Premarital Preconception Health: A Cross-Sectional Study of Multidimensional Factors Shaping Physical and Psychological Preparedness among Indonesian Youth

Fitriyani Fitriyani[1*], *Ratna* Arifiana[1], *Leila Nisya* Ayuanda[1], *Festy* Mahanani[2], *Nur* Chabibah[2], and *Siti* Khuzaiyah[2]

[1]Faculty of Health Science, University of Muhammadiyah Pekajangan Pekalongan, Pekalongan, Indonesia
[2]Faculty of Health Science, UIN Sunan Kalijaga, Yogyakarta, Indonesia

Abstract. Early marriage remains common in Indonesia, particularly in rural areas, and often leads to adolescent pregnancy with adverse consequences for both mothers and infants. Strengthening preconception preparedness before marriage may help prevent adolescent pregnancy and reduce early pregnancy complications. This study aimed to identify factors influencing the physical and psychological readiness of unmarried Indonesian youth for marriage and preconception. A quantitative cross-sectional design was used. A total of 524 unmarried youths from ten provinces in Indonesia were recruited through convenience sampling. Data were collected using a structured questionnaire distributed via Google Forms. Chi-square tests and multiple logistic regression were used for analysis. Age was significantly associated with physical readiness for premarital and preconception health ($p = 0.016$; OR = 0.612). Exercise habits were also associated with physical readiness ($p = 0.005$; OR = 1.78). Sleep quality showed a strong association with physical readiness ($p < 0.001$; OR = 5.11) and was also significantly associated with psychological readiness ($p = 0.004$; OR = 1.68). In multivariate analysis, sleep quality emerged as the strongest predictor of readiness ($p < 0.001$; Exp(B) = 3.96), followed by exercise habits. These findings highlight the importance of sleep quality, regular exercise, and mental readiness in preparing youth for premarital and preconception health. Cross-sector collaboration is needed to strengthen supportive policies and programs in Indonesia.

1 Introduction

Adolescence is a critical period of biological and psychosocial transition in which individuals begin to enter the reproductive stage. Globally, adolescent pregnancy remains a significant public health issue, particularly in low and middle-income countries (LMICs). In 2019, approximately 21 million pregnancies occurred among adolescents aged 15–19 years in

*Corresponding author: fitriyani.umpp@gmail.com

LMICs, about half of which were unintended and resulted in around 12 million births [1]. Although several countries in Asia and Africa have implemented adolescent family planning programs through cross-sector collaboration, these initiatives still face challenges in access, education, and service delivery [2]. This situation highlights the importance of strengthening preconception readiness, which includes physical, psychological, and social preparedness before pregnancy occurs.

In Indonesia, adolescent fertility rates among those aged 15–19 remain a concern, with variations across provinces influenced by factors such as limited reproductive health education, school dropout, gender inequality, socio-economic conditions, and restricted access to reproductive health services [3]. Pre-marital and preconception readiness therefore requires context-specific interventions to strengthen adolescents' physical and psychological preparedness. Preconception readiness involves not only medical and nutritional aspects such as immunization, disease screening, and micronutrient supplementation, but also psychological readiness including understanding parental roles, emotional stability, relationship readiness, life planning, and socio-economic preparedness. Evidence suggests that effective adolescent preconception interventions should be multidimensional, combining clinical care, comprehensive reproductive health education, psychosocial counselling, and supportive policies [4].

Inadequate readiness for pregnancy during adolescence can lead to both short- and long-term consequences. Physically, adolescents who become pregnant without optimal health status face higher risks of maternal and neonatal complications. Psychologically and socially, early and unplanned pregnancy can contribute to mental health problems, disruption of education, persistent poverty, and challenges in parenting and child development [5]. Therefore, strengthening adolescents' readiness for marriage and preconception is an important strategy to reduce health and socio-economic burdens.

Health behaviors formed during adolescence, including sleep patterns and physical activity, play a crucial role in shaping future reproductive health. Lifestyle factors established during this period can influence both physical and mental readiness for pregnancy. Regular physical activity improves cardiometabolic and mental health, while good sleep quality supports emotional regulation and psychological well-being.

