

Original Article

The Relationship Between Nutritional Status And Event Early Menarche In Children Aged 9-12 Years

Lucia Endang Hartati YK¹, Nurisda Eva Irmawati ¹

¹ Department of Nursing, Health Polytechnic, Ministry of Health, Semarang.

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ABSTRACT

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Background: Nutritional status in girls can affect children's sexual maturity. Overnutrition status in girls can lead to earlier menarche, this is related to the fulfillment of the nutritional needs needed by the body, especially in the reproductive organs which are well fulfilled so that the hormones estrogen and progesterone function optimally so that the menarche process can run faster than normal age.

Methods: This study uses a quantitative methodology based on a cross-sectional design. Using a complete sampling technique, this research draws its sample from 63 participants. Nutrient intake is the one that stands alone. Time to first menstrual period is the dependent variable. Statistical tests were conducted using the Spearman rank test based on data collected through weighing, measuring height, and giving questionnaires to respondents.

Results: With a p-value of 0.003 ($p < 0.05$), this study demonstrated a negative connection between nutritional health and the incidence of early menarche.


Conclusion: This study discovered that early menarche was linked to poor nutritional status among 9–12-year-olds in SD Negeri Karangawen 1 in Demak Regency. It is recommended that nutritional education and intervention programs be implemented for young girls, particularly those aged 9-12, in SD Negeri Karangawen 1 in Demak Regency to improve their nutritional status and address issues related to early menarche.

 Corresponding Author


: Nurisda Eva Irmawati

 Affiliation

: Department of Nursing, Health Polytechnic, Ministry of Health, Semarang

 Email

: nurisdaeva@poltekkes-smg.ac.id

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Introduction

Children of primary school age are encouraged to consume a nutritionally balanced diet to fulfil their physical and cognitive needs due to their rapid growth period (Rahman et al., 2017). Usually, a child's growth requires adequate food, energy, protein, fat and intake of all nutrients because these substances are the

basis of growth and must be available. Measurements of height, weight, and Body Mass Index (BMI) can be used to determine nutritional status, which is a prediction of the level of equality that occurs between the level of nutrients needed and the level of nutrients in a satiating diet, especially for children (Ratnasari & Purniasih, 2019).



The maturity of children's sexual organs can be influenced by the nutritional status of girls. If the nutritional status of girls is in good condition, the hormones estrogen and progesterone function optimally so that the menarche process can run faster than normal (Ardhiyanti & Nufus, 2022). Conversely, when girls have poor nutritional status, it will trigger disturbances in reproductive function, which will result in menstrual disorders (Mulyani, 2019).

The role of macronutrient intake in the form of fat and protein (animal and vegetable) and micronutrients in the form of fiber and calcium can cause girls to mature prematurely; those who consume protein twice a week will experience menarche before the age of 12 years, in contrast to children who consume animal protein on average every 2-3 months and experience menstruation at the age of 12 years (Alam et al., 2021). This is reinforced by Enggar et al., (2022), who found that the low level of fiber content in the food consumed and the availability of excessive amounts of fat and calcium are risk factors that accelerate early menarche. Menarche is the first time blood is released from the vagina, which occurs in women in the normal age range of 12–14 years (Sari et al., 2019). If an elementary school student experiences menarche before the age of 12, it indicates that the child has menarche at an early age. Early menarche is the experience of menstruation for the first time by a woman in fertile conditions at the age of < 12 years, while the normal age range for menarche is 12–14 years (Tyas et al., 2019).

The age of children starting menarche varies greatly; some children start menarche at the age of 12 years, and there are even children who get menarche at the age of 8 years, which indicates that children experience early menarche (Yuliarti et al., 2020). According to BKKBN

data (2016), Indonesian women who have experienced menstruation on average occur when they are 12 years old; children at the age of 8 years have started menstruating; and 16 years is the longest age for starting menstruation. 16 years is the longest age for the onset of first menstruation. According to Riskesdas (2018), the percentage of girls who had menarche in Indonesia ranged from no more than 12 years old to 20.9%. Data presented by the Ministry of Health in 2018 shows the percentage of menarche cases in Indonesia, namely children aged 9–10 years (2.6%), 11–12 years (30.3%), 13 years (30%), and children over 13 years (37.1%).

