Factors Affecting Age of Menarche: A Cross-Sectional Study

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ABSTRACT

Background: Early menarche or first menstruation has been associated with increased risk of breast cancer and cardiovascular disease. Understanding the factors that influence the age of menarche is very important to provide promotive and preventive actions that can be carried out by schools and families. This study aims to analyze the factors that influence the age of menarche.

Subjects and Method: This study used an observational analytical study with a cross-sectional design. The subjects in this study were 125 female students at 5 public elementary schools in Malang City, East Java, Indonesia. The dependent variable was the age of menarche. The independent variables were nutritional status (BMI), stress, parenting patterns, and parenting pattern dominance. Data analysis used univariate, bivariate, and multivariate models with multiple linear regression methods.

Results: Age of menarche decreased with stress (b= -0.50; 95% CI = -0.70 to -0.29; p <0.001), BMI ≥25 (b= -9.00; 95% CI= -16.75 to -1.25; p= 0.023), authoritarian parenting style (b= -1.05; 95% CI= -1.53 to -0.58; p<0.001), and the dominance of parenting patterns by single parents or guardians (b= -4.92; 95% CI= -9.42 to -0.42; p= 0.032). The age of menarche was higher in adolescents with a lower BMI than a normal BMI (b= 4.78; 95% CI= 1.20 to 8.36; p= 0.009). The adjusted R^2= 46.81%.

Conclusion: Multiple linear regression analysis showed a relationship between stress factors, authoritarian parenting patterns, dominant parenting patterns, and BMI with a decrease in the age of menarche which was statistically significant.

Keywords: age of menarche, stress, authoritarian parenting, dominant parenting, BMI.

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BACKGROUND

The puberty phase is an important stage in life to achieve reproductive and somatic organ maturity (Calcaterra et al., 2021). Every teenager will experience a transition period that shows secondary sexual characteristics until the process of sexual maturity, one of which is menstruation that occurs in women (Fatimah et al., 2021; Munanadia, 2023). First menstruation or menarche at an early age has been associated with an increased risk of breast cancer and cardiovascular disease (Lee et al., 2019). The results of a study in the United States stated that earlier age of menarche and thelarche were shown to be associated with an increased

risk of breast cancer in adulthood (Goldberg et al., 2020). Every 1 year earlier age of menarche is associated with a 2-3% higher relative risk of death from all causes and ischemic heart disease (Cheng et al., 2022).

The average age of menarche for women in Indonesia is 12.96 years with a decrease of 0.145 years per decade (Ministry of Health of the Republic of Indonesia, 2018). Along with the development of the times, currently the age group of menarches is shifting earlier, which is around the age of 9-12 years old (Yulita et al., 2022). The distribution of nutritional status in women who have overweight or obese nutritional status accelerates the occurrence of menarche, conversely, underweight or thin nutritional status causes menarche to be later than it should be (primary amenorrhea) (Syam et al., 2022). Previous research in Indonesia has shown that high Body Mass Index (BMI), higher parental income, and living in urban areas are associated with early puberty in girls based on the Tanner scale assessment (Asrullah et al., 2022). The relationship between childhood experiences and poor parenting patterns results in early menarche outcomes (≤10 years) (Demakakos et al., 2019). Stressful environments in early childhood, such as father absence and family dysfunction, are considered to be causes of early maturation (Zhang et al., 2019).

Overall, this determinant study is important to study the pubertal status (age of menarche) in elementary school girls and determine various risk factors for early menarche, ensuring evaluation actions for improvement that can be taken by parents (Malitha et al., 2020). This study is expected to provide new knowledge regarding the relationship between stress factors, authoritarian parenting patterns of parents, dominance of parenting patterns and BMI on age of menarche.

SUBJECTS AND METHOD

1. Study Design
This research design used an observational analytical study with a cross-sectional approach. This study was conducted in 5 public elementary schools in Malang City in May 2024.

2. Population and Sample
The subject in this study was all female students in public elementary schools in Malang City, East Java, Indonesia, totaling 23,392 students. The sample was selected using a Multistage Random Sampling design. First, Cluster random sampling was carried out to select 5 schools as research locations, then Purposive Random Sampling was used to determine a sample of female students who met the research inclusion criteria. The inclusion criteria were having experienced menarche, in grades 4-6 of elementary school aged 9-13 years, mentally and physically healthy, and parents willing for the students to become subjects. A total of 125 female students were selected as research samples.

