Kesehatan*, 11(2), 120–130.

Sofyan, D., & Budiman, I. A. (2022). Basketball jump shot technique design for high school athletes: Training method development. *Journal Sport Area*, 7(1), 47–58. https://doi.org/10.25299/sportarea.2022.vol7(1).7400

Sugiyono. (2022). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta.

Winarno, M. (2020). *Dasar-dasar permainan bola basket*. Malang: Universitas Negeri Malang Press.

Yenes, R., Irawan, R., & Ramadhan, R. H. (2025). Jump shot training method based on massed practice. *Journal of Coaching and Sport Performance*, 13(2), 89–96. https://doi.org/10.56984/8ZG007DHU6E

Yulianti, S., & Hamid, R. (2023). Integration of mobile applications in sports training: A systematic review. *Journal of Sport Technology Research*, 8(4), 155–168. https://doi.org/10.1080/jstr.2023.1556