# Healthy Breakfast Education to Prevent Anemia in Elementary School Children using PowerPoint Media

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**Abstract.** This study aims to educate about the importance of a healthy breakfast to prevent anemia in elementary school children. The study was conducted on 28 fourth-grade students at Hanjuang Samijaya Elementary School, Cihanjuang Village, Parongpong District, West Bandung, Indonesia. The method used is a quantitative research method with a *pre-experimental design* type *one group pretest-posttest*. The results showed that the average value of the pretest was 77.86 and the posttest was 89.29. The results of the comparison between the pretest and posttest showed an increase in respondents' knowledge after taking action in the form of education on the importance of having a healthy breakfast by consuming nutritious food. It is known that the average calculation result of N-Gain (*Normalized Gain*) is 58% (N-Gain > 40-55%). These results indicate that education about healthy breakfast is quite effective for elementary school students. This is indicated by the pretest score which is quite good, so students can know the importance of a healthy breakfast to prevent anemia. As for the results of the t-test calculation, it is known that T count (-8.132) < T table (1.703). That is, the students' post-test scores did not increase significantly. With the completion of this research, it is hoped that more students will know the importance of a healthy breakfast in an effort to prevent anemia.

## 1. Introduction

A healthy breakfast is an intake of nutritious food eaten in the morning to meet daily energy needs to be able to move well after sleeping at night (Suraya *et al.*, 2019). Breakfast has long been described as the most important meal of the day so that energy needs can be met (Delley & Brunner, 2019). To meet the nutritional intake in the body, the menu in a healthy breakfast must contain carbohydrates, protein, fat, vitamins, minerals, and fiber to be able to increase energy, concentration, and memory. However, there are still many who ignore the habit of breakfast and choose to do it during the day or eat foods that are fatty and high in calories (Larega, 2015). This also happens to school children who do not all have good healthy breakfast habits, only 10.6% of children's breakfasts have sufficient energy (>30%) and there is still a lack of breakfast with diverse foods (Sitoayu *et al.*, 2016). The habit of having breakfast

with foods rich in nutrients provides many benefits for the health of the body, one of which is to prevent anemia. The World Health Organization defines anemia as a low concentration of hemoglobin (Hb) in the blood. The causes of low hemoglobin (Hb) include nutritional deficiencies, especially iron. Even though iron is essential for biological functions, including respiration, energy production, DNA synthesis, and cell proliferation (Camaschella, 2015). Thus, a healthy breakfast behavior pattern is very important to maintain a healthy body so that it is not susceptible to anemia.

Anemia is not only experienced by teenagers but can happen to anyone. Data shows that in 2015, the prevalence of primary school children in Indonesia who were affected by anemia reached 29% (Sirajuddin & Masni, 2015). Until now the problem of anemia in elementary school children is still a problem in the world of health that needs to be addressed. Anemia can cause a decrease in the level of fitness, immunity, memory, and concentration which will have an impact on decreasing student learning outcomes and achievement at school (Dumillah & Sumarmi, 2017). This is reinforced by the statement of the Director General of PAUD, Primary and Secondary Education, Ministry of Education and Culture, Research and Technology, that nutritional problem in the form of stunting and anemia in school children can affect children's activities and learn in school achievements. Especially during the Covid-19 pandemic, there was an increase in cases of malnutrition that caused anemia. This condition has the potential to reduce body resistance and have an adverse impact on children's physical and emotional growth, such as growth disorders, decreased cognitive, psychomotor, and immune functions as a result of a lack of various micronutrients (Zulaenah *et al.*, 2016). Some studies say that mental health is influenced by the quality of eating and breakfast habits. So in this case nutritious food plays an important role in maintaining physical and mental health (Hermanto *et al.*, 2020).

