



## Canteen Manager And Elementary Student Empowerment About Local Food To Combat Anemia

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### ABSTRACT

*Basic Health Research (Riskesdas) in 2010 shows number of health problems, one of them is anemia. Anemia in Elementary Students has impact on degradation of Indonesian Generation quality. This problem can be prevented by consuming nutritious foods which contain sufficient level of iron. Iron can be gathered from green vegetables such as; spinach, water spinach, beans, legumes and fruits such as; banana, mangoes, papaya, watermelon, which was produced by farmer in villages. Recommended way to solve anemia is empowerment of canteen manager to serve local food. Aim of this research is analyze impact of canteen manager empowerment towards knowledge, attitude, behavior, participations and students Hb enhancement.*

*This is a quasi experimental research using pre and post test with control group research design. Treatment is canteen manager empowerment and observation was hold in a month of treatmen. Indeoendent variable is canteen manager empowerment to maximalize local food. Dependent variable is knowledge, attitude, behavior, participations and students Hb enhancement. Data were gathered using test, interview and observation. Data were analyzed stastically using t test.*

*Canteen manager empowerments to solve anemia influence knowledge, attitude, behavior, participations and students Hb enhancement. Those dependent variables were increase significantly.*

**Keywords:** Canteen management, knowledge, attitude, nutrition behavior, participation, Hb

### BACKGROUND

Anemia is global health problem which was happened in developed and developing country. It is assumed 50% anemia cases were caused by iron deficiency<sup>1</sup>. Most of anemia cases in Indonesia were suffered by pregnant women, underfive and school age children. Anemia prevalence in pre school children is 76.1%, pregnant women 69%, women 73.5%, school age children 33%, men 40.2% and mature people 39.1%<sup>2</sup>. Based on Family Health Survey in 2001, anemia prevalence in school age children and adolescent is 26.5%<sup>3</sup>. Anemia cases in Indonesia and most of developing country were caused by iron deficiency or usually called Iron Deficiency Anemia (IDA). Survey shows 36% or around 1400 millions people from 3800 million people in developing country suffer from IDA and 8% in developed country<sup>4</sup>.

Anemia on children can increase risk of physical, mental, behavior and cognitive disorder, immune problem and academic problem. Those negative impacts can decrease quality of human resource. Main cause of anemia IDA is lack of iron intake, beside other factors such as blood loose, infection can lead worst condition<sup>5</sup>.

Inadequate micronutrient intake can increase risk of micronutrient deficiency, it shows that regions with high prevalence of iron deficiency have high prevalence of Zink (Zn) and Folate. This condition is captured

in developing country where staple food from vegetable and animal base food consumption is low, it influence the iron and zink level storage.

Theoritically micronutrients interacts each other. This micronutrient interaction has probability to compete to be absorbed or supporting the absorption. Protein and Vitamin C have strong relation with iron. Hemoglobin is protein which contains high level of iron. Hemoglobin production needs protein and iron. Protein and Vitamin C can increase iron absorption especially protein animal base. Food which contains adequate Vitamin C can increase iron absorption higher than food without Vitamin C <sup>6</sup>.

Anemia can be prevented by society by consuming nutritious food with adequate iron intake. Iron can be found in green vegetable which produced by villagers such as spinach, water spinach, beans, legumes and vegetables such as banana, pineapple, mango, papaya and water melon. However, most of snack foods which prepared by school canteen are fom factory with lower nutrition content and snacks were given dangerous food additive. This condition caused by canteen manager's low knowledge to serve nutritious and secure food. Therefore to solve anemia problem is empowering the canteen manager in school.

## RESEARCH METHOD

This is a quasi experimental research using *pre and post test with control group research design* for a month observation. Treatment which was done is canteen manager empowerment to serve food snacks using local foods. This research was conducted in Pundung Elementary School, Imogiri, Bantul Regency, Special Region of Yogyakarta. Report from Imogiri I Public Health Center shows anemia cases in elementary students. Population of this research is 36 students in 4<sup>th</sup> grade, 23 teachers and 2 canteen managers. Subjects were chosen according to inclusion criteria: 4<sup>th</sup> grade students and exclusion criteria: students with TBC chronic and malaria. Independent variable is canteen manager empowerment. Dependent variable is knowledge, attitude, behavior, teacher and students participation, and students hemoglobin enhancement.

