

Factors Analysis of Anaemia in Adolescent Girl

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Abstract: Early detection of anaemia in adolescent girls is important to optimize future maternal health. Prevention of anaemia in junior and senior high school students is the target program of Community Health Center in Indonesia. This study aimed to determine factors that affect the incidence of anaemia at adolescent girls of Junior High School 3 Kediri. We used observational analytic study with cross sectional design through questionnaires and blood sampling using HB Stick from 171 girls in Junior High School aged 10 - 19 years. The result showed 78 respondents (45.6%) had anaemia and 93 respondents (54.4%) did not experience anaemia. From the analysis, there was a correlation of Menarche age (p 0.036; OR 0.574; CI 0.342-0.964), father education (p 0.027; OR 0.309; CI 0.109-0.877), parents income (p 0.026; OR 0.119; CI 0.018-0.776), Menstruation cycle (p 0.000; OR 0.098; CI 0.031-0.318) and Duration of Menstruation (p 0.031; OR 0.348; CI 0.129-0.904) with the incidence of anaemia. There was no correlation between eating habits (p 0.999; OR 0.999; CI 0.000) with the incidence of anaemia. Iron supplementation and support from family, school and community health center was necessary to prevent anaemia in adolescent girls.

1 INTRODUCTION

Anaemia is a major public health problem worldwide and is often ignored in both developed and developing countries. Preschool children, pregnant women and adolescents constitute vulnerable group of anaemia (Deshpande *et al.*, 2013). Adolescence, a period of transition between childhood and adulthood, occupies a crucial position in the life of human beings. This period is characterized by an exceptionally rapid rate of growth (Nelima, 2015)

The global youth population face a series of serious nutritional challenges that not only affect their growth and development but also their livelihood as adults. However, adolescents remain dormant, difficult to measure and difficult to reach population, where the needs of adolescent girls in particular, are often ignored. Anaemia in adolescent girls contributes to maternal and fetal death and future morbidity (Upadhye and Upadhye, 2017)

Fe deficiency anaemia is a common problem in the world with a prevalence of 9% in infants, 9-11% in girls, and less than 1% in young men (Marcdante and Kliegman, 2015). Other study showed 25% of adolescent students in the world are suffering from

iron deficiency anaemia (Whitfield, Bergmann and Lazarchick, 2015). Fe deficiency occurs in both developing and developed countries with nutritional problems. In response, the World Health Organization (WHO) aims to reduce anaemia in women of childbearing age by up to 50% in addition to children's initiatives targeted by 2025 (WHO *et al.*, 2011). The proportion of anaemia in non-pregnant women in Indonesia resulted in Riskesdas. A cut off point reference used for women of reproductive age 15-49 years old with anaemia is when Hb <12.0 g / dL. Data available on urban-rural areas (Badan Pusat Statistik, 2016). This study aim is to determine factors that affect the incidence of anaemia in adolescent girls in Junior High School.

2 METHODS

2.1 Participant

The study was conducted in Junior High School 3 urban areas of the northern city of X aged 10 years - 19 years and has not married as many as 171 girls. Adolescence is defined by WHO as period of life spanning the ages between 10-19 years which is a

period where both physical as well as psychological changes occur (Jawarkar *et al.*, 2015)

2.2 Research Procedure

This research was analytic observational with cross sectional design to collect population data through questionnaire and blood sampling using HB Stick. For interpretation of anaemia, cut-off point for hemoglobin level taken was < 12g/dl (Kaur, Deshmukh and Garg, 2006). The questionnaire consists of 26 questions to know the student knowledge about anaemia (causes of anaemia, anaemia sufferers, anaemia symptoms). It is said good knowledge with scores above 12, and said less knowledge with a total score of less than 12. Feeding habits assessed by questionnaire contained 9 questions about the number of meals per day, diet, iron supplements, vitamins, and coffee or tea habits. Rating by category: less (<7), moderate (7-8), good (> 8).

3 RESULTS AND DISCUSSION

Based on table 1 of 171 respondents found that most respondents aged 10-12 years as many as 51 respondents (29.9%) and respondents aged 13-16 years as many as 120 respondents (70.1%)

Table 1: Adolescent girls age frequency distribution.

Age	N	%
10-12 years	51	29.9%
13-16 years	120	70.1%
16-19 years	0	0%
Total	171	100%

Table 2: Frequency distribution of haemoglobin level characteristics.

HB levels	N	%
Anaemia	78	45.6
Non Anaemia	93	54.4
Total	171	100%

Based on table 2 of 171 respondents obtained 78 respondents (45.6%) had anaemia and 93 respondents (54.4%) did not experience anaemia.

Table 3: Frequency distribution of parental education characteristics.

Parents education	Father	%	Mother	%
>9 years	127	74.3	105	61.4
<9 years	44	25.7	66	38.6
Total	171	100%	171	100%

Based on table 3 of 171 respondents found that education over 9 years in the father 127 respondents (74.3%) and mother 105 respondents (61.4%) and education less than 9 years in the father 44 respondents (25.7%) and mother 66 respondents (38.6%).