There have been many studies have discussed the importance of education on the importance of a healthy breakfast, including the Effect of Healthy Breakfast Education on Knowledge and Attitudes of Elementary School Children in Purwokerto by using a quasi-experimental study design to provide interventions to improve children's knowledge and attitudes about healthy breakfast (Prasetyo *et al.*, 2020). Then other research on Healthy Breakfast Education for School Children Through C-BreakLet Media (Creative Breakfast Booklet) in Semarang City uses booklet learning media which contains an understanding of the concept of a good and healthy breakfast and the importance of a healthy breakfast (Susilo *et al.*, 2019). Another study was written by Mawarni and Amin (2017) regarding ways or efforts to shape healthy breakfast behavior for deaf children through image-based nutrition education. Furthermore, there is a study written by Zogara (2021) about efforts to increase the knowledge and attitudes of elementary school students about healthy breakfasts carried out at Oebufu Inpres Elementary School, Kupang City. Other research on the importance of education on the importance of a healthy breakfast to increase school children's learning concentration as an effort to improve the quality of healthy and intelligent human resources (Anggoro *et al.*, 2021). The last, there is a study that discusses the effectiveness of healthy breakfast education on nutritional knowledge, breakfast frequency and energy intake carried out in Beji 01 elementary school students, Semarang Regency (Rozanah *et al.*, 2017).

The purpose of this study was to educate about the importance of a healthy breakfast to prevent anemia in elementary school children. The method used is a quantitative research method using a *pre-experimental design* type *one group pretest-posttest* which is carried out in a group of fourth grade elementary school children at Hanjuang Samijaya Elementary School, Parongpong District, West Bandung Regency. The novelties in this study are (1) there is a

relationship between healthy breakfast habits and anemia in elementary school children at Hanjuang Samijaya Elementary School, (2) the education process is carried out using *PowerPoint technology media*, (3) research focuses on the characteristics of anemia symptoms. and prevention efforts are presented in more detail and specificity.

## 2. Method
### 2.1. Research Subject

The subjects in this study were fourth grade elementary school students at Hanjuang Samijaya Elementary School, Parongpong District, West Bandung Regency. Respondents amounted to 28 people consisting of 15 male students and 13 female students. Figure 1 shows the percentage of the number of students sampled in the study. While Table 1 shows data on student names, age, and gender.
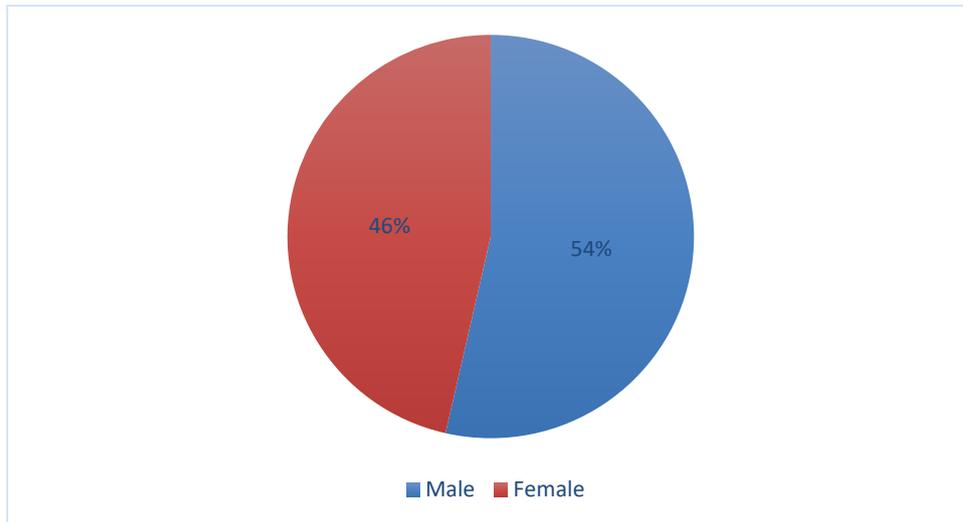


**Figure 1.** Percentage of student gender.

**Table 1.** Data on the student name, age, and gender.

| No | Name | Age | Gender (M/F) |
|----|------|-----|--------------|
| 1 | Student 1 | 10 | L |
| 2 | Student 2 | 10 | L |
| 3 | Student 3 | 10 | P |
| 4 | Student 4 | 11 | P |
| 5 | Student 5 | 10 | L |
| 6 | Student 6 | 10 | L |
| 7 | Student 7 | 10 | P |
| 8 | Student 8 | 10 | P |
| 9 | Student 9 | 11 | P |
| 10 | Student 10 | 11 | L |
| 11 | Student 11 | 10 | P |
| 12 | Student 12 | 10 | L |

| 13 | Student 13 | 10 | L |
|----|-----------|----|----|
| 14 | Student 14 | 10 | L |
| 15 | Student 15 | 10 | L |
| 16 | Student 16 | 10 | L |
| 17 | Student 17 | 11 | L |
| 18 | Student 18 | 10 | L |
| 19 | Student 19 | 10 | p |
| 20 | Student 20 | 11 | L |
| 21 | Student 21 | 10 | P |
| 22 | Student 22 | 10 | P |
| 23 | Student 23 | 10 | P |
| 24 | Student 24 | 10 | P |
| 25 | Student 25 | 11 | P |
| 26 | Student 26 | 11 | L |
| 27 | Student 27 | 10 | P |
| 28 | Student 28 | 10 | L |

