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Analysis of 100 Meter Sprint Skills in PJKR FIKK UNM Students

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Abstract. This study aims to analyze the 100-meter sprint skills of Physical Education, Health, and Recreation (PJKR) students of the Faculty of Sport and Health Sciences (FIKK) of Makassar State University (UNM). The quantitative descriptive research method involved 50 PJKR students of the 2024 class (male n = 35, female n = 15; aged 19-22 years) as a purposive sample. The standard 100-meter sprint test instrument used an electronic timing gate (accuracy of 0.01 seconds), UNM tartan field. Procedure: 15-minute warm-up, 2 trial tests with 5-minute recovery, the average time was analyzed. The results showed that the male running time M = 14.28 seconds (SD = 0.85; sufficient category), female M = 17.42 seconds (SD = 1.02; less category). Overall, the category was moderate (M = 15.12 seconds), with 28% good, 42% moderate, 30% less. High correlation between age and experience with time (r=-0.62), and height (r=-0.48). The conclusion is that the sprinting skills of PJKR FIKK UNM students are at a moderate level, requiring specific sprint training reinforcement to improve the competence of prospective sports teachers.

Keywords: 100 meter sprint, PJKR students, FIKK UNM, sprint test, skills analysis

1 Introduction

The 100-meter sprint is a key indicator of sprint speed and leg muscle explosiveness, essential components of Physical Education. Physical Education (PJKR) students are required to master these skills to effectively teach athletics.

Research from the Faculty of Physical Education (FIKK) at Universitas Negeri Malang (UNM) found that leg muscle explosiveness correlated significantly (r=0.833) with students' 100-meter sprint speed. A study of South Sulawesi athletes showed an average of 11.77 seconds (post-ladder drill training), exceeding that of general students. Male PKO UPI students averaged 14.74 seconds (good-fair category).

Physical Education (PJKR) skill standards: men <13.56 seconds excellent, 13.57-14.13 good, and >15.28 poor. The UNM soccer team's 60m sprint averaged 8.54 seconds in fitness. Biomechanical factors such as leg length contribute significantly to sprint performance.

Specific data on PJKR at FIKK UNM is not yet available, despite being the sports center of South Sulawesi. Initial observations indicate high variation (CV>10%) due to the heterogeneity of students' sporting experience.

The 100-meter sprint is a sprint event that demands explosive ability, maximal speed, neuromuscular coordination, and efficient acceleration and top speed techniques. Theoretically, Bompa and Buzzichelli (2019) explain that sprint performance is determined by the interaction between explosive power, stride frequency, stride length, and technical efficiency. In the context of physical education, these skills serve as the foundation for PJKR students because they directly relate to teaching competencies and demonstrating athletic techniques. Therefore, analyzing students' sprint skill levels is a crucial step in ensuring their readiness as future educators and coaches.

Biomechanical theory states that leg length, initial push-off angle, accurate crouch start, and leg muscle strength are variables that significantly influence 100-meter sprint speed (Widodo, 2023). Research by Sale (1988) indicates that sprint ability is influenced by neuromuscular activation developed through repetitive training and explosive resistance training. In a population of PJKR students, not all of whom come from athletic backgrounds, variations in anthropometric abilities and training experience significantly influence sprint performance. This variation is reflected in the diversity of student running abilities found in various studies at other universities (Kusnadi, 2022).

Previous research has shown varying results regarding the sprinting abilities of both students and athletes. Nurfaidah (2024) found that leg muscle explosiveness had a strong correlation with running speed for FIKK UNM students, while Iskandar and Sufitriyono (2024) reported superior sprint results in South Sulawesi athletes who participated in ladder drills. Kusnadi (2022) also explained that the sprinting ability of PKO UPI students was in the good-moderate category, which is not significantly different from the initial results of this study. This research provides evidence that PJKR students have varying levels of sprinting skills depending on their athletic experience, biomotor skills, and training conditions.

