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The Relationship Between Physical Fitness and Reproductive Health in Adolescents Among FIKK UNM Students

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ABSTRACT

This study aimed to examine the relationship between physical fitness and reproductive health among female students at the Faculty of Sports and Health Sciences (FIKK) Universitas Negeri Makassar (UNM), addressing the gap in empirical evidence for university populations specifically trained in sports and health sciences. A quantitative correlational design was conducted involving 120 female undergraduate students aged 18–24 years, selected using purposive sampling. Physical fitness was assessed using standardized field tests, including cardiovascular endurance (1,600 m run), muscular endurance (sit-ups), and flexibility (sit-and-reach). Reproductive health was measured via a validated structured questionnaire covering menstrual regularity, menstrual discomfort, and hygiene practices. Data were analyzed using descriptive statistics and Pearson's correlation coefficients, with significance set at $p < 0.05$. Descriptive analysis showed that 40% of participants had below-average fitness. Regarding reproductive health, 35% reported irregular menstrual cycles, 42% experienced moderate to severe menstrual discomfort, and 43% had suboptimal hygiene practices. Correlation analysis indicated significant relationships between physical fitness and reproductive health: cardiovascular endurance had a moderate positive correlation with menstrual regularity ($r = 0.342$, $p = .001$) and a moderate negative correlation with menstrual discomfort ($r = -0.311$, $p = .002$). Muscular endurance and flexibility also demonstrated significant positive and negative correlations with reproductive health indicators, although to a lesser extent. The findings suggest that higher physical fitness, particularly cardiovascular and muscular endurance, may improve menstrual regularity, reduce discomfort, and support optimal hygiene practices. Integrating structured physical activity programs in campus health initiatives could enhance reproductive well-being among female students. The study includes three tables summarizing descriptive statistics and correlation analyses, and employed validated field tests and structured questionnaires to ensure empirical rigor.

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A. Conception and design of the study;
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D. Manuscript preparation;
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INTRODUCTION

Adolescence and early adulthood are pivotal stages for developing lifelong health behaviors, especially regarding reproductive health (Mena et al., 2019). During this

transition phase, individuals undergo rapid biological and psychosocial changes that influence long-term well-being. Physical fitness, as a foundation of healthy living, plays a critical role not only in general health maintenance but also in supporting reproductive system function (Lee et al., 2022). Empirical evidence shows that inadequate physical fitness may contribute to hormonal imbalance, irregular menstrual cycles, and increased susceptibility to reproductive disorders. For young adults—particularly those studying health and sports sciences—the ability to adopt and model healthy physical habits is essential both academically and professionally (Lee et al., 2022; Kehm et al., 2025).

In Indonesia, the integration of reproductive health literacy and physical activity promotion among university students remains inconsistent (Drenowatz et al., 2021). Within Universitas Negeri Makassar (UNM), students of the Faculty of Sports and Health Sciences (FIKK) are academically positioned to lead in promoting healthy behavior . However, internal health monitoring data from FIKK (2024) indicate that 40% of students fall into the below-average fitness category, based on standardized physical fitness assessments. Additionally, informal campus health screenings recorded elevated menstrual irregularities and suboptimal reproductive hygiene practices among female students in the same cohort (Wiriawan et al., 2020;Butt et al., 2023). These figures highlight an important concern: although students are enrolled in a health and sports focused faculty, a significant proportion may not yet achieve optimal fitness levels that support reproductive well being (Kljajević et al., 2022; Nguyen & Le, 2024).

Recent research emphasizes a strong association between physical activity and reproductive health among young women. A controlled 12-week low-impact aerobic intervention among 120 adolescent girls demonstrated a 27% improvement in reproductive health behaviors and a 32% reduction in self-reported menstrual discomfort (Tsai et al., 2024). Similarly, a study involving 214 university students majoring in physical education reported that individuals with moderate-to-high fitness levels had significantly fewer reproductive health complaints (Aqila et al., 2025). Broader survey-based research across Indonesian universities indicated that physically active female students were up to 45% less likely to report reproductive health issues (Jurnal Pendidikan dan Pengajaran, 2024). International findings support this pattern: a 2024 meta-analysis reported a 30–40% reduction in PMS symptoms among physically active female college students due to improved hormonal balance and stress regulation (Yang et al., 2024).

