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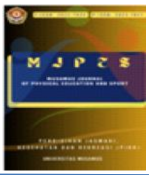

Physical Fitness Profile of Junior Secondary School Students Participating in Extracurricular Football: A Cross-Sectional survey

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Abstract

Objectives: This study described the overall and component-specific physical fitness profiles of students participating in an extracurricular football program at SMP Negeri 1 Sindue Tombusabora, Central Sulawesi, Indonesia.

Materials and Methods: A quantitative descriptive cross-sectional survey was conducted with all 15 male students aged 13–15 years who regularly participated in the school football program. Total sampling was used. Physical fitness was assessed with the Indonesian Physical Fitness Test (Tes Kebugaran Jasmani Indonesia, TKJI) for boys aged 13–15 years, comprising a 50-m sprint, 60-s pull-ups, 60-s sit-ups, vertical jump, and 1,000-m run. Raw performances were converted to the official five-point TKJI scores and summed to classify overall fitness. Data were summarized using means, standard deviations, ranges, frequencies, and percentages.

Results: Overall fitness was predominantly moderate: nine students (60.00%) were classified as moderate, five (33.33%) as poor, and one (6.67%) as good; no student was classified as very good or very poor. Mean performances were 7.07 ± 1.00 s for the 50-m sprint, 2.73 ± 2.25 repetitions for pull-ups, 34.40 ± 7.65 repetitions for sit-ups, 40.80 ± 5.12 cm for the vertical jump, and 302.60 ± 68.70 s for the 1,000-m run. Speed and abdominal muscular endurance were the strongest components, whereas upper-body muscular endurance and aerobic endurance showed the largest deficits.

Conclusions: Participation in extracurricular football alone did not correspond to uniformly high physical fitness in this small school cohort. The results support a periodized, component-specific program emphasizing progressive upper-body strength and aerobic conditioning while maintaining speed, core endurance, and lower-limb power. Periodic reassessment is recommended to guide training and monitor individual progress.

Keywords: adolescents; extracurricular sport; football; Indonesian Physical Fitness Test; physical fitness

Introduction

Physical fitness is a multidimensional attribute that includes cardiorespiratory endurance, muscular strength and endurance, speed, power, body composition, and motor competence. In children and adolescents, fitness is not only relevant to sport performance but is also a meaningful marker of current and future health. Higher cardiorespiratory and musculoskeletal fitness during youth is associated with a more favorable cardiovascular risk profile and better functional capacity (Ortega et al., 2008; Ruiz et al., 2009). These associations make school-based fitness monitoring valuable for identifying strengths, detecting deficits, and planning developmentally appropriate physical activity.

The need for systematic monitoring is particularly important during adolescence. Global surveillance shows that most adolescents do not achieve recommended physical activity levels (Guthold et al., 2020), while the World

Health Organization recommends an average of at least 60 minutes per day of moderate-to-vigorous physical activity across the week, including vigorous aerobic and muscle- and bone-strengthening activities on at least three days (Chaput et al., 2020). Objective evidence also indicates that moderate-to-vigorous physical activity is consistently associated with multiple health indicators in school-aged populations (Poitras et al., 2016). However, participation in an organized activity does not automatically guarantee adequate exposure, intensity, progression, or balanced physical development.

Football places repeated demands on sprinting, acceleration, deceleration, jumping, strength, and sustained intermittent running. Accordingly, young players require a combination of neuromuscular and cardiorespiratory qualities rather than excellence in only one component (Stølen et al., 2005). Training that includes appropriately prescribed high-intensity intervals can improve aerobic capacity in healthy young populations (Milanović et al., 2015), while supervised resistance training can safely develop strength and power in youth when technique, volume, and progression are age appropriate (Faigenbaum et al., 2009). Fundamental movement competence is also relevant because it is positively related to physical activity and fitness during childhood and adolescence (Lubans et al., 2010; Smith et al., 2014).