### 2.2. Research Design Analysis

The research design used was a pre-experimental design type one group pretest-posttest with a quantitative approach. Effendy (2016) explained that the pretest or initial test is a test carried out to know the extent to which the material or subject matter to be taught has been mastered by students, while the posttest is a final test. This is done to find out whether the material can be mastered well by students. The research data were collected by giving direct questions to the fourth-grade students of Hanjuang Samijaya Elementary School, Parongpong District, West Bandung Regency. This research data collection went through 3 stages, namely, (1) distribution of pretest questionnaires; (2) providing action in the form of direct education in the classroom; (3) distribution of post-test questionnaires. The questions given are 20, namely 11 multiple choice questions and 9 true and false questions with an answer value of 1 for each correct answer and 0 for incorrect answers. The questions given contain questions about the importance of education about the importance of a healthy breakfast to prevent anemia. The questions are as follows:

1. What is a healthy breakfast?
    a. Nutritious breakfast
    b. Breakfast in the morning
    c. Breakfast when feeling hungry
    d. Breakfast to be strong

2. When is a good breakfast time?
    a. During school hours
    b. School break time
    c. After school
    d. Before going to school

3. The best time for breakfast is at...

    a. 11.00 pm
    b. 06.00 am
    c. Between 07.00 – 09.00
    d. Between 09.00 – 12.00

4. What are the benefits of breakfast?
    a. Increase enthusiasm and focus on learning
    b. Feeling hungry and sleepy
    c. Feeling weak and not concentrating
    d. Don't eat at school

5. The following are felt as a result of not having breakfast in the morning...
    a. Body feels weak
    b. Strong and healthy
    c. Increase enthusiasm and focus on learning
    d. Nutritional needs are met

6. What are some good healthy breakfast menus?
    a. Fried food
    b. Rice
    c. Instant noodles
    d. Donuts

7. What will you do if you don't have time for breakfast at home?
    a. No breakfast
    b. Snack at school
    c. Bring lunch from home
    d. Eat when you come home from school

8. Anemia is also known as...
    a. Less blood
    b. Malnutrition
    c. Less eating
    d. High blood pressure

9. What foods can prevent us from getting anemia?
    a. Foods that contain iron
    b. Foods that contain sugar such as donuts and cakes
    c. Instant food like noodles
    d. Cholesterol-containing foods such as fried foods

10. The following are signs of anemia:
    a. Weak or tired
    b. Feeling hungry
    c. Passion and focus
    d. Sleepy

11. Which vegetables contain the most iron to prevent anemia?

a. Water spinach
b. Spinach
c. Cassava leaves
d. katuk leaves

| No | Question | True | False |
|----|----------|------|-------|
| 12 | A healthy breakfast has the right and balanced nutritional composition | | |
| 13 | A healthy breakfast makes the body weak and tired | | |
| 14 | Breakfast is a healthy lifestyle that has many benefits | | |
| 15 | A healthy breakfast can support learning achievement | | |
| 16 | Anemia is caused by a lack of iron | | |
| 17 | One of the signs of anemia is dizziness or headache | | |
| 18 | Snacks outside the home or school are healthier | | |
| 19 | Meat, eggs, spinach, and liver are sources of iron to prevent anemia | | |
| 20 | Healthy breakfast habits can prevent anemia | | |

### 2.2.1 N-Gain Analysis

To find out the increase in students' understanding of the importance of a healthy breakfast to prevent anemia, the normalized gain average score (N-Gain) was calculated. Nismalasari *et al* . (2016) said that N-Gain (*Normalized Gain*) was used to measure the increase in science process skills and cognitive learning outcomes between before and after learning. The analysis of the N-Gain value was carried out by calculating the difference between the *pretest value* (initial test before the action was given) and the *posttest value* (the final test after the action was given). To be able to find out if there is an improvement in the process, the normalized average *gain formula* developed by Hake is used (Susanto, 2012). The formula used in calculating the N-Gain value is shown in Equation (1).

$$N\ Gain = \frac{Score\ Posttest - Score\ Pretest}{Score\ Ideal - Score\ Pretest} \tag{1}$$

In determining the conclusion, there are references in the form of several categories from the results of the overall N-Gain average value and also an interpretation of the percentage of the N-Gain average value results. Table 2 shows the interpretation of the N-Gain mean score and Table 3 is the category of N-Gain effectiveness interpretation.