Nutritional status that affects the speed of menarche can be determined by measuring the upper arm circumference (LILA) and calculating the body mass index according to age (IMT/U). Measurement of Upper Arm Circumference (LILA) is a way of calculating nutritional status in women of childbearing age to determine predictions of the amount of nutrients located in fat and muscle, but this measurement is carried out in emergency conditions where height and weight measurements are not possible and the age of the child is unknown. Physical changes in the growth of adolescent girls take place rapidly, one of which is evidenced by the increase in muscle mass, so that the LILA status in girls is also related to the speed of sexual maturity of children (Deviliawati, 2022).

Young children who experience menarche early are likely to have a higher body mass index by age (BMI/U) than children who do not experience menarche at the same age (Yazia, 2019). Z-score calculation is a measurement concept that shows the range of sample values in standard deviation units, based on the calculation of the IMT/U value obtained minus the average IMT/U value and divided by the standard deviation. If the Z-score

calculation shows that the child is in the overweight category, then there is an increased risk of early menstruation. This may be due to the accumulation of body fat to stimulate egg maturation and ovulation faster, which causes early menstruation (Taufiqurrahman et al., 2018).

Menarche that occurs at too early an age in children will potentially increase their risk of experiencing malignancies, including breast cancer (Sadiman & Islamiyati, 2019). As a result, early menarche at an age of less than 12.5 years can provide a 1.54 times faster increase in breast cancer risk that can occur when girls grow up (N. Larasati et al., 2019).

A preliminary survey conducted by researchers on October 1, 2022, at SD Negeri Karangawen 1 Demak Regency found, based on the results of randomly selected interviews, that 29 out of 33 female students aged 9–12 years had menstruated before the age of 12, namely menstruation at the age of 8 years (1 student), 9 years (5 students), 10 years (11 students), 11 years (12 students), 12 years (1), and 3 others had not menstruated. In female students at SD Negeri Karangawen 1 Demak Regency who have experienced menarche, some students have a body posture and body mass index that have a larger range than their peers who have not experienced menarche, so the more nutritional status can affect female students who have experienced early menarche.

Following this description of the issue, researchers from SD Negeri Karangawen 1 Demak Regency are interested in studying the "Relationship between Nutritional Status and the Incidence of Early Menarche in Children Aged 9-12 Years."

Methods

This study employs a quantitative research strategy based on correlational and cross-sectional research. A total of sixty-three consenting female pupils from SD Negeri

Karangawen 1 Demak Regency, ranging in age from nine to twelve, who fulfilled the inclusion and exclusion criteria made up the sample for this study. We measured height and weight, computed IMT, U, and z-scores, and had participants fill out surveys to gather data. Researchers at SD Negeri Karangawen 1 Demak Regency set out to examine prematurity in girls and boys aged 9 to 12 in connection to their nutritional status. Data for each variable were shown as a percentage and frequency, indicating a univariate analysis. When doing bivariate analysis, the Spearman rank test was used..

Results

Table 1. Distribution Frequency Based on Age Respondent (child)

No	Age Respondent	Frequency	Percentage (%)
1.	9 year	6	9.5%
2.	10 year	8	12.7%
3.	11 year	27	42.9%
4.	12 year	22	34.9%
	Total	63	100%

Source : Primary data, 2023

Based on table 4.1, it can be seen that the frequency distribution of 63 respondents with the highest frequency is respondents aged 11 years, totaling 27 children (42.9%), and the frequency of the least age of respondents is age 9 years, totaling 6 children (9.5%).

Table 2. Distribution of Frequency based on Demographic characteristics of Respondent (Parents)

No	Data	Frequency	Percentage (%)
1.	Father's Education		
	Elementary School	2	3.2%
	Middle School	9	14.3%
	High School	38	60.3%
	Academy/ College	14	22.2%
	Total	63	100%
2.	Mother's Education		
	Elementary School	2	3.2%
	Middle School	6	9.5%
	High School	40	63.5%
	Academy/ College	15	23.8%
	Total	63	100%

No	Data	Frequency	Percentage (%)
3.	Father's Jobs		
	Civil Servants	9	14.3%
	Self-employed	37	58.7%
	Laborer	15	23.8%
	Doesn't Work	2	3.2%
	Total	63	100%
4.	Mother's Jobs		
	Civil Severant	7	11,1%
	Self-employed	26	41,3%
	Laborer	10	15,9%
	Housewife	20	31,7%
	Total	63	100%
5.	Income Parents		
	<UMK 2,680,000	30	47,6%
	>UMK 2,680,000	33	52,4%
	Total	63	100%