Based on these conditions, this study examines multidimensional factors influencing adolescents' physical and psychological readiness for premarital and preconception periods, including biological determinants (age, sleep quality, and physical exercise) and psychological readiness. Understanding these factors is important to inform evidence-based interventions that support adolescents' reproductive health preparation in the Indonesian context.

2 Methods and materials

The method and materials of this research presented in **Fig. 1.**

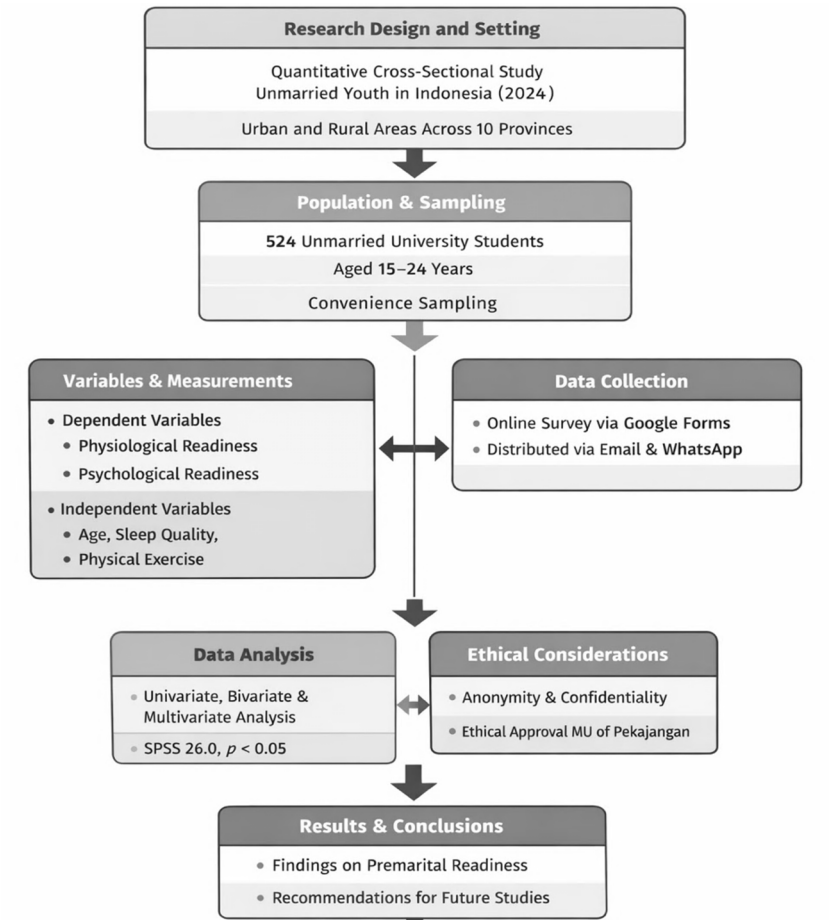

Fig. 1. Research Method

3 Results and discussion

3.1 Results

3.1.1 Characteristic respondent

This study involved 524 youth respondents in Indonesia, with characteristics presented in **Table 1**. The respondents were evenly distributed between healthy and unhealthy reproductive-age categories (50% each). Participants were aged between 16 and 24 years, with a standard deviation of 1.55. The majority of respondents (59.7%) resided in rural areas. More than one-third (39.5%) reported poor sleep quality.

Exercise habits were equally divided, with 50% of respondents reporting good habits and 50% reporting poor habits. Overall, most respondents (74.8%) demonstrated

inadequate physical preparedness, and more than half (54.6%) showed insufficient mental preparedness. Sleep quality was also considered an important predictor of premarital and preconception physical and psychological readiness. The respondents' sleep quality is shown in **Fig 2**.