Field-based test batteries offer schools a feasible way to obtain multidimensional fitness profiles. International work has established the utility of standardized field measures for youth, including cardiorespiratory and musculoskeletal tests (Ruiz et al., 2011), and large normative studies demonstrate substantial age- and sex-related variation in performance (Catley & Tomkinson, 2013; Golle et al., 2015; Tambalis et al., 2016; Tomkinson et al., 2017). In Indonesia, the TKJI provides age- and sex-specific scoring for a sequence of field tests. Nevertheless, evidence is limited for small extracurricular football programs in rural or semi-rural school settings, where facilities, training frequency, and coaching resources may differ from those available in organized academies.

The present study therefore aimed to describe the overall and component-specific physical fitness profiles of students participating in extracurricular football at SMP Negeri 1 Sindue Tombusabora. The study was designed to answer two practical questions: (1) how were students distributed across the overall TKJI fitness categories, and (2) which fitness components represented relative strengths and priority areas for training?

Materials and Methods

Study Design

This study used a quantitative descriptive, cross-sectional survey design. It did not test a causal hypothesis or evaluate an intervention; instead, it documented the fitness status of the complete extracurricular football group at one point in time. Data collection was reported as taking place on 18 June 2025 at the school grounds and the football field in Tibo Village, Sindue Tombusabora District, Donggala Regency, Central Sulawesi, Indonesia.

Study Participants

The target population comprised 15 male students aged 13–15 years who regularly participated in the extracurricular football program and represented the school team. Because the population was small, all eligible students were included through total sampling (N = 15). The source document did not report anthropometric characteristics, training history, weekly training volume, playing positions, injury status, or maturation stage; these variables were therefore not introduced into the analysis.

Study Organization

Fitness was assessed using the 2010 TKJI battery for boys aged 13–15 years. The five tests were administered sequentially as one battery: (1) 50-m sprint for running speed; (2) pull-ups completed in 60 s for upper-body muscular endurance; (3) sit-ups completed in 60 s for abdominal muscular endurance; (4) vertical jump for lower-limb explosive power; and (5) 1,000-m run for aerobic endurance. Standard equipment included a

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measured running area, stopwatch, starting flag or whistle, horizontal bar, mat, vertical-jump board, chalk, recording sheets, and writing materials.

Each raw result was converted to a TKJI score from 1 to 5 using the official male 13–15-year thresholds. Component scores were summed to produce an overall score. Overall categories were: 22–25 (very good), 18–21 (good), 14–17 (moderate), 10–13 (poor), and 5–9 (very poor). Test procedures and scoring were kept consistent for all participants.

50-m sprint	Speed	seconds	Lower time = higher score
60-s pull-ups	Upper-body muscular endurance	repetitions	More repetitions = higher score
60-s sit-ups	Abdominal muscular endurance	repetitions	More repetitions = higher score
Vertical jump	Lower-limb explosive power	centimeters	Greater height = higher score
1,000-m run	Aerobic endurance	minutes:seconds	Lower time = higher score

Statistical Analysis

Data were analyzed descriptively. For raw test performances, the mean, sample standard deviation, minimum, and maximum were calculated. TKJI component and overall categories were summarized using frequencies and percentages, calculated as frequency divided by the total sample and multiplied by 100. Because the study included the entire extracurricular group and did not compare groups or test an intervention, inferential statistics were not applied.

Results

The overall TKJI profile was concentrated in the middle and lower categories. Nine of 15 students (60.00%) were classified as moderate, five (33.33%) as poor, and one (6.67%) as good. No participant reached the very good category, and none was classified as very poor.

Very good	22–25	0	0.00
Good	18–21	1	6.67
Moderate	14–17	9	60.00
Poor	10–13	5	33.33
Very poor	5–9	0	0.00

The component-level raw performances are presented in Table 3. The 50-m sprint and sit-up results showed comparatively favorable profiles. By contrast, pull-up performance was low, with a mean of fewer than three repetitions, while the mean 1,000-m time exceeded five minutes.