Table 4: Frequency distribution characteristics of parent income.

Parents income	N	%
≥ Rp 1.758.000,00	142	83.0
< Rp 1.758.000,00	29	17.0
Total	171	100,0

Based on table 4 of 171 respondents found that the income of parents ≥ Rp 1.758.000,00 as many as 142 respondents (83.0%) and <Rp 1.758.000,00 of 29 respondents (17.0%).

Table 5: Frequency distribution of respondent knowledge characteristics.

Respondents knowledge	N	%
Good	62	36.3
Low	109	63.7
Total	171	100,0

Based on table 5, of 171 respondents found that most respondents have less knowledge about anaemia as much as 109 persons (63.7%) and good knowledge about anaemia that was as much as 62 persons (36.3%).

Table 6: Frequency distribution of menstrual pattern characteristics.

Menstruation pattern	N	%
Menarche Age (<11 years)	14	8.2
(≥11 years)	157	91.8
Menstrual cycle (Regular)	74	43.3
(Irregular)	97	56.7
Duration of menstruation (≤ 8 days)	88	51.5
(>8 days)	83	48.5
Total	171	100,0

Based on table 6 of 171 respondents found that the menarche age is less than 11 years as many as 14 respondents (8.2%) and more than the same as 11 years as many as 157 respondents (91.8%). Regular Cycle of 74 respondents (43.3%) and irregular as much as 97 (56.7%). The time of menstruation was less than equal to eight days as many as 88 (51.5%) and more than 8 days as many as 83 (48.5%)

Table 7: Frequency distributions of eating habits characteristics.

Eating habits	N	%
Good	72	42.1
Moderate	91	53.2
Defisit	8	4.7
Total	171	100,0

Based on table 7, of 171 respondents found that good eating habits as much as 72 respondents (42.1%), while 91 respondent (53.2%) and deficit of 8 respondents (4.7%).

Table 8: Resumes of bivariate analysis.

Variable	p	Explanation
Father education	0.000	Significant (p< 0,05)
Maternity education	0.000	Significant (p< 0,05)
Parents income	0.000	Significant (p< 0,05)
Respondents knowledge	0.000	Significant (p< 0,05)
Menarche Age	0.201	Not Significant (p>0,05)
Menstruation cycle	0.000	Significant (p< 0,05)
Duration of menstruation	0.000	Significant (p< 0,05)
Eating habits	0.000	Significant (p< 0,05)

Based on Table 8, the result of chi-square test in bivariate analysis shows that there are seven variables which have significant influence on the incidence of anaemia in adolescent girls, include education of father and mother (p = 0,000), parent income (p = 0,000), Respondent's knowledge (p = 0,000), menstrual cycle (p = 0,000), duration of menstruation (p = 0,000), and eating habits (p = 0,000) while those who have no effect on the occurrence of anaemia are menarche age (p = 0,201).

Adolescence is a transition phase of life from childhood to adulthood. This phase of life is vulnerable to nutritional deficiency due to the increased nutritional demands for growth and development (Limbu *et al.*, 2017). Iron requirement is higher among girls because of the increased need for blood volume expansion associated with accelerated adolescent growth and menstrual onset. Anaemia in this age group is a major concern because it has direct and immediate effects on productivity, cognitive function, decreases school performance and decreases physical work capacity.

Table 9: Multivariate analysis binary logistic regression test.

Variable	B	Wald	Sig	OR	CI 95%
Menarche Age	-0.554	4.397	0.036	0.574	0.342-0.964
Father education	1.173	4.873	0.027	0.309	0.109-0.877
Parents income	-2.128	4.951	0.026	0.119	0.018-0.776
Mentruation cycle	-2.318	15.027	0.000	0.098	0.031-0.318
Duration of Menstruation	-1.074	4.677	0.031	0.348	0.129-0.904
Eating habits (1)	-19.383	0.000	0.999	0.999	0.000
Eating habits (2)	-20.903	0.000	0.999	0.999	0.000
Constant	30.899				

This condition also has an indirect effect on the future economy of the individual then the nation. (Nelima, 2015). Iron deficiency anaemia (IDA) constitutes the major anaemia during adolescent period. Accelerated development, hormonal changes, malnutrition and starting of menstrual periods in girls are major causes in this period (Balci *et al.*, 2012).

Published risk factors for Iron deficiency anaemia (IDA), including race, poverty, education, low iron intake, heavy menses, parity, and a previous diagnosis of IDA, are based on all women of reproductive age, variably defined between 12 and 49 years. Adolescent women differ in many ways from older reproductive-age women, including nutritional requirements, duration of menses, and contraceptive use (Sekhar *et al.*, 2016)

Parents education in this research was divided into two categories: low education if formal education was taken <9 years (not finished primary school or not finished Junior High School) and higher education if formal education was taken ≥ 9 years (Graduated from Junior High School or graduate high school or college finish). According to research conducted by (Gedefaw *et al.*, 2015) father education status had a significant correlation to the prevalence of the incidence of anaemia in school-age adolescents have a 9.03 times greater chance of anaemia than teenagers who have a father with upper secondary education. This was because the father played an important role for good family decisions that related to with adolescent health. On the other hand, an educated father will also get a job with the appropriate salary and can apply a healthy lifestyle.

