



Development of family empowerment models for adolescent anemia: systematic review

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Abstract

This study aimed to systematically review literature related to the family empowerment model used for prevention of the anemia in adolescents. This study uses 5 journal databases, namely: PubMed, Science Direct, Google Scholar, Springer link, and BMC from 2010-2021. Before searching for articles, the researcher determines the keywords first and then extracts them using the PRISMA protocol according to the inclusion and exclusion criteria. Thus, 8 articles were found that matched the criteria of the JBI critical appraisal tools for analysis. The results show that two studies conducted an intervention for anemia prevention among adolescents. A few studies analyzed family empowerment amongst adolescents with Thalassemia. This study showed that the family intervention model can effectively influence the knowledge and behavior of mothers regarding children with Thalassemia. The intervention that can be given in family empowerment is emotional support, an increase in family involvement, family normalization, and family empowerment. To achieve appropriate family empowerment results in improving family abilities, assessing, influencing, and managing situations with family resources using the Caregiver Empowerment Model. Family empowerment which focuses on anemia has yet to be conducted in significant numbers. To increase the health of female adolescents in the prevention of anemia, there is a need to develop a caregiving empowerment model in family empowerment in anemia among adolescents.

Keywords: Adolescents, Anemia, Model development, Caregiver Empowerment Model, Family empowerment.

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1. Introduction

Almost all over the world, one of the main health problems in adolescents is anemia and half of these cases are caused by iron deficiency which needs special attention. The prevalence of anemia cases among female adolescents at school is as much as 50.3% [1]. Anemia among adolescents can cause lasting negative impacts on their growth, development, cognitive ability and learning concentration, and would also increase their vulnerability towards infectious diseases [2]. Prevalence of anemia among adolescents in 2017 according to the World Health Organization (WHO) is 40-88%, the highest being in South Asian countries including Bangladesh with 70%, Nepal with 67%, and Maldives with 62% [3]. In Indonesia, the incident of anemia is still high. According to data of *Riset Kesehatan* of year 2018, the prevalence of anemia among adolescents is 32%, which

means 3-4 out of 10 adolescents suffer from anemia [4]. The problem of anemia among adolescents is influenced by several factors that are related to one another, either directly or indirectly. Factors with direct influence include the lack of nutritional intake, both qualitatively and quantitatively, and infectious diseases. Factors with indirect influence include parenting styles, food security, environmental hygiene, and quality of and access to healthcare providers [5]. The main problems of family empowerment in preventing anemia in adolescents are levels of household income, education, knowledge, and skills. To prevent such problems, there needs to be synergic and integrated management and support and roles from various stakeholders. Improvement on preventive measures of anemia and malnutrition among adolescents is essential in order to prevent malnutrition among pregnant mothers of the next generation [6]. One way to prevent

anemia is the development of family empowerment. Caregiver Empowerment Model (CEM) is used to observe challenges in understanding and experiencing parenting and as a framework to develop and test theory-based intervention to promote positive results [7]. From the description of the background above, the objective of this study is to conduct a systematic review of literature related to the family empowerment model used for prevention of the anemia in adolescents.

2. Methods

This study used the referred Reporting Items for Systematic Reviews and Meta-Analyses guidelines [8]. The eligibility criteria consisted of experimental studies from international and Indonesia related to family empowerment intervention and anemia. The research population is adolescents. The studies reviewed were limited research conducted in international and Indonesian, and published in English or Indonesian from 2010 to 2021. Articles that are excluded from the category are the ones that are not published in any journal or are published in the form of a review.