3. Study Variables
The dependent variable in this study was the age of menarche. Meanwhile, the independent variables were nutritional status (BMI), stress, parenting patterns, and dominance of parenting patterns.

4. Operational Definition of Variables
Age of menarche is the age when the girls first experience menstruation which generally occurs at the age of 120 - 180 months (10 - 15 years old). The measurements are made through a questionnaire stating the date, month, and year of menarche minus the subject's date of birth. Menarche data is processed in months. Data retrieval is numerical, then for data analysis it is changed into categories (early, normal, and late).

Nutritional status is a body condition due to food intake and metabolic hormonal substances calculated based on the Body

Mass Index (BMI) which is dividing body weight (kg) compared to the square of body height (m). Omron brand digital foot scale with an accuracy of 0.1 (kg) is used to measure the subject's weight. Microtoise with an accuracy of 0.1 (cm) is used to measure the subject's height. Data collection is done numerically, then for data analysis it is changed into categories (normal, underweight, and overweight or obesity).

Stress is a condition caused by uncontrolled physical, environmental, and social demands. Measuring stress levels using the Perceived Stress Scale (PSS) questionnaire developed by Cohen, et al. (1983) consisting of 10 questions. Data collection is done numerically, then for data analysis it is changed into categories (low, medium, high).

Parenting is a parenting strategy that applies in a family, how the family shapes the child's behavior according to good norms and values for the sake of community life. Measurement is done by filling out a parent questionnaire according to the reality that occurs every day, the highest total score describes the subject's parenting pattern. Data collection is numerical, then for data analysis it is changed into categories (authoritarian, democratic, permissive).

Dominance of parenting patterns is someone who provides a dominant role in caring for (fulfilling affection and care) of children for 24 hours. Measurements are made by filling out parent questionnaires according to the reality that occurs. Data are grouped into categories of biological parents, and guardians or single parents.

5. Study Instruments
This study was conducted using questionnaires (students and parents), Omron brand digital foot scales with an accuracy of 0.1 (kg), and Microtoise with an accuracy of 0.1 (cm).

6. Data Analysis
The research data were analyzed univariate, bivariate and multivariate. Bivariate analysis used the chi square test and multivariate analysis used the multiple logistic regression test.

7. Research Ethics
Research ethics including informed consent, anonymity, and confidentiality, were carefully addressed throughout the research process. A research ethics clearance letter was obtained from the Research Ethics Committee at Dr. Moewardi Hospital, Surakarta, Indonesia, with No. 1.000/IV/-HREC/2024, on April 23, 2024.

RESULTS

1. Sample Characteristics
Research on factors influencing age of menarche was conducted on 125 subjects with respondents who had experienced menarche, were in grades 4-6 aged 9-13 years old at 5 Public Elementary Schools in Malang City.

Table 1 shows a total of 125 subjects in 5 Public Elementary Schools in Malang City as the research location. The highest level is in grade 6 with 57 subjects (45.6%) and predominantly at the age of 12 years. While the age of menarche experienced by the subjects is mostly in the normal category with 74 students (59.2%) and 51 subjects in the early category (40.8%). Nutritional status based on BMI is predominantly in the underweight category are 80 subjects (64%), the normal category are 39 subjects (31.2%) and overweight obesity with 6 subjects (4.8%). Stress factors are mostly in the moderate level with 96 subjects (76.8%).

The characteristics of father's education show the highest number at the college graduate level, with 64 subjects (51.2%). The father's dominant employment is as a private/ state-owned company employee which are 39 subjects (31.2%). At the mother's education level, the highest is high school graduate with 61 subjects (48.8%)

and the mother's dominant employment is as a housewife (IRT) with 62 subjects (49.6%). The maternal age in the category <40 years old is 60 subjects (48%), while the category ≥40 years old is 65 subjects (52%). The age of menarche experienced by the mother is mostly in the normal category by 113 subjects (90.4%) and late by 12 subjects (9.6%). The highest family income in a month is in the low category by 37 subjects (29.6%). The most common type of parenting pattern is democratic with a total of 93 subjects (74.4%) and is predominantly given by biological parents by 105 subjects (84%).