**Table 2.** Interpretation of N-Gain mean score.

| N-Gain Value | Category |
|--------------|----------|
| g > 0.7 | Tall |
| 0.3 g 0.7 | Currently |
| g < 0.3 | Lace |

**Table 3.** Category of N-Gain effectiveness interpretation.

| Percentage (%) | Interpretation |
|---|---|
| < 40 | Ineffective |
| 40-55 | Less effective |
| 56-75 | Effective enough |
| > 76 | Effective |

## 3. Results and Discussion

Data on increasing students' understanding of the importance of a healthy breakfast to prevent anemia can be seen from the results of the initial ability (pretest), final ability (posttest), and the increase in student ability (N-Gain) which are presented in Table 4.

**Table 4.** Analysis of pre-test and post-test gain values.

| No | Name | Score | | Post-Pre | Ideal Score (100) - pre | N-Gain Score | Category |
|---|---|---|---|---|---|---|---|
| | | Pre | Post | | | | |
| 1 | Student 1 | 85 | 90 | 5 | 15 | 0.33 | Medium |
| 2 | Student 2 | 70 | 75 | 5 | 30 | 0.17 | Low |
| 3 | Student 3 | 35 | 55 | 20 | 65 | 0.31 | Medium |
| 4 | Student 4 | 80 | 85 | 5 | 20 | 0.25 | Low |
| 5 | Student 5 | 70 | 95 | 25 | 30 | 0.83 | Tall |
| 6 | Student 6 | 95 | 100 | 5 | 5 | 1.00 | Tall |
| 7 | Student 7 | 75 | 100 | 25 | 25 | 1.00 | Tall |
| 8 | Student 8 | 85 | 85 | 0 | 15 | 0.00 | Low |
| 9 | Student 9 | 90 | 95 | 5 | 10 | 0.50 | Currently |
| 10 | Student 10 | 70 | 75 | 5 | 30 | 0.17 | Low |
| 11 | Student 11 | 85 | 95 | 10 | 15 | 0.67 | Currently |
| 12 | Student 12 | 60 | 80 | 20 | 40 | 0.50 | Currently |
| 13 | Student 13 | 85 | 95 | 10 | 15 | 0.67 | Currently |
| 14 | Student 14 | 75 | 80 | 5 | 25 | 0.20 | Low |
| 15 | Student 15 | 90 | 95 | 5 | 10 | 0.50 | Currently |
| 16 | Student 16 | 80 | 100 | 20 | 20 | 1.00 | Tall |
| 17 | Student 17 | 65 | 80 | 15 | 35 | 0.43 | Currently |
| 18 | Student 18 | 55 | 65 | 10 | 45 | 0.22 | Low |
| 19 | Student 19 | 70 | 85 | 15 | 30 | 0.50 | Currently |
| 20 | Student 20 | 90 | 100 | 10 | 10 | 1.00 | Tall |
| 21 | Student 21 | 80 | 100 | 20 | 20 | 1.00 | Tall |
| 22 | Student 22 | 75 | 100 | 25 | 25 | 1.00 | Tall |
| 23 | Student 23 | 90 | 95 | 5 | 10 | 0.50 | Currently |
| 24 | Student 24 | 85 | 100 | 15 | 15 | 1.00 | Tall |
| 25 | Student 25 | 85 | 90 | 5 | 15 | 0.33 | Currently |
| 26 | Student 26 | 80 | 85 | 5 | 20 | 0.25 | Low |
| 27 | Student 27 | 85 | 100 | 15 | 15 | 1.00 | Tall |
| 28 | Student 28 | 90 | 100 | 10 | 10 | 1.00 | Tall |
| | Average | 77.86 | 89.29 | | 0.58 | 58 | |