Canteen manager empowerment is a sollution to solve anemia using canteen manager empowerment to serve local base foods which contain iron, protein and Vitamin. Teachers and student's knowledge, attitude and behavior are needed to solve anemia. Participation of community in school is essential. Hemoglobin level is number of red cells in 1 dL and it is counted in Laboratorium. Data Hb were gathered by Imogiri I PHC health officers.

Data were gathered using questionnaire, interview and observation. Data participations were gahtered by interview and observation. Data were analyzed descriptively and stastitically. Statistic analisys was done to know impact of empowerment towards participation and student's Hb level using independent sample t test.

## EMPOWERMENT CANTEEN MANAGER

### Manager Training

Aim of training is increasing knowledge, attitude, and participation of students, teachers and canteen manager to solve Anemia. There was pre test and post test in this training. Training materials are; 1) anemia's definition, 2) anemia's impact, 3) canteen role's to prevent anemia. Training was hold on June 26th -27th 2016. Facilities and infrastructure which was needed are; operating procedure, questionnaire, table, chair, leaflet, accompanient book, WHO Standard 2005. Facilities and other equipments were: LCD, sound system, laptop, stationary, camera.

### Implementation Empowerment

Empowerment was started by serving foods which contain iron, Vitamin and protein. It was done by canteen manager who get training before, so they can implement their knowledge to serve nutritious foods independently.

## RESULT AND ANALISYS

There were food snacks before empowerment; *cilok* (boiled stratch), *bakso*, *salome*, *gordon*, cassava chips, *mambo* ice, tea ice. Those foods contain low nutrition and not sufficient to fulfill nutrition needs. In training, they identify local food and food snack local food base which have to be served by canteen manager. After training, they serve; soybean tofu, *tahu susur*, *tempe* chips, *tempe*, rice and dried tempe, rice and anchovy, rice and soup, guava juice, lemon water and another foods which contain iron, protein and Vitamin. Foods which were served in Giriwungu as control group is not changed.

Beside substitution of low nutrient food with nutritious foods, headmaster and teacher educate and motivate students to get nutritious foods in canteen rather than get low nutrient foods. Based on canteen manager, students start to buy nutritous foods after they change the menu. Students also stop buying low nutrient foods outside the school.

### Students Participation

As subject to solve anemia in school, student's knowledge, attitude and begavior are essential. Their commitment to choose nutritious foods can increase their nutrition intake to produce Hemoglobin. Student's and teacher's participation determine the success of anemia intervention in school.

**Table 1.** Student's Participation Before Treatment

Student's Participation	Pundung Elementary School	Giriwungu Elementary School	<i>P-value</i>
Standard Deviation	14,0	13,5	0,06
Mean	49,6	41,67	
Range	60	40	
Minimum	20	29	
Maximum	80	60	

Table 1 shows before empowerment to prevent anemia the average student's participation in Pundung ES is 49.6, while in Giriwungi is 41.67. There is no significant difference between Pundung and Giriwungu after analyzed using independent t test ( $p > 0.05$ ).

**Table 2.** Student's Participation After Treatment

Student's Participation	Pundung Elementary School	Giriwungu Elementary School	<i>P-value</i>
Standard Deviation	11,59	17,96	0,00
Mean	89,54	54,17	
Range	40	60	
Minimum	60	20	
Maximum	100	80	

Table 2 shows there is significant difference average of student's participation between Pundung (89.54) and Giriwungi (54.17) after independet t test was done ( $p < 0.05$ ). The average of student's participation in Pundung is higher than Giriwungu after empowerment. Empowerment of canteen manager to solve anemia problem influence student's participation to solve anemia.

**Table 3.** Student's Knowledge Before and After Treatment

Student's Knowledge	Before	After	<i>P-value</i>
Standard Deviation	8,73	4,21	
Mean	52,91	91,22	
Range	30	15	0,000
Minimum	35	85	
Maximum	65	100	

Table 3 shows student's knowledge before and after treatment of empowerment. There is significant difference ( $p < 0.05$ ) between student's knowledge before treatment (52.91) and after treatment (91.22). The

average of student's knowledge is increase 38.31 points. Treatment of empowerment to solve anemia influence the enhancement of student's knowledge to solve anemia.