Table 1. Characteristic of research subject

	Variable	n	%
Education	4th grade	21	16.8
	5th grade	47	37.6
	6th grade	57	45.6
Age	10 years old	15	12.0
	11 years old	43	34.4
	12 years old	57	45.6
	13 years old	10	8.0
Age of menarche	Early	51	40.8
	Normal	74	59.2
Body Mass Index (BMI)	Thin (Underweight)	80	64.0
	Normal	39	31.2
	Overweight and Obese	6	4.8
Stress factor	Mild	17	13.6
	Moderate	96	76.8
	Severe	12	9.6
Father's education	Elementary School	5	4.0
	Junior High School	7	5.6
	Senior High School	49	39.2
	College	64	51.2
Father's employment	Civil Servant/Army/Police	23	18.4
	Private/*BUMN*	39	31.2
	Self-employed	38	30.4
	Laborers	20	16.0
	Others	5	4.0
Pendidikan ibu	Elementary School	3	2.4
	Junior High School	8	6.4
	Senior High School	61	48.8
	College	53	42.4
Maternal employment	Housewife	62	49.6
	Civil Servant/Army/Police	21	16.8
	Private/*BUMN*	10	8.0
	Self-employed	16	12.8
	Laborers	14	11.2
	Others	2	1.6
Maternal age	<40 years old	60	48.0
	≥40 years old	65	52.0
Mother's age of menarche	Normal	113	90.4
	Late	12	9.6

	Variable	n	%
Family income	Low (<Rp 2,000,000)		29.6
	Moderate (Rp 2,000,000 – Rp 4,000,000)	37	28.0
		35	24.8
	High (>4,000,000 – Rp 6,000,000)	31	17.6
		22	
	Very High (>Rp 6,000,000)		
Types of parenting styles	Authoritarian	22	17.6
	Democratic	93	74.4
	Permissive	10	8.0
Dominance of parenting patterns	Biological Parents	105	84.0
	Single Parents and Guardians	20	16.0

2. Univariate Analysis

Table 2. shows the results of univariate analysis of 125 research subjects, the menarche age variable shows results (Mean= 135.93; SD= 12.17) with a minimum age of 105 months and a maximum of 155 months. The authoritarian parenting pattern variable shows results (Mean= 12.22; SD = 3.65) with a minimum score of 5 and a maximum of 20. The BMI variable shows results (Mean = 18.64; SD= 3.29) with a minimum BMI of 13.69 and a maximum of 32.87. Stress factors presented in PSS scores show results (Mean = 17.09; SD = 8.13) with a minimum

score of 0 and a maximum of 40.

Family income shows the results of (Mean= 5,175,200; SD 4,313,770) with a minimum of 1,400,000 and a maximum of 25,000,0000. The subject's age variable shows the results of (Mean= 11.54; SD= 7.79) with a minimum age of 10 years old and a maximum of 13 years old. The weight variable shows the results of (Mean = 42.35; SD = 7.79) with a minimum measurement result of 26 kg and a maximum of 72 kg. Height shows the results (Mean= 150.76; SD= 7.52) with a minimum measurement result of 131 cm and a maximum of 175 cm.

Table 2. Results of univariate analysis in the study of factors influencing age of menarche

Variable	n	Mean	SD	Min.	Max.
Age of menarche (months)	125	135.93	12.17	105	155
Parents' authoritarian parenting style	125	12.22	3.65	5	20
Body Mass Index (BMI)	125	18.64	3.29	13.69	32.87
PSS score	125	17.09	8.13	0	40
Income (Rp)	125	5,175,200	4,313,770	1,400,000	25,000,000
Age (years old)	125	11.54	0.83	10	13
Weight (kg)	125	42.35	7.79	26	72
Height (cm)	125	150.76	7.52	131	175

3. Bivariate Analysis

Table 3 on the BMI variable shows that there was a relationship between BMI and age of menarche that is statistically significant. Underweight female adolescent has an average age of menarche 8.67 months higher than those with normal weight, and

difference was statistically significant (b = 8.67; 95% CI= 4.40 to 12.93; p <0.001). Meanwhile, overweight or obese female adolescent have an average age of menarche 10.73 months lower than those with normal weight, and the difference was statistically significant (b = -10.73; 95% CI = -20.30 to -

1.16; p = 0.028). The stress factor variable generated through the PSS score shows that there was a negative relationship between stress and age of menarche which was statistically significant. Every increase of one unit of stress score will be followed by a decrease in age of menarche by 1.71 months (b= -1.71; 95% CI= -0.95 to -0.48; p <0.001).