3. Result

According to the article search result with the keywords mentioned above showed that there were 27 articles from PubMed, 13 articles from Science Direct, 23 articles from Google Scholar, 3 articles from Springer Link, and 15 articles from BMC. The next step is abstract review. After reviewing abstracts from 34 chosen articles, 24 articles were excluded because they are not studies of anemia among adolescents, and 10 articles are included to the next step, which is full-text review. From the search for full text of the 10 chosen articles, 2 articles were excluded because they are not of experimental study methods. Among the 8 articles chosen to be included for analysis, 7 of them were published in English, and 1 of them was published in Indonesian (Figure 1). Eight articles were found from about 11 years (2010–2021). A summary table is provided for a quick reference (Table 1). Publication years ranged from 2010 to 2021. In this study, 2 out of 8 were conducted in Indonesia, in Tanah Toraja [15] and in Indonesia [10]. Six studies were done outside of Indonesia, comprising 4 studies conducted in Iran, which were Kerman Thalassemia Center, University of Medical Sciences, Kerman, Iran [9], Bandar Abbas, Iran [12], Fasa City, Fars Province, Iran [13], and Tehran city [16], and 2 studies conducted in Thailand [11] and Ghana [14]. This systematic review shows that two studies conducted an intervention on anemia prevention among adolescents. The study conducted shows was on administration of iron and folic acid supplementation to 15 junior high school female students and 15 senior high school female students aged 10 to 19 years old [14]. The study Khani Jeihooni *et al.* showed the weekly administration of iron and folic acid supplementation was effective to increase hemoglobin count and decrease prevalence of anemia among female students. Other study regarding nutrition education intervention using PRECEDE model on preventive behavior against iron deficiency anemia among female students showed positive impact [13]. Family members who have health problem or experience pain or illness often face difficulties to access health care services as a result, their health status is deteriorated. The interventions that can be done to improve this condition is interactive family empowerment. This type of empowerment was based

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on the belief that every family has the potential and ability to grow and become more independent [10]. Study conducted by Kargar *et al.* suggested that knowledge and attitudes of mothers of children with thalassemia increased after receiving family centered empowerment [9]. In addition, there is a significant increase in family function and empowerment scores from time to time for families who play an active role in family empowerment programs. The family empowerment program is one of the best interventions in helping families and health professional education for thalassemia children [11]. Another study concluded that the provision of family-centered empowerment programs in the comprehensive care of children and adolescents is practically feasible and can increase their self-efficacy [12]. The family-based empowerment was significant in reducing overweight case due to adolescent's nutritional status against obesity prevention [15].

4. Discussion

Anemia is the most common health problems among female adolescents, and just like other chronic illnesses, it does not only affect various aspects of a person's quality to become an adult, but also poses the risk of giving birth to a generation with nutritional problems [16]. According to World Health Organization, globally, iron deficiency anemia is the main cause of morbidity and mortality among girls aged 10 to 19 years old [17]. The short-term negative impacts that can be caused by anemia are the decrease in immunity, physical condition and metabolism which can cause susceptibility towards illness, fatigue, and also decrease in concentration. The long-term negative impacts of anemia are connected with a decrease in work capacity and cognition which can result in a decrease in human resources and academic performance [14,18,19,20]. A few studies analysed family empowerment amongst adolescents. The implementation of family empowerment programs can be carried out and can increase self-efficacy for adolescent Thalassemia Major sufferers [12]. This study showed that family intervention model can effectively influence the knowledge and behavior of the mothers regarding children with Thalassemia [9]. Wacharasin *et al.* conducted a study regarding the effectiveness of family empowerment program on the function and empowerment of family amongst 56 families of children with Thalassemia [11]. The result of the finding showed that caregivers who participated in the family empowerment program can significantly increase family function and the empowerment score from time to time. Family empowerment program can be used as a robust intervention in helping the children with Thalassemia and their families, and also healthcare professional education. This study analyzes the survival factors of mothers and daughters who experience anemia through the provision of a family-based empowerment model [16]. The results show that the family-based empowerment model can improve the health lives of anemia girls and mothers. Family-based empowerment influenced the decrease of body mass index (BMI) of family members of the girls or their nutritional status [15]. The limitation of this study is that family empowerment model is mostly done in dealing with children with Thalassemia.