50-m sprint (s)	7.07 ± 1.00	6.10	9.90
60-s pull-ups (repetitions)	2.73 ± 2.25	1	8
60-s sit-ups (repetitions)	34.40 ± 7.65	25	47
Vertical jump (cm)	40.80 ± 5.12	30	46
1,000-m run (s)	302.60 ± 68.70	199	417

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Table 4 shows the TKJI score distributions for each component. In the sprint, 80.00% of students achieved scores of 4 or 5. In sit-ups, 80.00% also achieved scores of 4 or 5. Conversely, 86.67% obtained scores of 1 or 2 in pull-ups. Vertical-jump performance was concentrated at scores 2 and 3 (93.33%), and 60.00% obtained scores 1 or 2 in the 1,000-m run. These patterns identify speed and abdominal endurance as relative strengths, with upper-body muscular endurance and aerobic endurance as the clearest priorities.

50-m sprint	6 (40.00)	6 (40.00)	2 (13.33)	1 (6.67)	0 (0.00)
60-s pull-ups	0 (0.00)	0 (0.00)	2 (13.33)	6 (40.00)	7 (46.67)
60-s sit-ups	5 (33.33)	7 (46.67)	3 (20.00)	0 (0.00)	0 (0.00)
Vertical jump	0 (0.00)	0 (0.00)	8 (53.33)	6 (40.00)	1 (6.67)
1,000-m run	0 (0.00)	2 (13.33)	4 (26.67)	6 (40.00)	3 (20.00)

Discussion

Principal Findings

The principal finding was that the physical fitness of extracurricular football participants was mostly moderate rather than high. Although every participant was involved in football, one-third remained in the poor overall category and only one student reached the good category. This result is important because organized sport participation can create an expectation of adequate fitness, yet training exposure may be insufficient or may emphasize technical play more than systematic physical development. The result should therefore be interpreted as a profile of this specific cohort, not as evidence that extracurricular football is ineffective.

The multidimensional profile was uneven. Sprint speed and abdominal muscular endurance were relative strengths, whereas pull-up performance and 1,000-m running endurance were weaker. Such variation is plausible in football because short accelerations, changes of pace, and trunk stabilization are repeatedly practiced during play, while vertical pulling actions are uncommon and aerobic development depends strongly on training density, duration, and intensity. Football itself has high physiological demands (Stølen et al., 2005), but recreational or school sessions may not reproduce the structured conditioning load of competitive youth programs.

Comparison with Previous Research

The predominance of moderate overall fitness is consistent with the broader observation that sport participation does not eliminate adolescent inactivity or guarantee that all health-related fitness domains are well developed. Guthold et al. (2020) documented persistently high levels of insufficient activity among adolescents worldwide, and Poitras et al. (2016) showed that health benefits are most consistently linked to sufficient moderate-to-vigorous activity. Thus, session attendance alone is an incomplete indicator; the quantity, intensity, and progression of activity should also be monitored.

The strong sprint profile may reflect repeated exposure to accelerations and short high-intensity actions characteristic of football. Stølen et al. (2005) described football as an intermittent sport requiring repeated running at varied intensities. However, the weaker 1,000-m results indicate that repeated short actions had not translated into uniformly strong aerobic endurance. Meta-analytic evidence suggests that well-designed high-intensity interval training is effective for improving aerobic capacity in healthy young and middle-aged adults (Milanović et al., 2015). For this group, small-sided games, interval runs, and ball-based conditioning could therefore be structured with explicit work-to-rest ratios and progressive volume rather than relying solely on unstructured match play.