Despite these findings, most studies focus on adolescents or general university populations and do not specifically examine sports-science students who are expected to embody high physical and health standards. In the context of FIKK UNM, no published research has yet evaluated the explicit correlation between physical fitness and reproductive health using validated instruments and empirical measurements. The existing literature does not address whether students with academic training in sports and health sciences demonstrate superior reproductive health outcomes, nor does it explore whether fitness gaps in this population translate into measurable reproductive health challenges. This represents a clear gap in both theoretical understanding and applied educational practice.

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To address this gap, the present study investigates the relationship between physical fitness and reproductive health among FIKK UNM students. Research questions include: How do physical fitness levels relate to reproductive health indicators among students in a health and sports education faculty? and Do students with higher fitness levels exhibit better reproductive health outcomes? The objective is to analyze physical fitness status and reproductive health profiles to determine their association within this specific academic context. The novelty of this study lies in its targeted examination of sports-and-health-focused university students using empirical measures, providing context-specific evidence for designing integrated campus-based interventions to enhance reproductive well-being through physical fitness strategies.

METHODS

This study employed a quantitative correlational design to investigate the relationship between physical fitness and reproductive health among students of the Faculty of Sports and Health Sciences (FIKK) at Universitas Negeri Makassar (UNM). This design was selected as it allows measurement of variables and examination of associations between physical fitness indicators and reproductive health outcomes without manipulating research conditions, making it suitable for answering the research objectives (Han et al., 2022; Ulin Nikmah et al., 2023).

The population consisted of active undergraduate students enrolled in the FIKK UNM during the 2024/2025 academic year. Using purposive sampling, participants were selected based on the following criteria: female students aged 18–24 years, actively enrolled in academic activities, not pregnant, not currently undergoing treatment for chronic reproductive or endocrine disorders, and willing to participate by providing informed consent. Based on institutional enrollment data, the accessible population included approximately 850 eligible female students, from which a minimum sample of 120 respondents was targeted—ensuring statistical adequacy for correlational analysis. This sample size aligns with similar studies in reproductive and exercise science.

Data collection was conducted in two stages: physical fitness assessment and reproductive health questionnaire administration. Physical fitness data were collected using standardized field test protocols commonly applied in sports science research, including cardiovascular endurance (1,600-meter run test), muscular endurance (one-minute sit-up test), and flexibility (sit-and-reach test) (Batista et al., 2017; Bao, 2022). These instruments are widely validated within sports medicine and physical education research (Özcan et al., 2024). Reproductive health data were obtained using a structured and validated questionnaire adapted from established reproductive health assessment tools, including the Menstrual Symptom Questionnaire (MSQ) and items assessing menstrual regularity, hygiene practices, and reproductive discomfort frequency (Li et al., 2023). Prior to data collection, a pilot test involving 20 students was conducted to verify instrument clarity and reliability, yielding an internal consistency value above the acceptable threshold (Cronbach's alpha > 0.70)(Chesney & Tasto, 1975; Negriff et al., 2009).

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Research procedures were implemented systematically on campus. After approval from the university ethics committee, participants were recruited through class announcements and online academic platforms. Physical fitness measurements were conducted in the FIKK sports field and laboratory under supervision of trained assessors to ensure standardization. Respondents completed the reproductive health questionnaire immediately following fitness testing in a controlled classroom environment to minimize reporting bias. To protect confidentiality, participant identities were coded, and all individual responses were handled discreetly and securely.

Data analysis was performed using descriptive and inferential statistics with SPSS software (Antonius, 2017). Descriptive analysis included means, standard deviations, and frequency distributions to summarize physical fitness and reproductive health profiles. Prior to inferential testing, data were examined for normality, homogeneity, and completeness. Pearson's product–moment correlation coefficient was used to assess the association between physical fitness indicators and reproductive health variables, consistent with the study's quantitative correlational design. Statistical significance was set at $p < 0.05$. All procedures and analytical steps were documented to allow replication (Ajar et al., 2021).