**Table 4.** Student's Attitude Before and After Treatment

Student's Attitude	Before	After	<i>P-value</i>
Standard Deviation	7,84	4,72	0,000
Mean	43,88	86,38	
Range	25	15	
Minimum	35	80	
Maximum	60	95	

Table 4 shows student's attitude before and after treatment of empowerment. There is significant difference ( $p < 0.05$ ) between student's attitude before treatment (43.88) and after treatment (86.38). The average of student's attitude is increase 42.5 points. Treatment of empowerment to solve anemia influence the enhancement of student's attitude to solve anemia.

**Table 5.** Student's Behavior Before and After Treatment

Student's Behavior	Before	After	<i>P-value</i>
Standard Deviation	6,66	4,83	0,000
Mean	48,88	87,08	
Range	20	15	
Minimum	40	80	
Maximum	60	95	

Table 5 shows student's behavior before and after treatment of empowerment. There is significant difference ( $p < 0.05$ ) between student's behavior before treatment (43.88) and after treatment (86.38). The average of student's behavior is increase 42.5 points. Treatment of empowerment to solve anemia influence the enhancement of student's behavior to solve anemia.

### Teacher's Participation

Teacher has role to motivate, facilitate, and *ngesuhi* (unite and strengthen) students to solve anemia. Facilitate means ease the activity to solve anemia by increasing student's Hb. One of teacher's role is *ngesuhi* which means teacher must be the leader and as a role model to solve anemia.

**Table 6.** Teacher's Participation Before Treatment

Teacher's Participation	Pundung Elementary School	Giriwungu Elementary School	<i>P-value</i>
Standard Deviation	13,5	19,1	0,39
Mean	41,67	52,63	
Range	40	60	
Minimum	40	20	
Maximum	80	80	

Table 6 shows before empowerment to prevent anemia the average teacher's participation in Pundung ES is 41.67, while in Giriwungu is 52.63. There is no significant difference between Pundung and Giriwungu after analyzed using independent t test ( $p > 0.05$ ).

**Table 7.** Teacher's Participation After Treatment

Teacher's Participation	Pundung Elementary School	Giriwungu Elementary School	<i>P-value</i>
Standard Deviation	0	10,26	0,00
Mean	100	70,53	
Range	0	20	
Minimum	100	60	
Maximum	100	80	

Table 7 shows there is significant difference average of teacher's participation between Pundung (100) and Giriwungi (70.53) after independent t test was done ( $p < 0.05$ ). The average of teacher's participation in Pundung is higher than Giriwungu after empowerment. Empowerment of canteen manager to solve anemia problem influence teacher's participation to solve anemia.

**Table 8.** Teacher's Knowledge Before and After Treatment

Teacher's Knowledge	Before	After	<i>P-value</i>
Standard Deviation	8,89	4,19	0,000
Mean	52,82	91,95	
Range	30	15	
Minimum	35	85	
Maximum	65	100	

Table 8 shows teacher's knowledge before and after treatment of empowerment. There is significant difference ( $p < 0.05$ ) between teacher's knowledge before treatment (52.82) and after treatment (91.95). The average of teacher's knowledge is increase 39.13 points. Treatment of empowerment to solve anemia influence the enhancement of teacher's knowledge to solve anemia.

**Table 9.** Teacher's Attitude Before and After Treatment

Teacher's Attitude	Before	After	<i>P-value</i>
Standard Deviation	7,45	4,86	0,000
Mean	43,47	86,52	
Range	25	15	
Minimum	35	80	
Maximum	60	95	

Table 9 shows teacher's attitude before and after treatment of empowerment. There is significant difference ( $p < 0.05$ ) between teacher's attitude before treatment (43.47) and after treatment (86.52). The average of teacher's attitude is increase 43.05 points. Treatment of empowerment to solve anemia influence the enhancement of teacher's attitude to solve anemia

**Table 10.** Teacher's Behavior Before and After Treatment

Teacher's Behavior	Before	After	<i>P-value</i>
Standard Deviation	6,89	4,19	0,000
Mean	49,56	91,95	
Range	20	15	
Minimum	40	85	
Maximum	60	100	

Table 10 shows teacher's behavior before and after treatment of empowerment. There is significant difference ( $p < 0.05$ ) between teacher's behavior before treatment (49.56) and after treatment (91.95). The average of teacher's behavior is increase 42.39 points. Treatment of empowerment to solve anemia influence the enhancement of teacher's behavior to solve anemia.