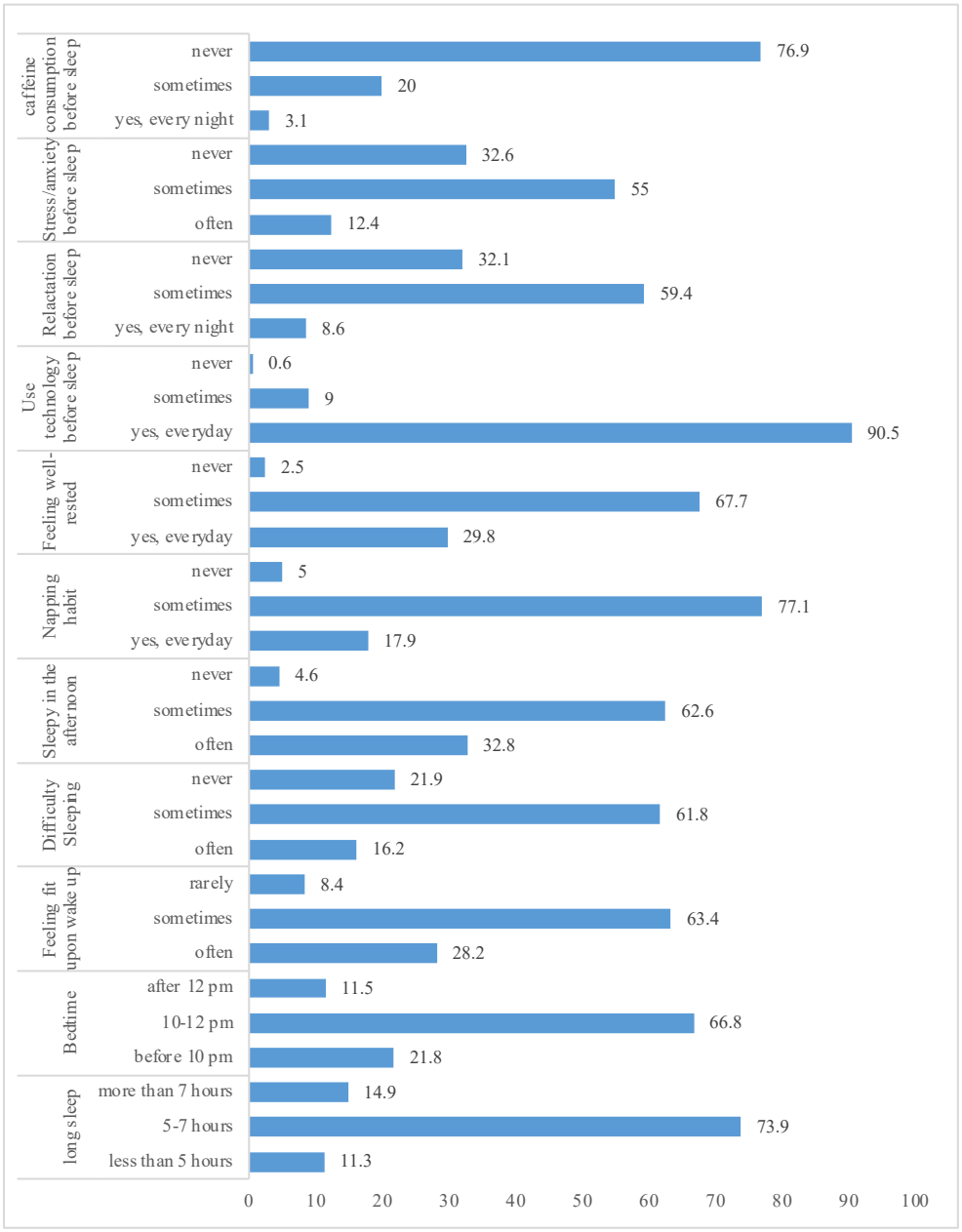

Fig. 2. Description of respondents' sleep quality (N: 524)

Fig. 2 shows that a small proportion of respondents (11%) have a sleep duration of less than 5 hours (12%) and go to bed after midnight. Only 28.2% feel refreshed when waking up, sometimes having difficulty sleeping was reported by more than half (61.8%). Only a

small proportion of respondents (29.8%) felt they had enough sleep, almost all used technology before bedtime such as gadgets and laptops (90.5%), more than half (55%) sometimes experienced stress before sleep, and 20% were accustomed to consuming caffeine before sleep. The variable of physical exercise habits of respondents is shown in **Fig. 3**.