Source : Data primary, 2023

Based on table 4.2, it can be seen that the frequency distribution of parental demographics of 63 respondents shows that the most background of the respondent's father is a high school graduate or equivalent, namely 38 people (60.3%), the highest level of education of the respondent's mother is a high school graduate or equivalent, as many as 40 people (63.5%), the majority of respondents' fathers work as self-employed as many as 37 people (58.7%), the majority of respondents' mothers work as self-employed as many as 26 people (41.3%), and the majority of respondents' parents earn >UMK 2,680,000 as many as 33 people (52.4%).

Table 3. Frequency Distribution of Nutritional Status

No	Nutritional Status	Frequency	Percentage (%)
1.	Thinness	4	6,4%
2.	Normal	20	37,1%
3.	Overweight	36	57,1%
4.	Obesity	3	4,8%
	Total	63	100%

Source : Primary data, 2023

Based on table 4.3, it can be seen that the distribution of nutritional status of 63

respondents mostly had overweight status, totaling 36 children (57.1%), and the least was obesity, totaling 3 children (4.8%).

Table 4. Distribution of Healthy Livin Behavior

No	Healthy Livin Behavior	Frequency	Percentage (%)
1.	Not Healthy	33	52,4%
2.	Healthy	30	47,6%
	Total	63	100%

Source : Primary data, 2023

Based on table 4.4, it can be seen that the distribution of healthy living behavior among 63 respondents shows that the majority of respondents have unhealthy habits, 33 children (52.4%).

Table 5. Distribution Frequency of Incidence of Early Menarche

No	Incident Early Menarche	Frequency	Percentage (%)
1.	< 12 Years	58	92,1%
2.	12 Years	5	7,9%
	Total	63	100%

Source : Primary data, 2023

Based on table 4.5, it can be seen from the distribution of the incidence of early menarche among 63 respondents that the majority of respondents had menarche at the age of <12 years, totaling 58 children (92.1%).

Table 6. Spearman Rank Correlation Test Result

Incident Menarche Early	Status Nutrition									
	Thin		Normal		Over weight		Obesity		Total	
	f	%	f	%	f	%	f	%		
< 12 Year	3	4.9	6	3.3	6	1.1	3	4.8	8	92.1
12 Year	1	1.5	4	4	0	0	0	0	5	7.9
Total	4	6.4	10	15.7	6	9.4	3	4.8	13	20.6

Spearman's rho = - 0.364 p=0.003

Source : Primary data, 2023

Based on table 4.6, the results of the



Spearman rank correlation test obtained a p-value of $0.003 < 0.05$, so H_0 is rejected. H_a is accepted, which means that there is a relationship between nutritional status and the incidence of early menarche, with a correlation coefficient of -0.364 indicating the opposite direction of the relationship with a sufficient level of strength of the relationship. So the higher the nutritional status of the child, the earlier the age of menarche.

Discussion

Description Characteristics Respondent

In this study, the most respondents were girls aged 11 years, with as many as 27 children (42.9%), and the least aged 9 years, with as many as 6 children (9.5%). When girls enter the age range of 9–12 years, they will experience puberty, which is a phase where the maturity of sexual organs occurs in girls so that they have the ability to reproduce (Nggarang, N & Jahum, 2019). Girls have a varied age range in getting puberty; this age range starts from the age of 8–13 years, with the average age of puberty occurring at the age of 11 years (T. C. Larasati et al., 2022). This is reinforced by Nurlaeli et al., (2021): girls will experience puberty between the ages of 9 and 12, marked by secondary development starting when breasts begin to appear, and some girls will experience their first menstruation. According to the researcher's analysis, girls aged 9–12 years in this study have entered puberty, as evidenced by having experienced menarche.

The majority of the educational background of the respondent's father was high school, or equivalently, as many as 38 people (60.3%), and the education level of the respondent's mother was mostly high school, or equivalently, as many as 40 people (63.5%). According Adawiah et al., (2019), parental education affects children's dietary intake. Parents with

higher levels of education are more likely to choose foods that contain nutrients and pay attention to nutrition than parents with lower levels of education. According to the researcher's analysis, the higher the level of education of parents, the easier it is to get information and implement daily behavior and lifestyle, especially in terms of health and nutrition.

