



THE EFFECT OF IRON AND FOLIC ACID SUPPLEMENTATION ON ADOLESCENT MENTAL HEALTH

Dewi Ari Sasanti^{1*}, Leni Suhartini²

¹Politeknik Borneo Medistra, Jl. Tiga No.99, Gn. Samarinda, Balikpapan Utara, Balikpapan, Kalimantan Timur 76125, Indonesia

²STIKes RSPAD Gatot Soebroto, Jl. Dr. Abdul Rahman Saleh No.24, Senen, Jakarta Pusat, Jakarta 10410, Indonesia
[*dewiarisasanti@gmail.com](mailto:dewiarisasanti@gmail.com)

ABSTRACT

Depression significantly impacts multiple aspects of life, including relationships, academic or work performance, and overall well-being. Individuals who have experienced abuse, severe loss, or other stressful events are more susceptible to depression. The aim of this study was to determine the effect of iron and folic acid supplementation on the mental health of adolescents. This research is a quantitative research using pre-experimental design, one-group pre-post test design research type. The sampling method in this study used purposive sampling with a sample size of 30 people. Researchers collected respondent data by gathering them in one room, providing an initial questionnaire. The researcher explained how to take Fe and folic acid tablets to the respondents. Respondents were instructed to write down the date in a table provided by the researcher after taking their iron tablets as scheduled. The researcher and respondents agreed on a meeting date one month later to complete the same questionnaire as the first. The results of the Wilcoxon Signed Rank Test statistical test show that the Asymp.Sig. (2-tailed) value is 0.001, because the significance value of the test results is 0.001 ($\alpha < 0.05$), so the hypothesis (H_a) is accepted and the hypothesis (H_0) is rejected. So it can be concluded that there is a significant influence on the provision of Iron and Folic Acid supplementation on adolescent mental health. The conclusion of this study is that respondents who adhere to the schedule for taking Fe and Folic Acid tablets have a good impact on mental health.

Keywords: adolescent; folic acid; iron; mental health

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INTRODUCTION

Adolescents are people who are in a transition period from childhood to adulthood. All aspects that exist in this period of development and transition include physical, cognitive, personality, and social development. Changes that occur in adolescence often cause mental health problems and this condition requires important attention to measure mental health. (Safitri, 2024). One in three adolescents (34.9%), equivalent to 15.5 million Indonesian adolescents, had one mental health problem in the past 12 months. • One in twenty adolescents (5.5%), equivalent to 2.45 million Indonesian adolescents, had one mental disorder in the past 12 months. Anxiety disorders are the most common mental disorders experienced by adolescents. • There is no difference, either by gender or age, in the prevalence of mental disorders overall. However, there are some differences by gender and age in the prevalence of certain types of mental disorders (I-NAMHS, 2022). The aim of this study was to determine the effect of iron and folic acid supplementation on the mental health of adolescents. The topic taken in this study is Iron and Folic Acid Supplementation with the researcher's contribution being to provide Iron and Folic Acid to adolescents aged 10-17 years to see the effect on mental health.

Neuropsychiatric disorders in adolescents are the trigger for the burden of disease and losses due to loss of productivity of 15-30 percent in the first three years of a decade of life. The losses caused by depression are the basis for many studies in examining various things that can reduce the risk of depression, including diet and physical activity. Several studies have reported that mental health is influenced by diet quality and breakfast habits.9,10 Nutrients in food appear to play an important

role in the balance of dopamine, serotonin, and norepinephrine which are the most influential neurotransmitters in controlling a person's mood and behavior. (Hermanto, et al. 2020).

Iron plays an important role in various physiological processes. Disturbances in iron homeostasis can have severe consequences, including neurodevelopmental disorders, neurodegenerative disorders, stroke, and cancer. Interestingly, the relationship between mental health disorders and iron homeostasis has not received significant attention. Therefore, our understanding of iron metabolism in the context of psychological illness is incomplete (Qiong WU, 2023). Micronutrients play a vital role in metabolic pathways that contribute to the development and functioning of the digestive system and nervous system. Inadequate intake of these micronutrients can negatively impact psychological well-being, increasing the risk of depressive disorders. Some micronutrients that are closely related to mental health include folate, vitamin B6, vitamin B12, vitamin D, zinc, and magnesium. Inadequate intake of several micronutrients, totaling deficiencies of four or more essential micronutrients, significantly increases the risk for depression (Liwinski, 2023). There are several ways to detect mental health and mental disorders, one of which is by using the Self-Reporting Questionnaire (SRQ-20) which consists of 20 question items (Zaini & Komarudin, 2022). The Self-Reporting Questionnaire (SRQ-20) is a questionnaire developed by the World Health Organization (WHO) for mental health screening and includes 20 question items (Mariyati & Wulandari, 2022). The aim of this study was to determine the effect of iron and folic acid supplementation on the mental health of adolescents.