Table 3 shows that there was a negative relationship between authoritarian parenting patterns of parents and age of menarche which was statistically significant. Every 1 unit increase in authoritarian parenting pattern score of parents will be followed

by a decrease in age of menarche by 1.7 months (b = -1.7; 95% CI = -2.21 to -1.19; p <0.001). The variable of parenting dominance shows that there was a negative relationship between parenting dominance and age of menarche which was statistically significant. Female adolescent who are raised by their mothers only (single parent) or by guardians experience an average age of menarche 10.63 earlier than those raised by both parents (b= -10.63; 95% CI = -16.21 to -5.04; p<0.001).

Table 3. The results of bivariate analysis in the study of factors influencing age of menarche

Variable	b	95% CI		p
		Lower limit	Upper limit	
Body Mass Index (BMI)				
Underweight	8.67	4.40	12.93	<0.001
Overweight and Obese	-10.73	-20.30	-1.16	0.028
PSS score	-1.71	-0.95	-0.48	<0.001
Authoritarian parenting style	-1.70	-2.21	-1.19	<0.001
Dominant parenting style	-10.63	-16.21	-5.04	<0.001

4. Multivariate analysis

Table 4 shows the results of multiple linear regression analysis on predictors of age at menarche.

a) Body Mass Index (BMI) and age of menarche

Table 4. shows that there was a statistically significant relationship between BMI and age of menarche. Underweight female adolescent have an average age of menarche by 4.78 months higher than normal weight female adolescent, and the difference was statistically significant (b = 4.78; 95% CI = 1.20 to 8.36; p = 0.009).

Table 4.4 shows that there was a statistically significant relationship between BMI and age of menarche. Overweight and obese female adolescent have an average age of menarche by 9.00 months lower than those with normal weight, and the difference was

statistically significant (b = -9.00; 95% CI = -16.75 to -1.25; p = 0.023).

b) Stress and age of menarche

Table 4 shows that there was a negative relationship between stress and age of menarche which was statistically significant. Every increase of one unit of stress score will be followed by a decrease in age of menarche by 0.50 months (b= -0.50; 95% CI = -0.70 to -0.29; p <0.001).

c) Authoritarian parenting style and age of menarche

Table 4 shows that there was a negative relationship between authoritarian parenting patterns of parents and age of menarche which was statistically significant. Every 1 unit increase in the score of authoritarian parenting patterns of parents will be followed by a decrease in age of menarche by 1.05 months (b= -1.05; 95% CI = -1.53 to -

0.58; p<0.001).

d) Dominant parenting style and age of menarche

Table 4 shows that there was a negative relationship between the dominance of parenting patterns and the age of menarche which was statistically significant. Female adolescent who are raised by their mothers only (single parent) or by guardians experience an average age of menarche 4.92 earlier than those raised by both parents (b= -4.92; 95% CI = -9.42 to -0.42; p = 0.032).

e) Model fit

This multiple linear regression analysis model shows a moderate model fit with an Adj R-Squared value of 46.81%. This means that the independent variables entered into the model together are able to explain the variation in the value of the age of menarche by 46.81%.

Table 4. Results of multivariate analysis in the study of factors influencing age of menarche

Variable	b	95% CI		p
		Lower limit	Upper limit	
Body Mass Index (BMI)				
Underweight	4.78	1.20	8.36	0.009
Overweight and Obese	-9.00	-16.75	-1.25	0.023
PSS score	-0.50	-0.70	-0.29	<0.001
Authoritarian parenting style	-1.05	-1.53	-0.58	<0.001
Dominant parenting style	-4.92	-9.42	-0.42	0.032
N observation= 125				
Adj R-Squared= 46.81%				
p<0.001				

DISCUSSION

1. Body Mass Index (BMI) and age of menarche

This study found that there was a relationship between BMI and age of menarche. This study is in line with previous studies which stated that being overweight or obese is associated with earlier onset of puberty, both in boys and girls (Daniels, 2021). Another study stated that weight gain during puberty is always accompanied by increased levels of the hormone's leptin and insulin in the body (Chung, 2017). Leptin acts as a signal to the hypothalamus regarding the amount of fat mass in the body whether it is sufficient to start the reproductive process which will then trigger the activation of the hypothalamic-pituitary-gonadal axis (Prosperi and Chiarelli, 2023).