The majority of respondents' fathers in this study work in the self-employed sector for as many as 37 people (58.7%), and the majority of respondents' mothers work in the self-employed sector for as many as 26 people (41.3%). According Utami et al., (2018) parents who have a job will be able to feed their children healthy food, which in turn will affect the nutritional status of their children. According to the researcher's analysis, working parents have income so that they can guarantee each family member a sufficient menu and amount of food quality so that good food security is formed and there is an increase in nutritional status for family members.

The majority of respondents' parents' income had an income of more than UMK for as many as 33 people (52.4%). According to Asfahani et al., (2019) parental income has a very close relationship with the level of adequacy of nutritional status owned by children. Parents with high income levels have the potential to have family members with good nutritional status, which will cause sexual growth and development to develop perfectly so that it can have an impact on the fulfillment of good nutritional status for family members, especially girls, which can affect the rapid maturity of the reproductive system, especially related to the occurrence of early menarche.

Description Status Nutrition on Child Age 9-12 year in elementary school Country 1 Karangawen Regency Demak

Nutritional status can mean a condition in the body that results from the equality status that occurs between the food that has been consumed beforehand as well as the use of nutrients needed by body cells in carrying out various biological functions, such as the process of digesting, absorbing, transporting, storing, metabolizing, removing substances that do not work in supporting life and growth, and normal use of the body and organs, as well as producing output in the form of energy (Enggar et al., 2022). The food consumed by a person can provide perfect nutrition for the body. This happens because the content of nutrients that are consumed properly by the body allows development in the brain, physical growth, and mental health to work more optimally (Rachma & Puspita, 2021).

Based on the research results presented in Table 4.3, the distribution of nutritional status in children aged 9–12 years at SD Negeri Karangawen 1 Demak Regency showed that the majority were overweight, as many as 36 children. The results of this study agree with research by Yazia, (2019) at SMP Negeri 22 Padang, which shows that 43 (48.9%) of 88 girls have overweight status and that the nutritional state of a child affects the weight of his height. The better the child's nutrition, the faster the growth and development. This happens when there is more adipose tissue, which makes hormones work harder to produce estrogen and progesterone, which stimulates gonadotropin-releasing hormone (GnRH) and an increase in luteinizing hormone, which triggers early menarche.

According to the researcher's analysis, the number of respondents in this study who had higher nutritional status was due to one of them being well fed. More

nutritional status in children can affect the growth of reproductive sexual maturity so that it has an impact on the occurrence of menarche, which is faster than normal age. This happens because when high levels of leptin are secreted by the adipose glands, it will affect the metabolism of gonadotropin-releasing hormone (GnRH), which causes the release of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) in the ovaries, which affects the maturation of follicles, which can trigger menarche.

Description Behavior Life Healthy on Child Age 9-12 year in elementary school Country 1 Karangawen Regency Demak

Various healthy behavioural factors that can have an impact on the occurrence of early menarche are diet, fast food consumption, physical activity, rest and sleep, and a history of mass media exposure (Lestari et al., 2022). However, there is a change in habits towards modern and instantaneous, including the consumption of fast food, soft drinks, lazy exercise, and lack of rest which can have a negative impact on health, with lifestyle being one of the important factors that can impact the age to get menstruation (Sukarsih & Supatmi, 2018).

From the results of the questionnaire data, it was found that the majority of respondents in the study stated that they ate with a balanced menu consisting of protein, carbohydrates, fats, vitamins, and minerals, the majority of which were categorized as frequent, totaling 43 children (68.3%), eating fats, carbohydrates, proteins, and vitamins, the majority of which were categorized as frequent, totaling 39 children (61.9%), eating regularly 3 times a day, the majority were categorized as rare, totaling 39 children (61.9%), and eating rice 1-3 times a plate, the majority were categorized as rare, totaling 30 children (47.6%). This study

agrees with research by Diana et al., (2019) at At Taufiq Islamic Elementary School, which shows the results that 19 (90.5%) of 21 grade VI students who get early menarche have a good diet consisting of consumption of protein, carbohydrates, vitamins, and minerals, so that diet affects menarche status. Someone who has a good diet will get menarche time faster than children who have a bad child's diet.