RESULTS AND DISCUSSION

Result

Physical Fitness Profile of Participants

To provide an overview of the participants' physical condition, descriptive statistics were first calculated for all measured fitness components. This allows a clear understanding of the general fitness status within the study population before exploring its relationship with reproductive health. A total of 120 female students participated in this study. The physical fitness assessments included cardiovascular endurance, muscular endurance, and flexibility. Table 1 summarizes the descriptive statistics of these measurements. The results show that 40% of participants were classified as below-average fitness, consistent with previous internal reports:

Table 1.
Physical Fitness Levels of FIKK UNM Students

Fitness Component	Mean ± SD	Classification (%)
Cardiovascular Endurance (1,600 m run, seconds)	7.58 ± 1.12	Below Average: 45% Average: 40% Above Average: 15%
Muscular Endurance (sit-ups, repetitions/min)	32.4 ± 7.6	Below Average: 38% Average: 42% Above Average: 20%
Flexibility (sit-and-reach, cm)	21.3 ± 5.2	Below Average: 37% Average: 43% Above Average: 20%

Source: Based on FIKK UNM student Assessment Data, 2024-2025

Reproductive Health Profile

To evaluate the reproductive health of participants, key indicators related to menstrual health and hygiene were systematically assessed. This approach provides a comprehensive overview of reproductive well-being among the study population,

forming the basis for analyzing its relationship with physical fitness. Reproductive health was assessed using a structured questionnaire evaluating menstrual regularity, menstrual discomfort, and hygiene practices. Table 2 illustrates the overall distribution of reproductive health indicators among the participants, including aspects such as menstrual regularity, menstrual discomfort, and hygiene practices.

Table 2.
Reproductive Health Indicators of FIKK UNM Students

Reproductive Health Variabel	Frequency (n)	Percentage (%)
Regular Menstrual Cycle	78	65%
Irregular Menstrual Cycle	42	35%
Milad Menstrual Discomfort	45	38%
Moderate to Severe Dsicomfort	50	42%
Optimal Hygiene Practice	68	57%
Suboptimal Hygiene Practices	52	43%

Source: Structured Questionnaire, FIKK UNM, 2004-2025

Based on Table 2, it can be seen that among the 120 female students, 65% reported having a regular menstrual cycle, while 35% experienced irregular cycles. In terms of menstrual discomfort, 38% of participants reported mild symptoms, and 42% experienced moderate to severe discomfort. Regarding reproductive hygiene practices, 57% of students followed optimal hygiene routines, whereas 43% were categorized as having suboptimal practices. These findings highlight that a substantial proportion of students face challenges in menstrual regularity, discomfort management, and hygiene, which may have implications for their overall reproductive health and well-being

Correlation Between Physical Fitness and Reproductive Health

Pearson's correlation analysis was conducted to examine the relationship between physical fitness and reproductive health indicators. As shown in Table 3, higher levels of cardiovascular endurance, muscular endurance, and flexibility were significantly correlated with better reproductive health outcomes, including regular menstrual cycles and fewer symptoms of menstrual discomfort.

Table 3
Correlation Between Physical Fitness Components and Reproductive Health Indicators

Physical Fitness Component	Menstrual Regularity	Menstrual Discomfort	Hygiene Practices
Cardiovasculer Endurance	Pearson Correlation: 0.342* Sig. (2-tailed): .001 N: 120	Pearson Correlation: -0.311* Sig. (2-tailed): .002 N: 120	Pearson Correlation: 0.298* Sig. (2-tailed): .004 N: 120
Muscular Endurance	Pearson Correlation: 0.287* Sig. (2-tailed): .005 N: 120	Pearson Correlation: -0.265* Sig. (2-tailed): .008 N: 120	Pearson Correlation: -0.265* Sig. (2-tailed): .010 N: 120
Flexibility	Pearson Correlation: 0.245* Sig. (2-tailed): .012 N: 120	Pearson Correlation: -0.230* Sig. (2-tailed): .018 N: 120	Pearson Correlation: 0.221* Sig. (2-tailed): .020 N: 120

*Significant at $p < .05$ (2-tailed)
Source: Data analysis, FIKK UNM, 2024–2025

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Based on the table 3 above, it can be concluded that there are statistically significant correlations between physical fitness components and reproductive health indicators among female students at FIKK UNM. Specifically, cardiovascular endurance shows a moderate positive correlation with menstrual regularity ($r = 0.342$, $p = .001$) and a moderate negative correlation with menstrual discomfort ($r = -0.311$, $p = .002$), indicating that higher cardiovascular fitness is associated with more regular menstrual cycles and less menstrual pain. Muscular endurance also demonstrates significant positive and negative correlations with menstrual regularity ($r = 0.287$, $p = .005$) and menstrual discomfort ($r = -0.265$, $p = .008$), respectively. Flexibility exhibits weaker yet still significant correlations with both indicators. These findings suggest that improvements in physical fitness, especially cardiovascular and muscular endurance, may contribute positively to reproductive health outcomes in this population.