METHOD

This research is a quantitative research using pre-experimental design, one-group pre-post test design research type. The sampling method in this study used purposive sampling with a sample size of 30 people. In this study, the measuring instrument used was the Self Reporting Questionnaire (SRQ-20) questionnaire, with 20 questions and measured by the Guttman scale (yes or no). The statistical test for validity in this study used the Pearson Correlation (Janna & Herianto, 2021). The second statistical validity test obtained a range of SRQ-20 validity values (0.708-0.941) and clearly exceeded the table's r value (0.136).

The Cronbach's Alpha value for the SRQ-20 questionnaire was 0.981. According to (Janna & Herianto, 2021), an instrument can be considered valid if the Cronbach's Alpha value reaches 0.688, indicating the questionnaire is proven reliable. The assessment of mental health conditions is based on the interpretation of the SRQ questionnaire by adding up the "yes" answers obtained from each questionnaire question. If six or more "yes" answers are obtained, the respondent is said to be indicated as having an emotional mental disorder or mental health problem (Ministry of Health of the Republic of Indonesia, 2013). The questionnaire used in this study was the Self Reporting Questionnaire (SRQ-20). The Self Reporting Questionnaire (SRQ-20) is a questionnaire developed by the World Health Organization (WHO) for mental health screening and includes 20 question items. Data analysis used the Wilcoxon signed-ranked test.

RESULT

Table 1.
Frequency distribution of age

	f	%	Valid Percent	Cumulative Percent
16	1	3.33	33.3	33.3
17	20	6.66	66.6	66.6
18	9	30.0	30.0	30.0

Table 1, there is 1 sample person aged 16 years, or around 3.33%, as many as 20 respondents aged 17 years, or as many as 66.6% of the total respondents, and there are at least 9 people aged 18 years or around 30% of the total respondents of 30 respondents. Table 2, The information from the table is the frequency distribution of compliance with Fe Tablet Supplementation. Namely, there are 4 or around 13.33% of the total respondents who are not compliant with the Fe tablet taking schedule, there are 26 or around 86.66% of respondents who are compliant with the Fe tablet taking schedule.

Table 2.
Frequency distribution of Fe Tablet Supplementation

Compliance	f	%	Valid Percent	Cumulative Percent
Not Compliance	4	13.33	13.33	13.33
Compliance	26	86.66	86.66	86.66

Table 3. Frequency distribution of folic acid supplementation

Compliance	f	%	Valid Percent	Cumulative Percent
Not Compliance	4	13.33	13.33	13.33
Compliance	26	86.66	86.66	86.66

The information from the table is the frequency distribution of compliance with Folic Acid Supplementation. Namely, there are 4 or around 13.33% of the total respondents who are not compliant with the schedule for taking Fe tablets, there are 26 or around 86.66% of respondents who are compliant with the schedule for taking Folic Acid.

Tabel 4.
Wilcoxon Signed Rank Test

		Ranks		
		N	Mean Rank	Sum of Ranks
Posttest – Pretest	Negative Ranks	0 ^a	.00	.00
	Positive Ranks	12 ^b	6.50	78.00
	Ties	18 ^c		
	Total	30		

a. Posttest < Pretest

b. Posttest > Pretest

c. Posttest = Pretest

Test Statistics ^a	
Posttest - Pretest	
Z	-3.464 ^b
Asymp. Sig. (2-tailed)	.001
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

		N	Mean Rank	Sum of Ranks	Z	Asymp. Sig. (2-tailed)
Pretest-Posttest suplementasi Zat Besi dan Asam Folat terhadap kesehatan mental remaja	Negative Ranks	0 ^a	.00	.00	-	.001
	Positive Ranks	12 ^b	6.50	78.00	3.464 ^b	
	Ties	18 ^c				

Based on the results of the Wilcoxon test listed in the table above, it was found that the negative difference or negative rank between the pre-test and post-test values was 0, meaning that there was no decrease in the pre-test value to the post-test value of Iron and Folic Acid supplementation on adolescent mental health, while the positive ranks or positive difference between the pre-test and post-test values was 12 or there was an increase in the pre-test value to the post-test value with an average increase of 6.50. The results of the Wilcoxon Signed Rank Test statistical test show that the Asymp.Sig. (2-tailed) value is 0.001, because the significance value of the test results is 0.001 ($\alpha < 0.05$), so the hypothesis (H_a) is accepted and the hypothesis (H_0) is rejected. So it can be concluded that there is a significant influence on the provision of Iron and Folic Acid supplementation on adolescent mental health.