The majority of respondents in this study have the habit of consuming fast food, which includes buying fatty foods, the majority of which are categorized as very frequent, totaling 37 children (58.7%), buying fried chicken, the majority of which are categorized as very frequent, totaling 31 children (49.2%), buying packaged food, the majority of which are categorized as very frequent, totaling 36 children (57.1%), and snacking at night, the majority of which are categorized as very frequent, totaling 43 children (68.3%). This study agrees with the results of research by Hutasuhut, (2020) in Dusun III Bakaran Batu Village, Batang District, Deli Serdang Regency, which shows that 42 (66.7%) of 63 adolescent girls have a habit of consuming fast food very often and that a history of high-calorie foods can make energy consumption exceed the needs that can affect the occurrence of early menarche, one of which is the habit of children consuming fast food with high calories such as ice cream, fried chicken, pizza, french fries, and various noodle foods.

Respondents in this study have bad habits of doing sports, which include sports with a duration of 10 minutes a week three times; the majority are categorized as never amounting to 35 children (55.6%); participating in sports activities at school; the majority are categorized as very often amounting to 33 children (52.4%); and exercising during holidays; the majority are categorized as never amounting to 36 children (57.1%). This study is in line with

the results of research conducted by Elyandri et al., (2023) at YAPA Al-Isti'aanah Bogor Regency, which shows that 69 (66.3%) of 104 adolescent girls aged 10–14 years have a habit of doing less exercise. Children who have a habit of exercising frequently will experience menarche at a normal age, in contrast to girls who do not exercise enough. Exercise habits can affect the hormone estrogen, which plays a role in the menarche process. This is reinforced by N. Larasati et al., (2019), who found that physical activity can have an impact on the production of reproductive hormones and help maintain a healthy balance in the absorption of nutrients by the body, so that girls who carry out physical activities with low intensity or occasionally have a tendency to experience menstrual bleeding faster than their peers who do physical activities regularly, such as volleyball, running, swimming, and badminton.

Most respondents in this study have sleeping habits that include sleeping for 8–10 hours every day; the majority are rarely classified as 27 children (42.9%); it is difficult to fall asleep if they are tired; the majority are often classified as 24 children (38.1%); they like to wake up in the middle of the night; the majority are rarely classified as 24 children (38.1%); after waking up, the majority are rarely classified as 27 children (42.9%); and taking drugs to fall asleep; the majority are never classified as 52 children (82.5%). This study agrees with research conducted by Pibriyanti et al., (2023) at Pondok Pesantren Gontor Putri 1, which shows that 70 (72.9%) of 96 adolescent girls aged 12–17 years have a low level of sleep quality, which can inhibit the work of the hormone melatonin. Adolescent girls need 9 hours of sleep a day. When someone sleeps, melatonin hormone levels increase, and melatonin is released from the pineal gland in the brain, which can inhibit sexual activity from maturing

too early (Gultom et al., 2020).

From the results of questionnaire data related to the history of mass media exposure, which includes communicating with adult themes via telephone, seeing adult-themed films, reading and watching vulgar films, and reading pornographic magazines, the majority is categorized as never, totaling 63 children (100%). The results related to mass media exposure in the study contradict research conducted by Yazia, (2019) at SMP Negeri 22 Padang, which shows that 45 (51.1%) of 88 seventh grade students who have experienced early menstrual bleeding are exposed to internet media with heavy categories. This is possible because the stimuli captured by the five senses of sight and hearing will be forwarded to the hypothalamus, where they will stimulate glands that produce sex hormones, which may have a significant impact on sexual biological development.

According to Hutasuhut, (2020), mass media exposure during puberty in children indirectly accelerates menstruation in children. Based on the research results presented in Table 4.4, the distribution of healthy living behavior in children aged 9–12 years at SD Negeri Karangawen 1 Demak Regency showed that the majority of 33 out of 63 respondents (52.4%) were in the unhealthy category. Research that is in line with this research was carried out by Nurrahmaton, (2020) at SMP Amanah Medan, which showed the results that 23 (69.7%) of 33 female respondents from classes VII, VIII, and XI had unhealthy life behaviors; female students who had received early menarche had unhealthy habits by consuming fast food, soft drinks, and snacks outside the home so that calorie intake increased in high amounts, which could potentially cause obesity; and the influence of technological advances also had an impact on the age of menarche, which decreased. According to the researcher's

analysis, the respondents in this study have unhealthy behavioral habits, as evidenced by their fondness for fast food, lack of exercise, and poor sleeping habits, but for dietary habits in the frequent category and for the history of mass media exposure, all respondents never accessed media with adult content. These habits can have an impact on sexual maturity, so they can cause a decrease in the age of menarche towards a younger age.