Table 1. Age, sleep quality, physical exercise habit, physical preconception readiness, and physiological preconception readiness

Variables	N	%	Min	Max	SD
Age					
Healthy reproductive (20-35 years)	262	50.0	16 y	24 y	1.555
Unhealthy reproductive (<20 years)	262	50.0			
Region					
Urban	211	40.3			
Rural	313	59.7			
Sleep Quality					
Good	317	60.5			
Not Good	207	39.5			
Physical Exercise Habit					
Yes	262	50.0			
No	262	50.0			
Physical of Preconception Readiness					
Ready	132	25.2			
Not Ready	392	74.8			
Physiological of Preconception Readiness					
Ready	238	45.4			
Not Ready	286	54.6			

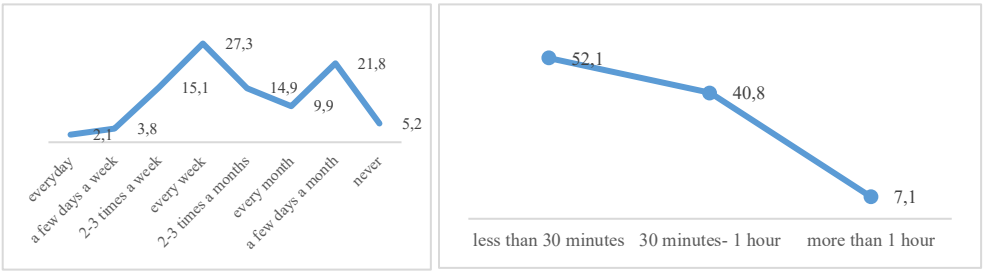

Fig. 3. Frequency and duration of physical exercise based on respondents (N:524).

Fig. 3 shows that on average respondents most frequently exercised once a week (27.3%) and once a month (21.8%). More than half of them exercised for less than 30 minutes each session.

3.1.2 Bivariate analysis

Table 2 showed that most respondents in the non-reproductive age group (<20 years) had inadequate premarital and preconception physical readiness (70.2%). Age was significantly associated with physical readiness (p=0.016; OR=0.612; 95% CI), indicating lower odds of inadequate physical readiness among productive-age adolescents compared with those aged <20 years. Poor sleep quality was strongly associated with inadequate physical readiness: 90.3% of adolescents with poor sleep quality reported inadequate premarital preconception physical readiness (p < 0.001; OR = 5.108; 95% CI). Low physical activity habits were also significantly associated with inadequate physical readiness (p<0.001; OR=1.775; 95% CI).

Table 3 presents the bivariate (chi-square) analysis of factors associated with youth premarital preconception psychological readiness. Among respondents of productive age, 54.2% had inadequate psychological readiness; however, age was not significantly associated with psychological readiness (p = 0.861; 95% CI). In contrast, among youth with poor sleep quality, 62.3% demonstrated inadequate psychological readiness, and sleep quality was significantly associated with psychological readiness. Youth with poor sleep quality had 1.68 times higher odds of inadequate psychological readiness than those with good sleep quality (p = 0.004; OR=1.68; 95% CI; p < 0.05). Exercise habits were not significantly associated with psychological readiness (p=0.114; 95% CI).

Table 2. The relationship between age, sleep quality, physical exercise habit with the physical premarital preconception readiness in youth

Variables		Physical of Preconception Readiness				Total		p-value*	OR	CI 95% Lowe-Upper
		Good		Not Good						
		n	%	n	%	n	%			
Age	Healthy reproductive (20-35th)	54	20.6	208	79.4	262	100	0.016	0.612	0.411-0.913
	Unhealthy reproductive (<20th)	78	29.8	184	70.2	262	100			
Sleep Quality	Good	112	35.3	205	64.7	317	100	<0.001	5.108	3.051-8.553
	Not Good	20	9.7	187	90.3	207	100			
Physical Exercise Habit	Good	80	30.5	182	69.5	262	100	0.005	1.775	1.188-2.652
	Not Good	52	19.8	210	80.2	262	100			