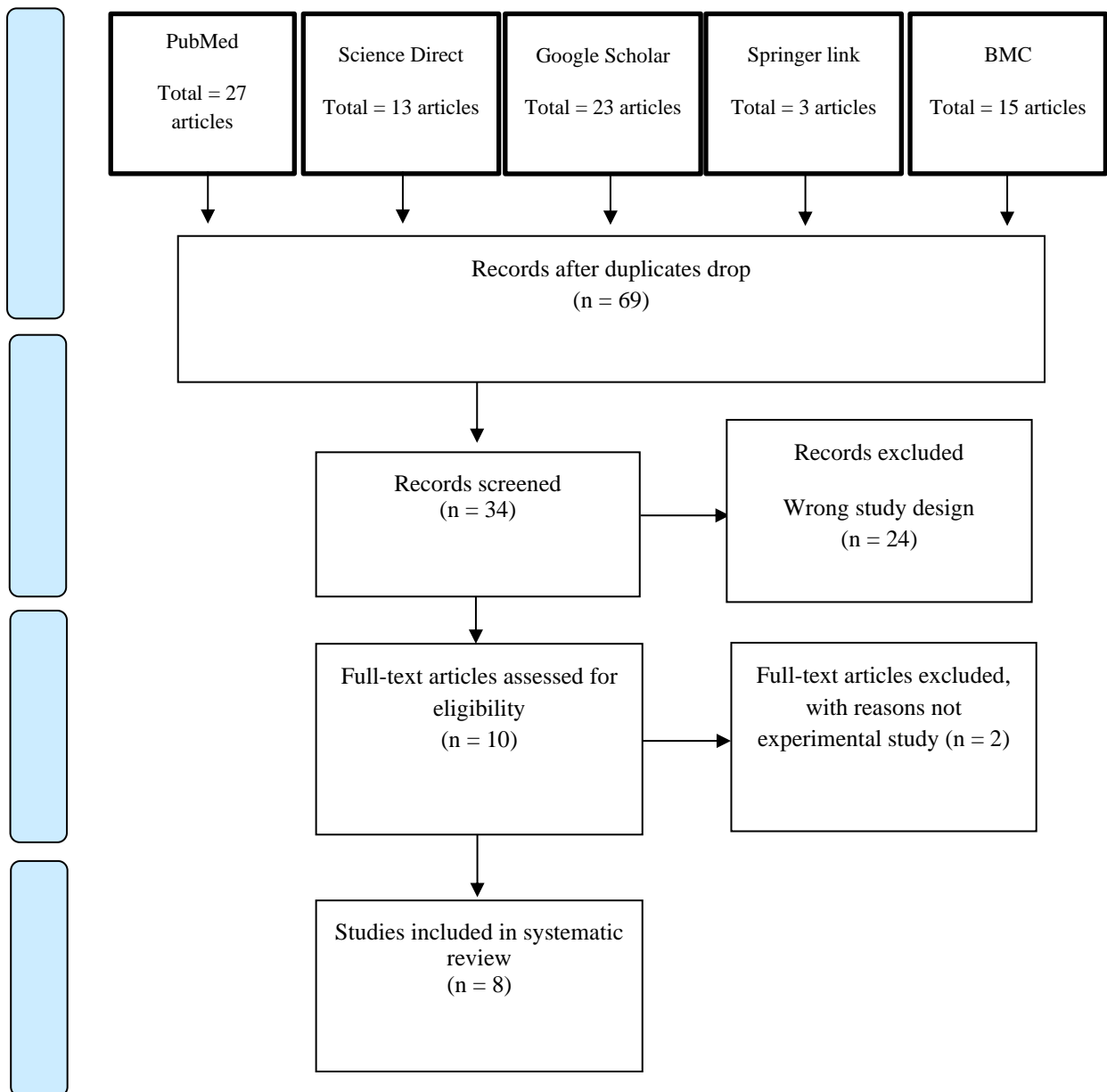


Figure 1: Flow diagram based on PRISMA guideline.