Description of the incidence of early menarche in children aged 9-12 years at SD Negeri 1 Karangawen, Demak Regency

Early menarche is the incidence of menstruation for the first time by girls, which is indicated by the appearance of blood from the vagina experienced by children under 12 years of age (Makarimah & Muniroh, 2018). The variation in the age of menarche in primary school children can be caused by two factors: internal factors, including maternal menarche status (heredity), and external factors in the form of economy, nutritional status, social environment, lifestyle, and mass media exposure (Karmila & Perbata, 2022).

Referring to the research results presented in table 4.4, the distribution of the incidence of early menarche in children aged 9–12 years at SD Negeri Karangawen 1 Demak Regency shows that of the 63 respondents, most experienced menarche at the age of <12 years, with as many as 58 children (92.1%) and at the age of 12 years, with as many as 5 children (6.3%). This study agrees with research conducted by Alam et al., (2021) at SMPN 10 Bulukumba, which showed that 49 (66.2%) of 74 girls had menarche at the age of <12 years, indicating a tendency for younger ages.

According to the researcher's analysis, many respondents in this study experienced early menarche at the age of



<12 years, which could be caused by one of them due to nutritional status factors. The more fulfilled the intake of nutrients and nutrients needed by the body properly, the faster the age of menarche. Respondents who have experienced early menarche tend to have a higher body mass index (BMI) than their peers who have not had menarche.

Analysis of The Relationship Status Nutrition with Incident Early Menarche in Children Aged 9-12 years in elementary school Country 1 Karangawen Regency Demak

Nutritional status is a condition of nutrients that must be consumed so that they are absorbed properly by the body; this will later become energy to produce overall body metabolism (Mulyani, 2019). Nutrition is also needed to support the level of female fertility. In addition to playing a role in growth, physical, and mental development, good nutritional intake can provide a higher quality of reproductive function, and one of them results in the occurrence of menarche (Novita, 2018). If nutritional intake is fulfilled optimally, it can increase the potential to accelerate the formation of hormones produced by the hypothalamus, pituitary, and ovarian glands, which will encourage girls to get menarche earlier (Sari et al., 2019).

Puberty is called the transition from childhood to adolescence, one of the signs of which is the menarche event in girls Arifin et al., (2020). Menarche is the name for a woman's first experience of menstruation, which is indicated by the flow of blood from the vagina caused by the decaying endometrial layer. This can be normal if it occurs at the age of 12-14 years (Siallagan et al., 2020). With the development of the times, it is known that there is a decrease in the age range of children who have menarche to a younger age, which makes

children menarche early (Rachma & Puspita, 2021). According to Fadhilah & Katmini, (2021) the first bleeding that flows from the female reproductive organs before the age of 12 is called early menarche. Based on Basic Health Research data from 2018 (Romlah, 2019), Indonesia ranks 15th out of 67 countries with a decreasing age of menarche of 0.145 per decade, with as many as 5.2% of women and children experiencing menarche at the age of no more than 12 years. According to Karmila & Perbata, (2022), there are several factors that result in a shift in the age of menarche, including internal factors, namely the mother's menarche status (heredity), and external factors such as nutritional status, social environment, economy, lifestyle, and mass media exposure. Nutritional status is one of the factors related to the shift in menstrual age examined in this study. In this study, the nutritional status of children was determined by measuring height, weight, and body mass index according to age (IMT/U) and calculating the Z-score. The nutritional status category based on the Body Mass Index according to age (IMT/U) and the Z-score threshold for children aged 5-18 years in this study is adjusted to Permenkes No. 2 of 2020, which includes undernutrition (thinness), good nutrition (thinness), and good nutrition (normal), overnutrition (overweight) and obesity.