*Chi-square test

Table 3. The relationship between age, sleep quality, physical exercise habit with the psychological premarital preconception readiness in youth

Variables		Psychological of Preconception Readiness				Total		p-value*	OR	CI 95% Lowe-Upper
		Good		Not Good						
		n	%	n	%	n	%			
Age	Healthy reproductive (20-35th)	120	45.8	262	54.2	262	100	0.861	1.031	0.731-1.455
	Unhealthy reproductive (<20th)	118	45.0	144	55.0	262	100			
Sleep Quality	Good	160	50.5	157	49.5	317	100	0.004	1.685	1.179-2.409
	Not Good	78	37.7	129	62.3	207	100			
Physical Exercise Habit	Good	128	48.9	134	51.1	262	100	0.114	1.320	0.935-1/863
	Not Good	110	42.0	152	58.0	262	100			

*Chi-square test

3.1.3 Multivariate analysis

Table 4 presents the multivariable analysis using multiple logistic regression, examining age, sleep quality, exercise habits as predictors of adolescents' premarital preconception physical readiness. Sleep quality was the strongest determinant: adolescents with poor sleep quality had significantly higher odds of inadequate physical readiness ($p < 0.001$; Exp(B) = 4.425; 95% CI). Exercise habits remained a significant predictor as well, with insufficient exercise associated with higher odds of inadequate physical readiness ($p = 0.043$; Exp(B) = 1.552; 95% CI). In contrast, age was not a significant predictor in the multivariable model.

Table 4. The influence of age, sleep quality, physical exercise habit, physical of premarital preconception readiness with the physical premarital preconception readiness in youth

Variables	Exp (B)	CI 95%		p-value**
		Lower	Upper	
Age	0.691	0.451	1.057	0.089
Sleep Quality	4.425	2.619	7.476	<0.001
Physical Exercise Habit	1.552	1.014	2.376	0.043

** multiple logistic regression

Table 5 presents the multivariable analysis using multiple logistic regression, in which age, sleep quality, exercise habits, and physical readiness were entered to identify factors associated with adolescents' premarital preconception psychological readiness. The results showed that sleep quality was the only significant predictor: youth with bad sleep quality had approximately twice the odds of inadequate psychological readiness ($p = 0.070$; Exp(B) = 1.418; 95% CI). In contrast, age, and exercise habits were not significantly associated with psychological readiness in the adjusted model.

Table 5. The influence of age, sleep quality, physical exercise habit with the psychological premarital preconception readiness in youth

Variables	Exp (B)	CI 95%		p-value**
		Lower	Upper	
Age	1.164	0.815	1.662	0.405
Sleep Quality	1.418	0.971	2.071	0.070
Physical Exercise Habit	1.189	0.834	1.694	0.339

**multiple logistic regression

3.2 Discussion

3.2.1 The relationship between age with physical premarital preconception readiness

Age is an important component of premarital and preconception screening because it reflects biological and reproductive maturity. Women who marry at a mature age (>20 years) generally have better physiological readiness of reproductive organs, whereas early marriage (<20 years) is associated with higher risks of prematurity, congenital anomalies, adverse maternal outcomes, and limited readiness in health, emotional, educational, and socio-economic aspects that may lead to higher fertility and divorce rates [6]. Nutritional problems among young mothers, including anemia, further increase the risk of low birth weight and stunting [7]. Age is also linked with higher education and knowledge levels, which improve awareness and readiness for preconception health. Therefore, education on early marriage risks and preconception health should be strengthened through schools, communities, and premarital counseling services. The Care Program (Counseling, Awareness, Resources, and

Education) for adolescent mental health has been proven effective in increasing awareness, skills, and psychosocial support for adolescents [8)].