Maternal education played a role in building family health, well-educated mothers would find it easier to receive health information, both in food and in childcare. Maternal inquiry was the main capital in supporting the family economy also play a role in preparing family food, as well as the care and care of children (Udgiri *et al.*, 2010). The result of this study in accordance with (Srivastava, Kumar and Sharma, 2016) which showed statistically significant association with mother's educational status and father's educational status.

Parent income in this research was the amount of income of father and mother based on UMR (Regency Minimum Wage) of 1.7 million rupiah. Result of study by (Farida, Widajanti and Pradigdo, 2013) about parent income where value ($p = 0,001$), which mean parent income was one of factor that determine the quality and quantity of food. The

study results from (Sachan *et al.*, 2012) suggest that the socioeconomic status of the family and traditional eating habits are of great importance in the development of anaemia.

A person's eating behaviour in this case was influenced by many things, including family income. What foods teenagers consume is highly dependent on what food is served by the family in this case the mother. This type of food was also highly dependent on how much money is available for the purchase of family food (Notoatmodjo, 2007).

From this study, the correlation between student knowledge and anaemia in accordance with the research (Martini, 2015) that there is a relationship between knowledge with the incidence of anaemia ($p = 0.048 < \alpha = 0.05$). Adolescents with knowledge who are less at risk 2.3 times more likely to develop anaemia than well-informed teenagers. In addition, the high proportion of anaemia is also due to adolescent ignorance while drinking tea after or along with eating can cause anaemia. For that, it is necessary efforts of health workers to prevent the incidence of anaemia by providing counselling about anaemia and consumption of the right tea drink to reduce the incidence of anaemia (Martini, 2015)

This study showed different result compared with (Gupta *et al.*, 2012). In this study, menarche age had significantly affect the prevalence of anaemia. Gupta study showed the result that onset of menarche had no significant effect on the prevalence of anaemia.

Menstrual cycle and duration of menstruation affect the incidence of anaemia. According to (WHO *et al.*, 2011), the high blood loss in women was an important risk factor that can cause iron deficiency anaemia in women. Iron out as much as ± 42 mg every menstrual cycle. While in men or women who are not menstruating will lose iron by 1 mg per day. Women with menstrual abnormalities over 8 days with a history of bleeding and clots during menstruation have a greater risk (WHO *et al.*, 2011).

From table 9 there is a correlation between eating habits and the occurrence of anaemia. This research was in line with (Kaimudin, Lestari and Dkk, 2017) showing that there was a meaningful relationship between eating habits and the incidence of anaemia in adolescent girls with the value of p value = 0.041 (Kaimudin, Lestari and dkk, 2017).

A diet was how a food was obtained, the type of food consumed, or the frequency of eating from a person. Diet was often irregular, rarely eat breakfast or lunch, consequently teenage girls were often limp and not enthusiastic in the learning process. This is because at the age of adolescence was often wrong

diet or limitation of high food contain Fe, mother's knowledge as a provider of food in the household, knowledge of young women, environmental influences, and nutritional status of the teen (Suryani, Hafiani and Junita, 2017).

A study also found that knowledge of low anaemia also occurs in Junior High School, this may be a factor in the lack of nutrient intake with low iron content. In many studies it was found that the anaemia is a common problem in adolescent age group due to intake of low diet and lack of awareness of nutrition is also main cause of anaemia (Hafeez *et al.*, 2016)

In many developing countries, one half all children and adolescents fail to achieve their full genetic growth potential due to the combined effects of inadequate nutrition and frequent illness. Moreover, due to faulty dietary habits, ignorance, and in a country like India, with a multitude of social customs and beliefs cited against women, the prevalence of malnutrition amongst girls remains quite high (Deshpande *et al.*, 2013).

It is important to give iron therapy for young girls who have anaemia. Iron therapy can lead to gastrointestinal discomfort, constipation, and bloating which, oftentimes, make patients self-discontinue (Whitfield, Bergmann and Lazarchick, 2015). This could affect the compliance of the iron therapy for young girls who have anaemia. Study from (Joshi and Gumashta, 2013) strongly recommends the 'Weekly Iron Folic Acid Supplementation' regime mainly through school health programme, and other similar adolescent health care service providers (Joshi and Gumashta, 2013)

4 CONCLUSIONS

There exists a need to prevent and cure anaemia incidence especially in young girls. Health education especially about anaemia is important for improving student knowledge about anaemia and eating habits. Support from community health center, school and parents are needed. Strengthening and empowerment young girls are the key to prevent anaemia so could reach better maternal health in the future.

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