Based on the data in Table 4, it is known that the average value of the pretest (initial test) is 77.86. Then after being given treatment in the form of education about the importance of a healthy breakfast to prevent anemia there was an increase in the average result with the post-test score (final test) was 89.29. These results indicate that students pay enough attention to the material given so that they can answer questions better. Then the percentage of the average value of N-Gain, which is 58% (> 40-55%) indicates that the method or treatment used in educational activities about healthy breakfasts to prevent anemia in grade IV elementary school students at Hanjuang Samijaya Elementary School is quite effective (see Table 3). These results can be seen from the overall average of the post-test questions which have increased from the pretest questions (see Table 4).

This study uses quantitative research methods. One of the characteristics of quantitative research is that statistical data tests are carried out, one of which is for the proposed research hypothesis (Hartati, 2016). Statistics is the science of collecting, processing, presenting, analyzing, and interpreting the data obtained to be used as information in making effective decisions. This statistic is a tool used to facilitate the calculation of data in the form of numbers (Rudini, 2016). In testing the difference in the mean of 2 variables from the same sample, the t-test: Paired Two Sample for Means was used. Table 5 of statistical test results of pre-test and post-test data.

**Table 5.** Statistical test results of pre-test and post-test data

|  | *Pre-test* | *Post-test* |
|---|---|---|
| Mean | 77.85714 | 89.28571 |
| Variance | 167.4603 | 138.3598 |
| Observations | 28 | 28 |
| Pearson Correlation | 0.822938 |  |
| Hypothesized Mean Difference | 0 |  |
| Df | 27 |  |
| t Stat | -8.13287 |  |
| P(T<=t) one-tail | 4.89E-09 |  |
| t Critical one-tail | 1.703288 |  |
| P(T<=t) two-tail | 9.78E-09 |  |
| t Critical two-tail | 2.051831 |  |

Based on the results of the statistical test in Table 5 using the t-test: Paired Two Sample for Means, the mean value of the pretest was 77.86 and the post-test was 89.29 from 28 respondents (see Table 4). The average t-test of 2 paired samples shows that the T count is (-8.132) smaller than the T table (1.703). That is, the students' posttest scores did not significantly. Thus the sample data collected did not succeed in proving the relationship between X and Y.

## 4. Conclusion

The research that has been conducted aims to provide education about the importance of a healthy breakfast to prevent anemia in elementary school children with the research sample being the fourth-grade students of Hanjuang Samijaya Elementary School, Parongpong District, West Bandung Regency. The method used is a quantitative research method using a *pre-experimental design* type *one group pretest-posttest*. There are 3 steps taken in conducting this research, namely (i) taking the pre-test; (ii) educational measures; and (iii) taking post-tests.

The results showed that the average value of the pretest was 77.86 and the posttest was 89.29. The average result of the calculation of N-Gain (*Normalized Gain*) is 58% (N-Gain > 40-55%) which indicates that education about healthy breakfast is quite effective for elementary school students. This is indicated by the pretest score which is quite good, so students can know the importance of a healthy breakfast to prevent anemia. As for the results of the t-test calculation, it is known that T count (-8.132) < T table (1.703). That is, the students' posttest scores did not significantly.

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### References

[1] Anggoro, S., Isnaningsih, T., & Khamid, A. (2021). Edukasi Pentingnya Sarapan untuk Meningkatkan Konsentrasi Belajar. *Jurnal Peduli Masyarakat*, *3*(3), 323-330.

[2] Camaschella, C. (2015). Iron-deficiency Anemia. *The New England Journal of Medicine*,*372*(19), 1832-1843.

[3] Delley, M., & Brunner, T. A. (2019). Breakfast Eating and Drivers of A Healthy Breakfast Composition. *Appetite*, *137*(2019), 90-98.

[4] Effendy, I. (2016). Pengaruh Pemberian Pre-test dan Post-test terhadap Hasil Belajar Mata Diklat HDW.DEV.100.2.A pada Siswa SMK Negeri 2 Lubuk Pasung. *VOLT: Jurnal Pendidikan Teknik Elektro*, *1*(2), 81-88.

[5] Hartati, R. (2016). Peningkatan Aspek Sikap Literasi Sains Siswa SMP melalui Penerapan Model Problem Based Learning pada Pembelajaran IPA Terpadu. *Jurnal Edusains*, *8*(1), 91-97.