3.2.2 The relationship between sleep quality with physical premarital preconception readiness

Sleep quality plays an important role in reproductive health because reproductive hormones follow circadian rhythms. Sleep deprivation can disrupt hormonal balance, activate the hypothalamic–pituitary–adrenal axis, increase stress hormones, and reduce reproductive hormones such as testosterone and gonadotropins, which may affect fertility in both men and women [9]. Poor sleep is common among adolescents, often influenced by excessive technology use before bedtime, which can lead to sleep deprivation, fatigue, and impaired daily functioning [10]. In this study, a proportion of adolescents reported sleeping less than five hours and frequently using electronic devices before sleep. These findings highlight the need for promoting healthy sleep habits among adolescents, including reducing gadget use before bedtime to support reproductive health readiness.

3.2.3 The relationship between physical exercise habit with physical premarital preconception readiness

Regular physical activity provides important biological benefits that support physical readiness before pregnancy. Aerobic exercise improves cardiovascular function, reduces blood pressure, and enhances metabolic health, which can reduce the risk of complications such as gestational hypertension [11]. Exercise also improves muscle strength, stamina, and overall physical fitness, which are essential to cope with the physical demands of pregnancy. The preconception period is an important window for promoting healthy lifestyles, including regular physical activity, which can also influence long-term family health behaviors [12]. The World Health Organization recommends at least 150 minutes of moderate-intensity physical activity per week to maintain health and prevent non-communicable diseases.

3.2.4 The relationship between age with psychological premarital preconception readiness

The results showed no significant relationship between age and psychological readiness for premarital and preconception phases. Although age is often associated with life experience, psychological readiness depends more on emotional maturity, motivation, relationship quality, and the ability to manage responsibilities. Individuals of the same age may demonstrate different psychological conditions depending on their social environment, education, and support systems. Other important determinants include emotional intelligence, communication skills, financial stability, and relationship commitment [13]. Therefore, premarital education programs should emphasize emotional regulation, interpersonal communication, and decision-making skills to strengthen adolescents' psychological readiness.

3.2.5 The relationship between sleep quality with pshycological premarital preconception readiness

This study found a significant relationship between sleep quality and psychological readiness for premarital and preconception periods. Adolescents with good sleep quality tend to have better emotional regulation, mental stability, and readiness to manage interpersonal

relationships and responsibilities. Poor sleep has been associated with increased anxiety, depression, and emotional reactivity, which can reduce psychological readiness [14]. Adequate sleep also supports brain health and emotional processing, contributing to better mental well-being. These findings suggest the importance of integrating sleep health education and stress management into school programs and public health campaigns.

3.2.6 The relationship between physical exercise habit with psychological premarital preconception readiness

The study found no significant relationship between physical exercise and psychological readiness for premarital preconception. Although physical activity can improve physical health indicators such as BMI, blood pressure, and glucose tolerance, psychological readiness is more strongly influenced by knowledge, communication skills, relationship quality, socio-cultural factors, and social expectations that shape adolescents' perceptions of readiness for marriage and family life; physical activity may contribute indirectly to psychological well-being through improved resilience and emotional regulation rather than directly influencing premarital readiness [15].

3.2.7 Strength and limitation

This study used a convenience sampling technique and therefore does not recommend the conditions of youth in a region of Indonesia with high early marriage problems. However, in this research, the researcher attempted to take a balanced sample from 10 provinces in Indonesia, which is expected to represent youth samples across the country. In addition, this research only collected quantitative data, so it is necessary to add qualitative data to more deeply address pre-marital and preconception readiness.

4 Conclusions

Based on the results of this study, it is concluded that age, sleep quality, and physical exercise habits in youth affect pre-marital and preconception physical readiness, and sleep quality is also related to pre-marital and preconception psychological readiness.

Recommendations for the education sector include integrating curricula related to reproductive health education, promoting the 'sleep smart generation', and encouraging regular physical activity for physical and mental health. In the religious and social sectors, KUA, organizations, and religious institutions can prioritize values and spirituality by integrating body balance through physical activity and good sleep quality to prepare for pre-marital and preconception readiness. In the youth and community sector, the role of peer educators promoting a healthy lifestyle should be strengthened, and in the health sector, it is necessary to develop a holistic pre-marital and preconception screening module.

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