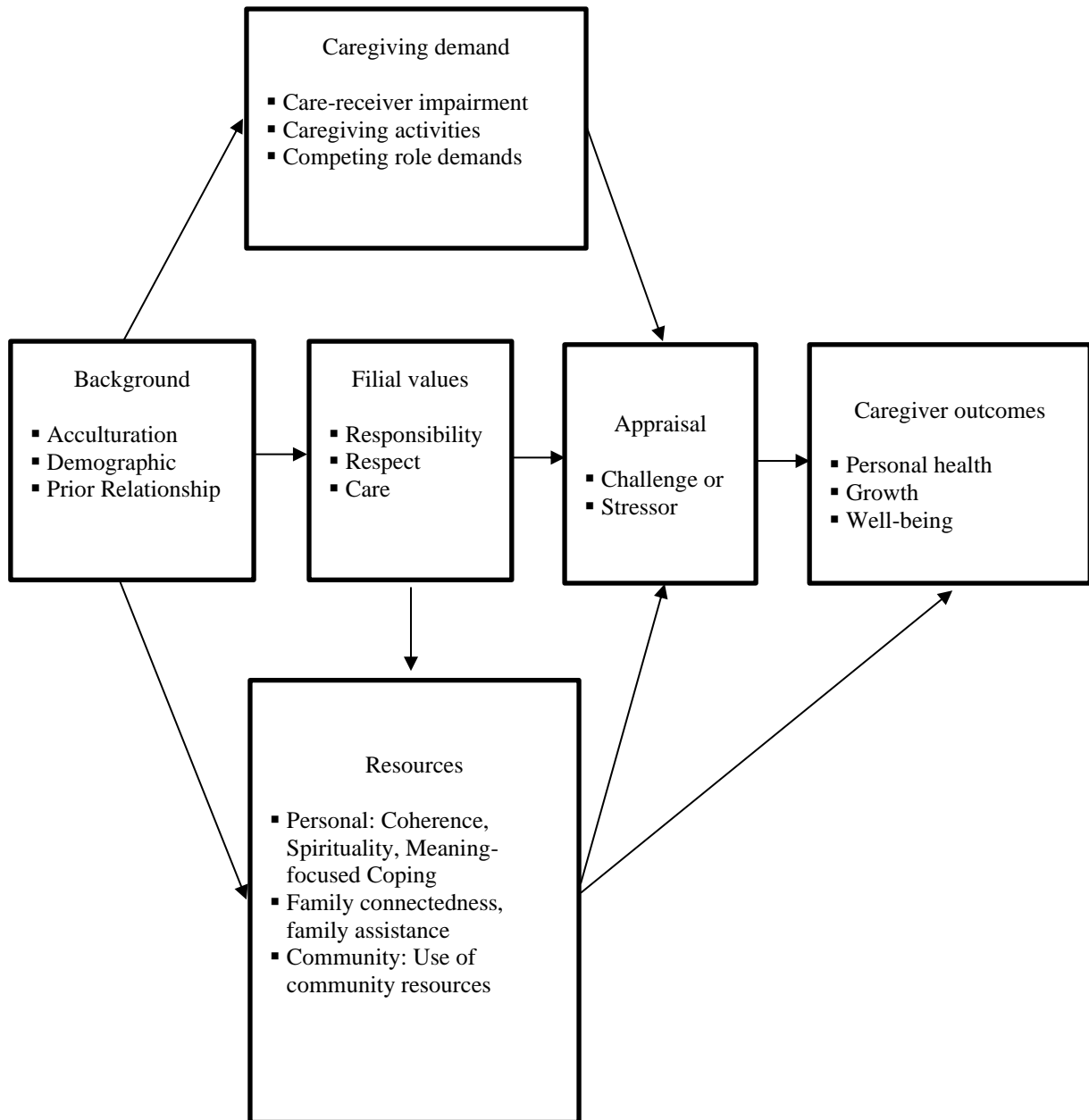


Figure 2: Caregiver Empowerment Model modification [10,13].

Table 1: Summary of selected studies.