[6] Hermanto, R. A., Kandrina, B., & Latifah, L. (2020). Hubungan Antara Status Anemia,Tingkat Aktivitas Fisik, Kebiasaan Sarapan, dan Depresi pada Remaja Putri di Kota Yogyakarta. Media Gizi Mikro Indonesia, 11(2), 141-152.

[7] Larega, T. S. P. (2015). Effect of Breakfast on The Level of Concentration in Adolescents. *Medical Journal of Lampung University*, *4*(2), 115-121.

[8] Mawarni, E. E., & Amin, M. (2017). Membentuk Perilaku Sarapan Sehat Anak Tunarungu Melalui Edukasi Gizi Berbasis Media Gambar. *Jurnal Healthy*, *6*(1), 1-12.

[9] Nismalasari., Santiani., & Rohmadi. (2016). Penerapan Model Pembelajaran Learning Cycle terhadap Keterampilan Proses Sains dan Hasil Belajar Siswa Pada Pokok Bahasan Getaran Harmonis. *Jurnal EduSains*, *4*(2), 74-94.

[10] Prasetyo, T. J., Nuraeni, I., Wati, E. K., & Rizqiawan, A. (2020). Pengaruh Edukasi Sarapan Sehat terhadap Pengetahuan dan Sikap Anak Sekolah Dasar di Purwokerto. *Jurnal Pangan Kesehatan dan Gizi Universitas Binawan*, *1*(1), 18-25.

[11] Rozanah, F., Yuniarti., & Susiloretni, K. A. (2017). Efektivitas Edukasi Sarapan Sehat terhadap Pengetahuan Gizi, Frekuensi Sarapan, dan Asupan Energi Pada Siswa Sekolah Dasar Negeri Beji 01 Kabupaten Semarang. *Jurnal Riset Gizi*, *5*(1), 15-21.

[12] Rudini, R. (2016). Peranan Statistika dalam Penelitian Sosial Kuantitatif. *Jurnal Saintekom*, *6*(2), 53-66.

[13] Sartika, R. A .D. (2012). Penerapan Komunikasi, Informasi, dan Edukasi Gizi terhadap Perilaku Sarapan Siswa Sekolah Dasar. *Kesmas: Jurnal Kesehatan Masyarakat Nasional*,

*7*(2), 76-82.

[14] Sirajuddin, S., & Masni. (2015). Kejadian Anemia Pada Siswa Sekolah Dasar. *Kesmas: Jurnal Kesehatan Masyarakat Nasional*, *9*(3), 264-269.

[15] Sitoayu, L., Wahyuni, Y., Angkasa, D., & Noviyanti, A. (2016). Sarapan Sehat Menuju Generasi Sehat Berprestasi. *Jurnal Abdimas*, *3*(1), 56-62.

[16] Suraya, S., Apriyani, S. S., Larasaty, D., Indraswari, D., Lusiana, E., & Anna, G. T. (2019). "Sarapan Yuks" Pentingnya Sarapan Pagi Bagi Anak-Anak. *Jurnal Bakti Masyarakat Indonesia*, *2*(1), 201-207.

[17] Susanto, J. (2012). Pengembangan Perangkat Pembelajaran Berbasis Lesson Study dengan Kooperatif Tipe Numbered Heads Together untuk Meningkatkan Aktivitas dan Hasil Belajar IPA di SD. *Journal of Primary Educational*, *1*(2), 71-77.

[18] Susilo, M. T., Kurnia, A. R., Mardiana., Tianri, P. D. D., & Triyono, A. (2019). Edukasi Sarapan Sehat Anak Sekolah Melalui Media C-BreakLet (Creative Breakfast Booklet) di Semarang. *Sport and Nutrition Journal*. *1*(2), 53-57.

[19] Zogara, A. U. (2021). Edukasi Gizi Meningkatkan Pengetahuan dan Sikap Siswa Sekolah Dasar Tentang Sarapan Sehat. *CHMK Health Journal*, *5*(2), 290-296.

[20] Zulaekah, S., Purwanto, S., & Hidayati, L. (2016). Anemia Terhadap Pertumbuhan dan Perkembangan Anak Malnutrisi. *Jurnal Kesehatan Masyarakat*, *9*(2), 106-114.