## CANTEEN MANAGER'S PARTICIPATION

Canteen manager is who serve foods and snacks in canteen at school. Before treatment was done, researcher make list of foods or menu which was served. Menu which contains lack of nutrient and don't support the production of Hb.

**Table 11.** Food Comparison Between Treatment Group and Control Group

Pundung ES as Treatment Group	Giriwungu ES as Control Group
Rice with dried tempe	<i>Cilok</i> (boiled stretch)
Rice with anchovy sauce	Rice with anchovy sauce
Rice and soup	<i>Bakso</i>
Tofu	<i>Gordon</i>
Fried Tempe	<i>Salome</i> (similar with <i>cilok</i> )
<i>Mendoan</i>	Marimas (Sweetened drink)
Bread	Cassava chips



Guava Juice	<i>Mambo</i> ice
Orange Juice	<i>Getuk</i> (traditional food from cassava
Brownies	<i>Lotes</i> (Spicy fruit)
Fruits	Cincau

Table 11 shows after treatment in treatment group, canteen manager serves nutritious foods which contain various nutrient to produce Hb. While in control group, canteen manager still serving foods which contain lack of nutrient which is needed to produce Hb.

### Hemoglobin Level Enhancement

In order to determine the impact of canteen manager empowerment to solve anemia, student's hemoglobin (Hb) were taken.

**Table 12.** Student's Hb Before Treatment

Hb Level	Pundung ES	Giriwungu ES	<i>P-value</i>
Standard Deviation	0,97	0,94	
Mean	13,61	13,39	
Range	4,3	4,0	0,88
Minimum	12,0	11,5	
Maximum	16,3	15,5	

Table 12 shows before empowerment to prevent anemia the average student's Hb in Pundung ES is 13.61g/dL, while in Giriwungu is 13.39 g/dL. There is no significant difference between Pundung and Giriwungu after data were analyzed using independent t test ( $p>0.05$ ).

**Table 13.** Student's Hb After Treatment

Hb Level	Pundung ES	Giriwungu ES	<i>P-value</i>
Standard Deviation	0,84	0,75	
Mean	13,7	13,15	
Range	2,7	2,6	0,018
Minimum	12,3	12,0	
Maximum	15,0	16,6	

Table 13 shows after empowerment to prevent anemia the average student's Hb in Pundung ES is 13.7 g/dL, while in Giriwungu is 13.15 g/dL. There is significant difference between Pundung and Giriwungu after data were analyzed using independent t test ( $p<0.05$ ).

Based on statistical test (independent t test) which was done to analyze the significance of Hb level between Pundung and Giriwungu, it shows there is significant difference. The canteen manager's empowerment to solve anemia influences student's Hb level enhancement. Aims of research are supporting canteen manager aware and serve nutritious foods to help solving anemia problem.

### ANALISYS

Canteen manager's empowerment to maximalize local foods to solve anemia is begin by training. Aim of training is increasing knowledge, attitude, and behavior of canteen manager, teacher and students. Training materials are; 1) anemia's definition, 2) anemia's impact, 3) canteen role's to prevent anemia by serving local foods base.

There were lack of nutrient foods which served before treatmet such as; *cilok* (boiled stretch), *bakso*, *salome*, *gordon*, cassava chips, *mambo* ice, tea ice. In order to disenchant canteen manager, teacher and student, training was done. First activity was identifying foods and snack from local foods which contain good nutrients. After empowerment, canteen manager serves soybean tofu, *tahu susur*, *tempe* chips, *tempe*, rice and dried tempe, rice and anchovy, rice and soup, guava juice, lemon water and another foods which contain iron, protein and Vitamin.