Upper-body endurance was the clearest deficit: 86.67% of participants scored in the lowest two TKJI bands for pull-ups. This finding is not surprising because football training tends to prioritize running, ball skills, and lower-limb actions. Nevertheless, balanced youth development should include age-appropriate muscular strengthening. The youth resistance-training position statement by Faigenbaum et al. (2009) supports supervised, technically sound, progressive resistance exercise. Practical options in a school setting include assisted pull-ups, inverted rows, push-ups, crawling patterns, elastic-band rows, and partner-resisted exercises, with progression determined by movement quality and recovery.

Sit-up scores were comparatively high, suggesting better local abdominal endurance. Yet a single repetitive trunk-flexion test should not be interpreted as a complete measure of core function. The program should retain abdominal endurance while broadening trunk training to include anti-extension, anti-rotation, lateral stabilization, and hip control. This wider approach is consistent with developing general movement competence. Reviews by Lubans et al. (2010) and Smith et al. (2014) indicate that fundamental movement skills and physical activity or fitness are positively related, supporting a program that integrates strength, locomotion, landing, balance, and sport-specific skills.

Vertical-jump results were mainly moderate or poor and no participant reached the top two bands. Lower-limb power is influenced by strength, coordination, body size, maturation, and familiarity with jumping technique. Normative studies show that youth fitness performance varies substantially with age and sex (Catley & Tomkinson, 2013; Golle et al., 2015; Tambalis et al., 2016). Consequently, the current values should be compared cautiously with other populations. Progressive jumping and landing tasks, low-volume plyometrics, and basic strength exercises may be appropriate, but training should be individualized and technique-led.

The study also illustrates the value and the limits of field batteries. Ruiz et al. (2011) recommended standardized, feasible tests for school-based health-related fitness assessment, while Tomkinson et al. (2017) demonstrated the usefulness of large reference datasets for youth cardiorespiratory performance. TKJI is locally practical and provides an integrated classification, but differences in test protocols mean that its scores should not be directly equated with international batteries. Repeated use of the same standardized protocol is most useful for monitoring within-school change over time.

Practical Implications

A targeted training plan should address the observed imbalance. Two weekly strength exposures could prioritize pulling strength, total-body control, and lower-limb force production. Aerobic conditioning could be delivered through progressive intervals and carefully designed small-sided games, while sprint drills and trunk endurance are maintained. Training loads should be adjusted to age, technical competence, and recovery. A short reassessment every 8–12 weeks using the same protocol would allow the teacher or coach to evaluate whether specific deficits are improving and to revise the program accordingly. The WHO evidence summary provides a useful general activity target, but school programming should also include planned vigorous and strengthening activities (Chaput et al., 2020).

Strengths and Limitations

A strength of this study was the use of a standardized, multidimensional battery with complete participation by the target extracurricular group. Reporting both raw performances and categorical distributions made the component profile transparent. Several limitations must be considered. The sample was small, male only, and drawn from one school, which limits generalizability. The cross-sectional design cannot establish whether football participation caused the observed fitness levels. No non-participant comparison group was included. Anthropometry, biological maturation, habitual physical activity, nutrition, sleep, training attendance, playing position, and prior injury were not measured. The source data also did not provide measurement-error estimates or assessor reliability. Future research should include larger multisite samples, girls, comparison groups, maturation and training-load indicators, and repeated measurements across a season.

Conclusions

The physical fitness of the 15 students participating in extracurricular football at SMP Negeri 1 Sindue Tombusabora was predominantly moderate. Speed and abdominal muscular endurance were relative strengths, whereas upper-body muscular endurance, aerobic endurance, and lower-limb power required greater attention. These findings support a balanced, periodized program that combines football practice with progressive strength, aerobic, and power development. Regular reassessment using the same standardized procedures is recommended to monitor change and guide individualized training decisions.

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Conflict of Interest

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Research Ethics

The source thesis did not provide sufficient information to verify the approving ethics body, approval number, institutional permission, parental or guardian consent, or participant assent. These details must be completed and verified by the authors before journal submission; no ethics information has been inferred or fabricated in this manuscript.

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