DISCUSSION

Mental disorders, also referred to as mental health conditions, are disorders that affect cognition, emotion, and behavioral regulation, significantly impairing children's learning ability and adults' functioning in the family, workplace, and society at large. (Wu,Q. 2023). Mental disorders have a generally high incidence, compared to other health conditions. According to the World Health

Organization (WHO), 970 million people worldwide live with a mental disorder, with anxiety disorders and depression being the most common.

Despite effective prevention and treatment options, the majority of people with mental disorders do not have access to effective care. Untreated mental health conditions can lead to serious personal consequences, such as self-harm and suicide, which places significant burdens on families and communities. (Moitra, M, 2022). Individuals with mental disorders can also experience stigma, discrimination, and human rights violations. (Farwin A, 2023). The main finding of the results of this study is that there is a significant influence of the provision of Iron and Folic Acid supplementation on adolescent mental health with a significance value of 0.001 ($\alpha < 0.05$). This is in accordance with research by Hentze et al. 2010 that iron has a specific and unique role in the brain due to the direct involvement of this metal in the function of the central nervous system, including myelin synthesis, neurotransmitter synthesis, and metabolism.

Of the 30 respondents, 26 or around 86.66% of respondents were obedient in following the schedule for taking Fe tablets, indicating that Fe tablet supplementation has a positive impact on mental health. This is in accordance with Wu, Q, 2023's research that iron supplements have been suggested to alleviate mental disorders. Iron metabolism in the brain is very important to influence the underlying mechanisms to improve strategies that help prevent and possibly cure mental disorders. The mechanisms underlying the effects of iron on mental disorders are diverse and complex. The effects of iron on psychological health are determined by many physiological/biological properties and spatial/temporal factors. These include neurotransmission, iron-related myelination, and oxidative stress, among many others. Recently, the effects of ferroptosis on mental health and related emotional disorders have also been illustrated in several studies. (Bao, Wd.2021).

The findings of the researcher's study from 30 respondents found that 26 or around 86.66% of respondents were obedient in following the schedule for taking Folic Acid, and had a good impact on mental health. This is in accordance with the research of Liwinski, T.2023) that folic acid and L-methylfolate show promising results, especially for people with depression, because they offer benefits both as an additional antidepressant and as monotherapy. Rigorous research through double-blind randomized clinical trials (RCTs), encompassing diverse populations and clinical settings, is needed to confirm the efficacy of folic acid and L-methylfolate. These efforts could be extended to suicide prevention, leveraging the safety and affordability of folic acid. Overall, a comprehensive systems psychiatry perspective combined with personalized medicine holds the key to unraveling the complexities of depression and optimizing treatment strategies for individuals based on their unique characteristics and needs.

Weekly iron and folic acid supplementation has been shown to be effective in increasing serum ferritin, Hgb levels, and reducing the risk of anemia or iron deficiency in adolescents compared to placebo or no intervention. UNICEF's latest nutrition strategy, released in 2021, includes weekly iron and folic acid supplementation as an intervention in the outcome area focused on 'childhood and adolescence' (U. N. C. F. 2020). The number of this study involved 30 respondents, for more comprehensive results it is necessary to increase the number of respondents, with wider variables. This is in line with the conclusion of the study by Kedir S, Hassen. 2024, namely the limitations of available data underscore the need for a comprehensive and standardized research methodology to explain the various effects associated with weekly iron-folic acid supplementation on various nutritional, educational, and health parameters.

CONCLUSION

Based on the results of the analysis and discussion of the research results, it can be concluded that the effect of iron and folic acid supplementation on adolescent mental health is that there is a significant effect with a significance value of 0.001 ($\alpha < 0.05$). It is important to note that

respondents who adhere to the schedule for taking Fe and Folic Acid tablets have a positive impact on their mental health.

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