Based on table 4.5 of the Spearman rank correlation test results, the p-value in this study is 0.003 <0.05, which indicates that there is a relationship between nutritional status and the incidence of early menarche. The correlation coefficient value obtained is -0.364, which indicates that the direction of the relationship is opposite with a sufficient level of strength of the relationship, so that the higher the nutritional status of the child, the earlier the



age of menarche. Therefore, the hypothesis formulated by the researcher is H_0 rejected, H_a accepted, which states that there is a relationship between nutritional status and the incidence of early menarche. This agrees with (Syam et al., 2022) which give a statement about whether the decline in the age of menarche is related to improved living standards such as adequate nutrition and good health services.

The results of this study are in accordance with research by Tyas et al., (2019) in elementary schools in Pati District, Pati Regency, which shows that there is a relationship between nutritional status and the incidence of early menarche, with the results of the spearman rank test getting a p-value of $0.001 < 0.05$ with a correlation coefficient of -0.321 , which shows the opposite direction of the relationship with a sufficient level of relationship strength, meaning that if girls have more nutritional status, they will experience menarche earlier.

According to Ardhiyanti & Nufus, (2022) more nutritional status in girls can have an impact on the age of menarche, causing the incidence of early menarche. This is related to adequate nutritional needs in the reproductive organs, which results in the hormones estrogen and progesterone functioning optimally so that the menarche process can run faster than normal. This is reinforced by Arifin et al., (2020) An increase in nutrition is related to fat that accumulates in adipose tissue, which can reduce leptin levels. When leptin levels increase, it can inhibit the secretion of the hormone GnRh and manipulate the release of FSH and LH in the ovaries for follicle production as well as follicular production in the in the ovaries for follicle production and oestrogen production, resulting in early menarche.

According to the researcher's analysis, an increase in the standard of living of the

community has an effect on improving the economic status of children so that they have better nutritional status, which can contribute to accelerating the maturation of the reproductive system and accelerating the onset of early menstruation. Researchers found several facts from respondents related to nutritional status: the majority of respondents are accustomed to consuming fast food, often consume foods containing fat, carbohydrates, protein, and vitamins; rarely eat three times a day; prefer to eat ciki-ciki snacks that contain many preservatives; and have excessive snacking habits.

Nutritional status is associated with the incidence of early menarche in girls aged 9–12 years in SD Negeri Karangawen 1 Demak Regency. Girls' sexual maturity is caused by the nutrients in their bodies; therefore, it is concluded that one of the causes of early menstruation is due to nutritional factors (Mulyani, 2019). Girls who are overweight have a 3.36-fold increased risk of experiencing early menarche (Gultom et al., 2020). Compared to their peers who have not yet menstruated, children who have menarche usually have a higher height and weight (Marlia, 2020) . Apart from the Body Mass Index (BMI), the nutritional status category can also be seen from the Z-score calculation. If the Z-score calculation shows the overweight category, the child has a higher risk of experiencing early menarche. This may occur due to the accumulation of fat in the body so that it can stimulate egg maturation and more ovulation cycles, which result in early menarche (Taufiqurrahman et al., 2018).

According to the Breast Cancer Research Program in America in Fuadah, (2016), children who get early menarche have a potential risk of breast cancer of up to 50% compared to children who get menarche at the age of 16 years. As a result, early menarche at an age of less than 12.5

years can increase the potential risk of breast cancer up to 1.54 times faster, which can occur when girls grow up (N. Larasati et al., 2019). In addition to breast cancer, early menarche can also cause ovarian cancer (Rois et al., 2019). One of the efforts to prevent early menarche is to keep the body weight in an ideal condition so that it is not excessive or overweight, consume low-fat foods, and consume fruits and vegetables (Mukhoirotin & Sulayfiyah, 2020).

Conclusion

The majority of respondents' nutritional status in this study was overweight, with the majority of respondents having unhealthy behaviors. In the description of the incidence of menarche in this study, the majority experienced early menarche at the age of < 12 years. This study shows that there is a relationship between nutritional status and the incidence of menarche, where the higher the nutritional status of the child, the earlier the age of menarche.

Authors Contributions

Authors 1 and 2 collaborated in the drafting of the article, commencing with the research proposal, the collection of research data, the analysis of the data, the discussion of the results, and the drafting of the research journal article. Authors 1 and 2 collaborated in the drafting of the article, commencing with the research proposal, the collection of research data, the analysis of the data, the discussion of the results, and the drafting of the research journal article.

Conflicts of Interest

There is no conflict of interest

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