There is a positive correlation between hyperinsulinemia and adiposity, insulin resistance, and early puberty (Prosperi and Chiarelli, 2023).

2. Stress and age of menarche

This study found that there was a negative relationship between stress and age of menarche. When the body experiences stress, the body will indirectly release the hormone cortisol. This is in line with previous research which states that high levels of the hormone cortisol will stimulate the body to release the hormones insulin, leptin and the neuropeptide-Y (NPY) system which causes hunger so that there is a desire to eat. Similar research shows that high psychological stress factors can increase the incidence of early menarche by 1.19 times in women aged ≤10 years old (Yu et al., 2020).

3. Authoritarian parenting style and age of menarche

This study found that there was a negative relationship between parenting patterns and age of menarche. The results of this study are in line with previous studies which

stated that parents who adopt emotional and harsh parenting styles cause their daughters to experience early puberty (Ling et al., 2022). Authoritarian parenting forms a character that must submit and obey all parental rules, without giving the child freedom of opinion (Taib et al., 2020). Other studies have stated that authoritarian parenting is included in the type of negative parenting that is associated with early puberty in girls, but not in boys (Pham et al., 2021).

4. Dominant parenting style and age of menarche

This study found that there was a negative relationship between the dominance of parenting patterns and the age of menarche. Female adolescent who are raised by their mothers only (single parent) or by guardians will experience an age of menarche by 4.92 earlier than those raised by both parents. This means that children who are raised by their biological father and mother are able to increase the age of menarche by 4.92 years compared to children who are raised by one parent or by guardians such as grandparents, aunts, or babysitter.

This study is in line with previous studies which state that girls who grow up in households with stepparents and single parents experience menarche earlier than their peers because they live in stressful situations (Johnston et al., 2020). Other studies have shown that girls who do not live with both parents from birth to age 2 are at higher risk of early menarche (Aghaee et al., 2020). The influence of negative family experiences (divorce, violence, and parental conflict) will affect the characteristics of the parents and directly impact the timing of early puberty (DiLalla et al., 2021).

REFERENCE

Aghaee S, Deardorff J, Greenspan LC, Quesenberry CP, Kushi LH, Kubo A (2020). Early life household intactness and timing of pubertal onset in girls: a prospective cohort study. BMC Pediatri., 20(1). https://doi.org/10.1186/s12887-020-02345-w

Asrullah M, L'Hoir M, Feskens EJM, Melse-Boonstra A (2022). Trend in age at menarche and its association with body weight, body mass index and non-communicable disease prevalence in Indonesia: evidence from the Indonesian Family Life Survey (IFLS). BMC Pub. Health, 22(1). https://doi.org/10.1186/s12889-022-12995-3

Calcaterra V, Cena H, Regalbuto C, Vinci F, Porri D, Verduci E, Chiara M, Zuccotti GV (2021). The role of fetal, infant, and childhood nutrition in the timing of sexual maturation. In Nutrients.

13(2): 1–15. https://doi.org/10.3390-/nu13020419.

Cheng TS, Ong KK, Biro FM (2022). Adverse effects of early puberty timing in girls and potential solutions. J Pediatr Adolesc Gynecol. 35(5): 532–535. https://doi.org/10.1016/j.jpag.2022.05.005.

Chung S (2017). Growth and puberty in obese children and implications of body composition. In J Obes. Metab. Syndr. 26(4): 243–250). Korean Society for the Study of Obesity. https://doi.org/10.7570/jomes.2017.26.4.243

Daniels SR (2021). Overweight is associated with early puberty in boys and girls. J. Pediatr. 230, 1–3. https://doi.org/-10.1016/j.jpeds.2021.01.014

Demakakos P, Pashayan N, Chrousos G, Linara-Demakakou E, Mishra GD (2019). Childhood experiences of parenting and age at menarche, age at menopause and duration of reproductive lifespan: Evidence from the English Longitudinal Study of Ageing. Maturitas, 122, 66–72. https://doi.-org/10.1016/j.maturitas.2019.01.010