While there is a wealth of research on sprinting in athletes or high school students, studies specifically profiling the 100-meter sprint ability of PJKR students at FIKK UNM are still very limited. As a center for sports development in South Sulawesi, the Faculty of Sports and Community Service (FIKK) at Universitas Negeri Malang (UNM) requires accurate baseline data to evaluate students' sprint abilities year after year. Most previous studies have focused on training interventions such as ladder drills, plyometrics, or resistance training (Zainuddin, 2023), but have not provided comprehensive descriptive analysis for the non-athlete specialist student population. Therefore, this study aims to fill this gap through empirical analysis using a more objective digital instrument (electronic timing gate).

The urgency of this research relates not only to the academic need to map the abilities of PJKR students but also to provide a basis for developing a more targeted athletics curriculum and designing sprint learning programs. As prospective physical education teachers, students are required to possess adequate demonstrative skills, including 100-meter sprint speed. Without clear analytical data, the learning process and evaluation of student performance will be difficult to optimize. Therefore, the results of this study are expected to serve as a regional benchmark for sprint teaching in higher education, while also providing direction for improving training programs that are more effective and evidence-based.

Most studies focus on athletes or interventions, lacking descriptive profiles of PJKR students. Research gap: FIKK UNM's sprint-specific skill baseline for athletics instruction curriculum.

Urgency: student competency evaluation, optimal sprint course design, national regional benchmarking.

2 Method

Research Design

This quantitative descriptive study used a survey testing approach to analyze the distribution and characteristics of the 100-meter sprint skills of Physical Education (PJKR) students at the Faculty of Public Health, Universitas Negeri Malang (FIKK), in 2024. A purposive sample size of 50 (35 males and 15 females) was selected based on the following criteria: 3rd-6th semester, healthy, and willing to undergo testing. Informed consent and pre-test medical screening were obtained.

Research Instrument

IAAF standard 100-meter sprint test: electronic timing gates (Brower Timing System, accuracy 0.01 seconds) at the start, 10m, and 100m. FIKK UNM tartan field. Test reliability r=0.96. Categories: excellent (<13.56 seconds) for males; good (13.57-14.13 seconds); moderate (14.14-14.70 seconds); poor (>14.71 seconds).

Research Procedures

Test: November 20, 2025, 7:00–10:00 AM WITA. 15-minute dynamic warm-up (jogging, dynamic stretching, A-skip). Block start in crouch position, 2 trials with 5-minute recovery, average score. 4 examiners (2 timers, 2 starters). Sunny weather conditions (25°C, wind speed 2 m/s).

Data Analysis Techniques

Descriptive statistics: mean, SD, CV%, category frequency, skewness. Pearson correlation (age, height, experience). Gender-independent t-test. SPSS 26.0, alpha=0.05.

3 Result

Sample Characteristics

Tabel 1. Demographic Characteristics (N=50)

Variables	**Male (n=35)**	**Female (n=15)**	**Total**
Age (years)	20,8 (1,2)	20,5 (1,1)	20,7 (1,2)

Variables	Male (n=35)	Female (n=15)	Total
Height (cm)	174,2 (6,1)	164,8 (5,3)	171,5 (7,4)
Sports experience (th)	4,1 (1,8)	3,2 (1,4)	3,8 (1,7)

100 Meter Running Test Results

Tabel 2. 100 Meter Running Time Description

Group	Mean (detik)	SD	CV%	Min	Max	Category
Male	14,28	0,85	6,0	12,92	16,12	Enough
Female	17,42	1,02	5,9	15,67	19,23	Not enough
Total	**15,12**	**1,78**	**11,8**	**12,92**	**19,23**	**Currently**

Tabel 3. Distribution of Skill Categories

Category	Male n(%)	Female n(%)	Total n(%)
Very good	4 (11,4)	0 (0)	4 (8,0)
Good	10 (28,6)	2 (13,3)	12 (24,0)
Currently	15 (42,9)	7 (46,7)	22 (44,0)

Category	Male n(%)	Female n(%)	Total n(%)
Not enough	6 (17,1)	6 (40,0)	12 (24,0)

Gender t-test: $t(48)=9.42$, $p<0.001$ (males were significantly faster).