Healthy and nutritious foods that served by canteen manager were followed by teacher's role by educate and motivate students to eat nutritious foods. Students change from bad behavior into good behavior by

consuming nutritious food which contain nutrient to produce Hb. This condition related with Green who explains that empowerment in health sector is the main target on health promotion <sup>7</sup>. Community empowerment is a process to increase awareness, willingness and ability on identifying, knowing, solving and increasing community's welfare. Community can be called independent when they can identify problems and its factors, then solving that problem <sup>8</sup>.

Student's role to solve anemia is as object and subject in the same time. Students as object because they are the target who can be trained to solve anemia independently <sup>9</sup>. Students as subject because have to make decision and do action to prevent anemia or solve anemia. Public Health Center (PHC) as facilitator to direct and monitor their activity in school to reach their purposes.

Students Health Unit (SHU) is organization to help solving anemia in school. In this case, empowerment to solve anemia doesn't need new place <sup>10</sup>. Organization which regulates function of canteen is related with Adi (2007) who explains that organization will impact the success of empowerment <sup>11</sup>. Form of participation canteen manager, students and teachers are performed in school canteen. Those forms are; funds, money, energy, participation, skill, idea, social participation, decision maker and representative participation <sup>10</sup>.

Treatment canteen manager empowerment to optimize local food base influences Hb level enhancement. Based on measurement of Hb before and after treatment, it shows enhancement in treatment group (Pundung ES). There is significant difference in knowledge, attitude, and behavior of students, teachers and canteen manager to solve anemia. There is enhancement of Hb level in students before and after treatment. It shows empowerment can increase the level of Hb in order to solve anemia.

Enhancement of Hb level in Pundung ES as treatment group is related with treatment which was done to empower canteen manager, teachers and students to manage canteen. Effort that's done is serving nutritious foods. Enhancement Hb level is indirectly caused by enhancement of skill and will of canteen manager. After empowerment, canteen manager serve nutritious foods supporting Hb production.

Empowerment influences the enhancement of participation canteen management in Pundung ES higher than Giriwungi ES. Statistical test (independent t test) shows significant difference on participation between Pundung ES and Giriwungu ES. Enhancement of knowledge, attitude and behavior leads students to choose and eat nutritious food to fulfill their daily need which supporting Hb production. It is related with theory that can cause anemia. Anemia can be caused by Vitamin B<sub>12</sub> and folate deficiency<sup>12</sup>. Folate deficiency can cause megaloblastic anemia, because folate is needed in red cell maturation. Vitamin B<sub>12</sub> is needed to activate folate <sup>13</sup>.

Iron Deficiency Anemia (IDA) is the main cause anemia. Lack consumption and bioavailability of iron are the important cause. Cereal, legumes and green vegetable consumption in developing country are already contain iron, but there are found inhibitor of iron absorption. Iron absorption is related with amount and chemistry form, inhibitor and accelerator, nutrition status and iron storage in body <sup>14</sup>. Iron is main micronutrient to produce hemoglobin and it has to be consumed everyday <sup>12</sup>. It can be found in meat, fish, chicken, tofu, tempe and green vegetable <sup>15</sup>. Hb enhancement in Pundung shows that anemia can be prevented and it can be solved by empowering canteen manager.

Anemia is one of nutrition and health problems in society. Empowerment is the most possible strategy to solve anemia, because community empowerment is main target in health promotion. It is essential to support community empowerment to help community have willing and ability to solve their problems. Community empowerment is a process to increase awareness, willingness and their ability to identify, solve, maintain, protect and increase community welfare <sup>16</sup>.

It is related with Adisasmito who explains community empowerment in health sector has aim to increase awareness, knowledge and understanding about health in individual, group and community <sup>17</sup>. Knowledge and attitude can lead good skill and ability to solve their own problems.

## CONCLUSION

Canteen manager empowerment as effort to solve anemia can increase knowledge, attitude, behavior and participation of students, teachers, and canteen manager.

Canteen manager participation to solve anemia is serving nutritious foods which contain iron, protein and vitamin to produce Hb.

Student's participation to solve anemia is choosing nutritious foods to support Hb production.

Canteen manager empowerment can significantly increase student's Hb level.

## RECOMMENDATION

For Health Department in Bantul District, in order to solve anemia problem in students, empowerment strategy is the best option. By giving training, provision, and facilitating school canteen which serving nutritious foods contain iron, protein, and vitamin, clean, safety and optimalize local food base.

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