Study	Research topic	Methods	Results
Kargar <i>et al.</i> (2011) [9]	To evaluated the effect of empowering family centered model on knowledge and attitude of mothers, who have children with thalassemia referred to Thalassemia Center of Kerman.	semi-experimental	The knowledge and attitudes of mothers of children with thalassemia after obtaining implementing family centered of empowerment have more awareness and better attitude.
Ardian (2014) [10]	Health problem cannot be assessed from patient's perspective as an individual, it must be assessed from their perspective as a member of their family, because the person is living in the context of their family	quasi-experimental	Family empowerment intervention is based on the belief that every family has a potential and ability to develop and become more independent
Wacharasin <i>et al.</i> (2015) [11]	quasi-experimental research on a family empowerment program in families with thalassemia children	quasi-experimental	This practically family-centered empowerment program feasible and it can increase self-efficacy in patients with thalassemia major. It is necessary to further use the program in a comprehensive care protocol for children and adolescents
Borimnejad <i>et al.</i> (2018) [12]	Randomized Controlled Clinical Trial on self-efficacy of adolescents with thalassemia major by administering the Family-Centered Empowerment Program	quasi-experimental study	Family-centered empowerment programs can practically be given and increase self-efficacy for thalassemia major patients. It is necessary to provide a family-centered empowerment program referring to a comprehensive care protocol for children and adolescents.
Khani Jeihooni <i>et al.</i> (2021) [13]	To evaluate the effectiveness model nutrition education on iron deficiency anemia among female students using of the PRECEDE	quasi-experimental study	There is a significant relationship between the provision of nutrition education interventions using the PRECEDE model with increasing iron anemia prevention behavior in female students.
Gosdin <i>et al.</i> (2021) [14]	To see the effectiveness of giving iron and folic acid supplements every week to reduce cases of anemia in school-based early adolescents	quasi-experimental study	There is an increase in Hb and a decrease in the prevalence of anemia in adolescents after being given weekly school-based IFA supplements
Tombeg <i>et al.</i> (2021) [15]	To analyse the effect of family-based empowerment on the teenager's nutrition status	quasi-experimental study	The effect of family-based empowerment in nutritional status and as a reference for adolescents who have experienced overweight in order to implement a healthy diet in Tanah Toraja
Roshan <i>et al.</i> (2021) [16]	The effect of quality of life of adolescent girls with anemia and mothers on the use of the family centered empowerment (FCEM) model	Semi-experimental	There is an increase in the quality of life of anemic adolescent girls and mothers after getting the FEM promotion

Interventions done in management of anemia were also done only as administration of iron and folic acid supplementation and education or nutritional counseling on adolescents in school settings, which did not involve the parents' parenting styles in the intervention activities. There is a need of intervention which involves all family members to establish family empowerment in anemia among adolescents. The intervention that can be given in family empowerment is emotional support, increase in family involvement, family normalization and family empowerment. Caregiver Empowerment Model elaborate on family empowerment as an increase in a family's ability to assess, influence and

manage situations using family resources tin order to achieve desirable outcomes. Caregiver Empowerment Model (CEM) can be used to increase and promote better outcome in nurturing the family [10]. The development of caregiving empowerment which was developed by Ardian [10] referred to 1) Demands of caregiving, including the decrease of care acceptance, caregiving activities, and competitive roles; 2) resources: a) family's personal factors such as coherence, spirituality, and coping mechanism used, b) family factors such as connectedness and family assistance, and c) community factor such as the accessibility of resources; 3) basic values which comprise of responsibility, respect, and

empathy; 4) family background, including acculturation, demographic factors, and previous relationships; 5) evaluation: evaluation result as a challenge or stressor; and 6) result of family caregiving: perception regarding health, personal and family growth, and the existence of prosperous condition (Figure 2).

5. Conclusion

Family empowerment which focuses on anemia has yet to be conducted in significant number. Family involvement in family empowerment in this study is mostly done among girls and their mothers and have yet to involve all members of their families. Studies regarding development of family empowerment model on anemia among girls need to use variables as followed: demands of caregiving, resources, basic values, family background, evaluation and outcome of caregiving. To increase the health of female adolescents in prevention of anemia, there is a need to develop caregiving empowerment model in family empowerment in anemia among adolescents through interventions as followed: 1) administration of iron and folic acid supplementation; 2) nutritional education or counselling; 3) additional nutritional programs such as lunch programs in schools; and 4) accessibility to healthcare facilities