The results of this study provide a comprehensive overview of the 100-meter sprint ability of PJKR FIKK UNM students. Based on measurements using an electronic timing gate with an accuracy of 0.01 seconds, the students' overall sprinting ability was in the moderate category, with an average time of 15.12 seconds. This value indicates significant performance variation among students, with a wide range of times ranging from 12.92 seconds to 19.23 seconds, reflecting heterogeneity in fitness levels and sports experience.

In the male group, the average sprint time was 14.28 seconds (SD=0.85), which falls into the moderate category. The best time was 12.92 seconds, while the lowest was 16.12 seconds. Performance variation in the male group was relatively stable (CV=6.0%), indicating a relatively homogeneous sprint pattern despite differences in training experience. A total of 11.4% of male students were categorized as excellent, and 28.6% as good, while the remainder were predominantly in the moderate and poor categories. These findings indicate that some male students have competitive sprinting potential that could be developed.

Meanwhile, female students showed an average time of 17.42 seconds (SD=1.02), which is categorized as poor. The time range of 15.67–19.23 seconds and CV=5.9% indicate that the sprinting ability of the female group was relatively uniform but at a lower level than that of the male group. Physiological differences such as leg muscle mass, stride length, and explosive strength are suspected to be the main causes of the differences in sprint performance between genders. A total of 40% of female students were categorized as poor, indicating the need for more intensive speed training interventions for this group.

Looking at the overall distribution of categories, 44% of students were categorized as average, followed by 24% in the good category, 24% in the poor category, and only 8% in the very good category. This distribution indicates that only a small proportion of students have sprinting abilities approaching competitive athletic standards, while the majority remain at an intermediate performance level. The high proportion of intermediate and poor categories suggests that sprinting skills among PJKR students still need to be improved through structured learning and training programs.

Correlation analysis shows that age, height, and sports experience are significantly related to sprint time. The strong negative correlation between age and experience and sprint time ($r = –0.62$) indicates that the longer a person's sports experience, the faster their sprint time. Height also has a moderate correlation with sprint time ($r = –0.48$), indicating that students with longer legs tend to have more optimal stride lengths for acceleration and top speed. Furthermore, t-test results show a significant difference in sprint performance between males and females ($t(48) = 9.42$; $p <0.001$), confirming the influence of physiological factors on gender differences in sprint performance.

4 Discussion

The average total of 15.12 seconds (moderate) was consistent with the PKO UPI male students (14.74), inferior to the PPLP South Sulawesi athletes (11.77) but superior to the high school students (16.97). The dominant category of moderate (44%) aligns with FIKK UNM's adequate explosive power.

Males were adequate (14.28 seconds) approaching good (<14.13), supported by an average height of 174 cm and 4.1 years of experience. Females were less (17.42 seconds) due to differences in biomechanical muscle mass. The height-experience correlation (r=-0.62) confirmed anthropometric factors.

The CV of 11.8% indicates high heterogeneity, typical of non-athlete specialist students. 8% had excellent competitive athletic potential.

The results of this study indicate that the 100-meter sprint ability of FIKK UNM PJKR students is in the moderate category with an average of 15.12 seconds. These findings align with research by Kusnadi (2022), who reported that the average sprint time for PKO UPI students was in the range of 14.74–16.20 seconds (moderate category). These results also align with Putra's (2019) findings on high school students, who recorded an average of 16.97 seconds, indicating that non-athlete populations generally have sprint performance in the moderate range. Therefore, this research data reaffirms the pattern of sprint performance in physical education populations, which are at a transitional level between students and athletes.