Discussion

The present study provides a comprehensive analysis of the relationship between physical fitness and reproductive health among female students at FIKK UNM. The descriptive statistics indicate that a notable proportion of participants exhibited below-average fitness levels across key components, with 45% classified as below-average in cardiovascular endurance, 38% in muscular endurance, and 37% in flexibility. These findings suggest that a substantial segment of the student population may be at risk for reduced physical performance, which could have broader implications for overall health and well-being. Previous internal reports corroborate these observations, highlighting a consistent trend of suboptimal fitness among female students in this setting.

In parallel, the reproductive health assessment revealed that 35% of participants reported irregular menstrual cycles, while 42% experienced moderate to severe menstrual discomfort. Additionally, 43% of students demonstrated suboptimal hygiene practices. These results indicate that a significant portion of students face challenges related to menstrual regularity, pain management, and hygiene maintenance. The findings align with existing literature suggesting that menstrual irregularities and discomfort are prevalent among young adult women, and that these conditions can be influenced by lifestyle factors, including physical activity and fitness levels.

Correlation analysis further elucidated the relationship between physical fitness and reproductive health outcomes. Cardiovascular endurance demonstrated a moderate positive correlation with menstrual regularity ($r = 0.342$, $p = .001$) and a moderate negative correlation with menstrual discomfort ($r = -0.311$, $p = .002$), indicating that higher cardiovascular fitness is associated with more regular cycles and reduced menstrual pain. Similarly, muscular endurance showed significant positive and negative correlations with menstrual regularity ($r = 0.287$, $p = .005$) and menstrual discomfort ($r = -0.265$, $p = .008$), respectively. Flexibility, while showing weaker correlations, still demonstrated significant associations with reproductive health indicators, including menstrual regularity ($r = 0.245$, $p = .012$) and discomfort ($r = -0.230$, $p = .018$). These findings suggest that different components of physical fitness may contribute variably

to reproductive health, with cardiovascular and muscular endurance exerting the most pronounced effects.

The positive association between higher physical fitness and optimal reproductive health can be explained by several physiological mechanisms. Regular physical activity and enhanced cardiovascular fitness improve blood circulation and hormone regulation, which may contribute to more stable menstrual cycles. Similarly, muscular endurance and flexibility may reduce the severity of menstrual pain by improving core strength and muscular support of the pelvic region. These mechanisms highlight the importance of promoting physical fitness as part of interventions aimed at improving reproductive health among young women.

Furthermore, the study emphasizes the interplay between physical fitness and hygiene practices. Students with higher fitness levels tended to report better hygiene routines, which may reflect a broader pattern of health-conscious behaviors among physically active individuals. These findings underline the multifaceted benefits of physical activity, not only in enhancing physiological fitness but also in supporting health-promoting behaviors that contribute to overall well-being.

Overall, the results underscore the potential role of physical fitness in supporting reproductive health among female students. Interventions aimed at improving cardiovascular and muscular endurance, alongside promoting flexibility, may offer a practical approach to reducing menstrual irregularities and discomfort while fostering positive health behaviors. Future research could explore longitudinal or interventional studies to further establish causal relationships and evaluate the effectiveness of structured physical activity programs in improving reproductive health outcomes.

CONCLUSION

The study demonstrates a significant relationship between physical fitness and reproductive health among female students at FIKK UNM. Higher levels of cardiovascular endurance, muscular endurance, and flexibility were associated with more regular menstrual cycles, reduced menstrual discomfort, and better hygiene practices. These findings suggest that improving physical fitness may contribute positively to reproductive well-being and overall health. Promoting structured physical activity programs targeting cardiovascular and muscular fitness, alongside flexibility exercises, can be an effective strategy to support menstrual health and encourage healthy lifestyle behaviors among young women.

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