References

- [1] M.A. Tandoh, A.O. Appiah, A.K. Edusei. (2021). Prevalence of anemia and undernutrition of adolescent females in selected schools in Ghana. *Journal of nutrition and metabolism*. 1-5.
- [2] S.-R. Pasricha, M. Low, J. Thompson, A. Farrell, L.-M. De-Regil. (2014). Iron supplementation benefits physical performance in women of reproductive age: a systematic review and meta-analysis. *The Journal of nutrition*. 144(6): 906-914.
- [3] W.N. Anaemias. (2017). Tools for effective prevention and control. World Health Organization: Geneva, Switzerland. 1-83.
- [4] Ministry of Health. (2018). Basic Health Research 2018. Jakarta: Ministry of Health of the Republic of Indonesia.
- [5] C.M. Chaparro, P.S. Suchdev. (2019). Anemia epidemiology, pathophysiology, and etiology in low-and middle-income countries. *Annals of the New York Academy of Sciences*. 1450(1): 15-31.
- [6] Y. Prabandari, D. Hanim, R.C. AR, D. Indarto. (2016). Hubungan kurang energi kronik dan anemia pada ibu hamil dengan status gizi bayi usia 6-12 bulan di kabupaten boyolali (correlation chronic energy deficiency and anemia during pregnancy with nutritional status of infant 6–12 months in Boyolali regency). *Penelitian Gizi Dan Makanan (The Journal of Nutrition and Food Research)*. 39(1): 1-8.
- [7] P.S. Jones, B.W. Winslow, J.W. Lee, M. Burns, X.E. Zhang. (2011). Development of a caregiver empowerment model to promote positive outcomes. *Journal of Family Nursing*. 17(1): 11-28.
- [8] D. Moher, A. Liberati, J. Tetzlaff, D.G. Altman, P. Group. (2010). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *International Journal of Surgery*. 8(5): 336-341.
- [9] N.M. KARGAR, F. BORHANI, R.E. DORTAJ, S. Sabzevari. (2011). The effect of family-centered empowerment model on the mothers' knowledge and attitudes about thalassemia disorder.
- [10] I. Ardian. (2014). Family empowerment as family caregiving intervention. *Sultan Agung Bulletin of Science*. 52(133):41-54.
- [11] C. Wacharasin, M. Phaktoop, S. Sananreangsak. (2015). A family empowerment program for families having children with thalassemia, T Thailand. *Nursing & health sciences*. 17(3): 387-394.
- [12] L. Borimnejad, S. Parvizy, H. Haghaani, B. Sheibani. (2018). The effect of family-centered empowerment program on self-efficacy of adolescents with thalassemia major: A randomized controlled clinical trial. *International journal of community based nursing and midwifery*. 6(1): 29.
- [13] A. Khani Jeihooni, S. Hoshyar, P. Afzali Harsini, T. Rakhshani. (2021). The effect of nutrition education based on PRECEDE model on iron deficiency anemia among female students. *BMC Women's Health*. 21(1): 256.
- [14] L. Gosdin, A.J. Sharma, K. Tripp, E.F. Amoafu, A.B. Mahama, L. Selenje, M.E. Jefferds, R. Martorell, U. Ramakrishnan, O.Y. Addo. (2021). A school-based weekly iron and folic acid supplementation program effectively reduces anemia in a prospective cohort of Ghanaian adolescent girls. *The Journal of nutrition*. 151(6): 1646-1655.
- [15] Z. Tombeg, A.J. Hadi, S. Manggabarani. (2021). The Effect of Family-Based Empowerment on Adolescent's Nutritional Status in Tana Toraja. *Medico-Legal Update*. 21(2).
- [16] F. Seyed Nematollah Roshan, H. Navipor, F. Alhani. (2020). Practical intervention on quality of life of anemic girls and their mothers. *International Journal of Adolescent Medicine and Health*. 33(3): 107-113.
- [17] WHO. (2017). Global accelerated action for the health of adolescents (AA-HA!): guidance to support country implementation. *Global Accelerated Action for the Health of Adolescents (AA-HA!) Guidance to Support Country Implementation*.
- [18] J.L. Beard, H. Dawson, D.J. Piñero. (1996). Iron metabolism: a comprehensive review. *Nutrition Reviews*. 54(10): 295-317.
- [19] T.H. Hassan, M.A. Badr, N.A. Karam, M. Zkaria, H.F. El Saadany, D.M.A. Rahman, D.A. Shahbah, S.M. Al Morshedy, M. Fathy, A.M.H. Esh. (2016). Impact of iron deficiency anemia on the function of the immune system in children. *Medicine*. 95(47).
- [20] S. Yunanci, R. Risma, M. Masrif, M. Mulianingsih. (2023). A Literature Review of the Relation Between Iron Deficiency Anaemia, Physical Activity and Cognitive Function in Adolescent Girl. *Scripta Medica*. 54(4): 405-412.