DiLalla LF, Pham HT, Corley RP, Wadsworth S, Berenbaum SA (2021). Family experiences and parent personality as antecedents of pubertal timing in girls and boys. J. Youth and Adolesc. 50(5):1017–1033. https://-doi.org/10.1007/s10964-021-014240

Fatimah JM, Arianto, Bahfiarti T (2021). Media communication and youth reproductive health, North Toraja District. Gac Sanit. 35, S112–S115. https://doi.org/10.1016/j.gaceta.2021.07.007

Goldberg M, D'Aloisio AA, O'Brien KM, Zhao S, Sandler DP (2020). Pubertal timing and breast cancer risk in the Sister Study cohort. Breast Cancer Res. 22(1). https://doi.org/10.1186/-s13058-020-01326-2

Johnston CA, Cavanagh SE, Crosnoe R (2020). Family structure patterns from childhood through adolescence and the timing of cohabitation among diverse groups of young adult women and men. Develop. Psycho, 56(1), 165–179. https://doi.org/10.1037/-dev0000842

Kementerian Kesehatan Republik Indonesia (2018). Hasil Utama Riskesdas 2018.

Lee JJ, Cook-Wiens G, Johnson BD, Braunstein GD, Berga SL, Stanczyk FZ, Pepine CJ, Merz CNB, Shufelt CL (2019). Age at Menarche and Risk of Cardiovascular Disease Outcomes: Findings From the National Heart Lung and Blood Institute-Sponsored Women's Ischemia Syndrome Evaluation. J. Am. Heart Assoc., 8(12). https://doi.org/10.1161/JAHA.119.012406

Ling H, Yan Y, Feng H, Zhu A, Zhang J, Yuan S (2022). Parenting styles as a moderator of the association between pubertal timing and chinese adolescents' drinking behavior. Inter. J. Environment. Res. and Pub. Health, 19(6). https://doi.org/10.3390/ijerph19063340

Malitha JM, Islam MA, Islam S, Al Mamun ASM, Chakrabarty S, Hossain MG (2020). Early age at menarche and its associated factors in school girls (age, 10 to 12 years) in Bangladesh: A cross-section survey in Rajshahi District, Bangladesh. J. Physiol. Anthropol., 39(1). https://doi.org/10.1186/s401-01-020-00218-w

Munanadia (2023). An Overview of The Reproductive Health of Teenage Girl in The Bereng Bengkel Village. BEMJ, 6(2), 45–50.

Pham HT, Dilalla LF, Corley RP, Dorn LD, Berenbaum SA (2021). Family environmental antecedents of pubertal timing in girls and boys: a review and open questions.

Prosperi S, Chiarelli F (2023). Early and precocious puberty during the COVID-19 pandemic. In Front. Endocrinol. (Vol. 13). Frontiers Media S.A. https://doi.org/10.3389/fendo.2022.1107911.

Syam WDP, Gaytri SW, Muchsin AH, Bamahry AR, Laddo N (2022). Hubungan status gizi terhadap usia menarche (relationship of nutritional status and age of menarche). Fakumi Med. J, 2(9), 637–645.

Taib B, Ummah DM, Bun Y (2020). Analisis pola asuh otoriter orang tua terhadap perkembangan moral anak (Analysis of authoritarian parenting patterns of parents on children's moral development). J. Pend. Guru PAUD, 3(1), 128–137.

Yu EJ, Choe SA, Yun JW, Son M (2020). Association of Early Menarche with Adolescent Health in the Setting of Rapidly Decreasing Age at Menarche. J Pediatr Adolesc Gynecol. 33(3), 264–270. https://doi.org/10.1016/-j.jpag.2019.12.006

Yulita C, Devitasari I, Delika M, Eka HS, Raya P, Tengah K (2022). Gambaran menarche pada remaja siswi di Sekolah Menengah Pertama Negeri 14 Palangkaraya (Menarche overview in female students at State Junior High School 14, Palangkaraya). JSM, 50–56. https://doi.org/10.33084/jsm.-vxix.xxx

Zhang L, Zhang D, Sun Y (2019). Adverse childhood experiences and early pubertal timing among girls: A meta-analysis. Int J Environ Res Public Health. 16(16). https://doi.org/10.33-90/ijerph16162887