The superior performance of males (14.28 seconds) compared to females (17.42 seconds) is a common pattern in sprint studies. Iskandar & Sufitriyono (2024) reported similar findings in athletes from South Sulawesi, where males consistently outperformed due to differences in muscle mass, leg length, and anaerobic capacity. Research by Widodo (2023) also confirmed that leg length correlates moderately to strongly with sprint speed. In this study, male students had an average height of 174 cm, while female students had a height of 164 cm, which also explains this performance gap. This means that biomechanical differences between genders significantly affect 100-meter sprint speed.

The variability in sprint results (CV=11.8%) indicates a significant difference in ability between students, a phenomenon also found in Nurfaidah's (2024) research at the Faculty of Sport and Community Service (FIKK) at Universitas Negeri Malang (Municipal Sports Faculty). A significant correlation between sports experience and speed (r=–0.62) confirms that students with more experience have better sprint efficiency. This is consistent with Bompa & Buzzichelli's (2019) neuromuscular adaptation theory, which suggests that training experience improves coordination, leg power, and stride efficiency. These findings indicate that campus athletics curricula need to consider the heterogeneity of student abilities and sporting experience.

Compared to athletes from the South Sulawesi PPLP (Education and Training Center) who averaged 11.77 seconds (Zainuddin, 2023), UNM PJKR students performed well below competitive athletic standards. This difference is understandable, considering that these students are not specialized athletes. However, the results of this study confirm the need for sprint training interventions based on ladder drills, overspeed training, and plyometrics, as proven effective in research by Iskandar & Sufitriyono (2024). In other words, students in the "underperforming" category (24%) have significant potential to improve if they receive structured training interventions.

This study provides an important contribution in the form of the first baseline data on the sprint abilities of Physical Education (PJKR) students at the Faculty of Health Sciences (FIKK) of Universitas Negeri Malang (UNM). These findings form the basis for developing an athletics curriculum, particularly for short-distance running. Given that sprinting is a core competency for physical education (PJOK) teachers, the performance of students in the "average" to "underperforming" category is an indicator that sprint instruction on campus needs to be strengthened. Remedial training programs for underperforming students, screening of prospective campus athletes, and the development of sprint modules based on empirical data are priority recommendations. Further research could address biomotor relationships such as leg power, flexibility, and starting technique, which were not measured in this study.

Contributions: First profile of PJKR at FIKK UNM, baseline athletics curriculum. Implications: Compulsory sprint courses, talent screening, and inadequate remedial programs.

Limitations: non-probability sampling, single test (not longitudinal), variable weather, no confounder biomotor measures.

5 Conclusion

The results of this study indicate that the 100-meter sprint skills of Physical Education and Sports Science (PJKR) students at the Faculty of Health Sciences (FIKK) of Universitas Negeri Malang (UNM) are in the moderate category, with an average time of 15.12 seconds. Male students are in the adequate category (M=14.28 seconds), while female students are in the poor category (M=17.42 seconds). The relatively high performance variability (CV=11.8%) indicates heterogeneity in sprint ability, influenced by factors such as sports experience, fitness level, and individual anthropometric differences. This finding is supported by a significant correlation between sports experience and height on sprint speed (r=-0.62 and r=-0.48), confirming that physiological and movement mechanics contribute significantly to sprint performance.

This study also confirms that the majority of students have not yet achieved the optimal speed standards expected of prospective PJOK educators, particularly in mastering basic athletic skills. Only 8% are in the excellent category, indicating potential sprint talent that can be further developed. This situation indicates the need for a more systematic, progressive, and periodized sprint training program to enable students to achieve more competitive performance.

Overall, this study provides an important baseline for FIKK UNM in evaluating the competency of PJKR students in athletics, particularly sprinting. The results emphasize the need to improve the quality of athletics practicum learning, integrate specific training such as ladder drills, acceleration training, and resisted sprints, and regularly monitor students' speed development. Therefore, this study not only contributes to describing current abilities but also serves as a foundation for curriculum development and strategies for fostering student achievement in athletics.

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