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Factors that influence the nutritional status of elementary school children

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Abstract. This study aims to determine the factors that influence the nutritional status of elementary school children. Descriptive methods used to provide knowledge about the problems that include healthy foods, the use of food for the body, how to choose and manage food, nutritional knowledge for elementary school students and interviewing about nutrition for teachers from 8 primary schools. The results of this study have differences in nutritional values between classes and between schools, grade 6 has a higher grade than grade 5, and grade 5 students is higher than grade 4. The highest score is obtained from primary school 117 and primary school 123, while the lowest score is elementary school 125. Based on the regression analysis, the change is influential from father's education, the higher the father's education, the higher the nutritional value of the students. The findings study are nutrition education in primary schools is not given specifically, but nutrition issues are included in subject and art skills, Physical and Health Education, Natural Sciences, Social Sciences and Islamic Religious Education, Teachers are more enthusiastic in teaching nutrition compared to classroom teachers, and father education is very influential on the nutritional value of children.

10 Introduction

Suggested that students will be better prepared if medical schools require a nutrition and behavior modification course as a prerequisite for admission [1]. Primary School is another form of basic education that undertakes an education program for six years. The purpose of basic education is to provide a basic inventory for students' ability to develop their lives as individuals, community members, citizens, and prepare the students to continue to Junior High School. Nutrition education in elementary schools can provide children with the information and skills to develop healthy food choices and dietary behaviors [15]. One of the contents of elementary school curriculum is subjects: 1) Handicrafts, 2) Physical education and health, 3) Natural Science, 4) Social, 5) Islamic education that each lesson has different characteristics. Based on the nutrients included in the five lessons found in elementary schools are automatically based on reality and social phenomena through an interdisciplinary approach. The results of interviews and observations at eight public elementary schools at Sako Kenten Sub-district in the class of Handicraft, Physical Education, natural sciences, social sciences and Islamic education with more nutrition material entry in the lesson Handicrafts given in class 1, 2nd, 3rd and 6th grade. While the material of nutrition in physical education is given in class 1, 2nd, 4th and 5th grade. For science material in class 6, 2nd in Social Science in 5th grade, Islamic Religious Education in nutrition class enter in class 1 and level 6.



This article is a summary of the results of two phases of research on the design of nutrition education that has been done in eight elementary schools in Sako Kenten Kota Palembang. The first phase of research on the delivery of nutrition education in primary schools, especially measures the level of nutritional knowledge of primary school students and the nutrition that is taught, while the second phase of research focuses on modeling nutrition education in the primary school curriculum which has experienced several changes in the Curriculum KTSP, nutrition is still widely found in various places, especially in rural areas [3]. Nutrition problems will lead to poor quality of human life, which will ultimately hamper development. From the review of several previous studies it can be concluded that the main causes of nutritional problems are ignorance or low nutritional knowledge. Deficiency and excess nutrients is a chronic and acute nutritional problem that threatens primary school-aged children. Therefore, efforts in the dissemination of nutritional knowledge need to be done on an ongoing and sustainable basis, both through formal and non-formal education. Through formal education, nutrition education should be given at an early age [14]. The goal for improving the quality of human life is the responsibility of all Indonesian people, including school-aged children.

Nutrition is needed for the students for growth and development, energy, thinking, and endurance. Quality nutrition will optimize brain growth and development [12]. Primary school students are seen as potential targets for receiving nutritional education in the school year and conveying knowledge about nutrition into the environment of every family, especially parents and siblings. Election of elementary school students is based on several considerations, including in terms of age, the ability to understand new knowledge and ideas possessed by primary school children at the most effective level compared to younger or older ages. In the family environment, statements and actions of primary school children are relatively often taken into account or even copied by parents and siblings. According to its deployment, primary school-aged children scattered throughout Indonesia in journals, relatively large so it is natural to choose primary school children as a target for the dissemination of nutritional innovations.

2. Methods

This study is a descriptive study on 804 students in grades 4, 5, and 6 in eight elementary schools in Sako Kenten Palembang directed at nutrition education in elementary school. Research instruments are tools or facilities used by researchers in collecting data so that the work easier and the results are better, accurate, complete and systematic so easy to process. The instruments used in this study were to provide test questions on nutritional knowledge that includes healthy foods, the use of food for the body, how to select and prepare food, nutrition knowledge for elementary school students and interviews on nutrition for teachers from eight elementary schools in Sako Kenten Palembang was chosen as an example in this study. Of the eight primary schools, a series of questions about nutrition were given. The questions were written in presentations for the level of nutritional knowledge that includes healthy foods, eating for the body, how to choose and manage food, nutritional understanding, nutrition sources and as a result of malnutrition. In addition, it is also interviewed a number of elementary school teachers about the content of nutrition and teaching techniques selected. Parents are also interviewed to get an overview of their daily eating habits to students and their families. Examples in this research phase two are teachers who teach subjects include nutrition materials, namely, crafts, physical education, natural sciences, social sciences, islamic education. Model preparation yielded sixty one models of five lessons consisting of nutrient syllabus that need to be submitted and alternatives in the selection of props to be used.

3. Results and Discussion

Based on statistical test of 804 students from eight elementary schools in sub district Sako Kenten Palembang showed the difference of nutritional value between classes in general is the average grade of nutrition grade in elementary school number 117, total number 79, state primary 118 total 64, elementary school number 119 total 63, elementary school number 120 total 69,5, elementary school number 121 total 70,9, elementary school number 122 total 62,3, elementary school number 123 total 74,4 and elementary school number 125 total 57,2 mean of nutrition among school is 67,6. The effectiveness of the lessons learned from the presentation done to the students in the eight elementary schools of Sako

Kenten Palembang showed the differences in nutritional values between classes and between schools (Table 1) is generally proven that Grade 6 has higher mean scores than Grade 5 and Grade 5 students higher than grade 4. This fact can be used as an indication of an increase in nutritional knowledge by students: the longer and more students get the nutrients, the higher their nutritional knowledge. The diversity of students' knowledge of nutritional scores in grades 4, 5 and 6 is no different. This means that there is no difference in class between nutritional knowledge and the highest and lowest score range of each class is a total of 20. Differences in mean score of nutritional knowledge among schools are thought to be due to differences in students' abilities. The highest average score was obtained by elementary school 117, then elementary school number 123 and lowest was elementary school number 125. From Table 2, the percentage of students who can correctly answer about 76.4% of malnutrition, 75.9% nutrition knowledge, 72, 7%, source of nutrition 60,4%, food use 53,4%, and how to choose and manage food 47,1%.

The result of regression analysis, the expected change affects only father's education in directly ($A = 0,01$) influencing student nutrition knowledge with contribution 14,39% ($r^2 = 14,39\%$). The higher the father's education the higher the value of students' knowledge. Regression equation obtained: $Y = 63,42990,8792X$, namely Y: The nutritional value of students and X: father's education same with this result, involvement of school nutrition programs in nutrition education was reported by a majority of respondents, only half of respondents are coordinating or collaborating with teachers in providing nutrition education. This indicates opportunities exist to expand coordinated, school-wide nutrition education programs [2].

Although the nutritional knowledge of students is sufficient, the application in daily eating habits is lacking. It is possible that this is influenced by the socioeconomic and cultural conditions of the family. In order for students to more easily apply nutritional knowledge, nutrition education materials in primary schools must be adjusted to the eating habits and food availability as well as local socio-economic and cultural conditions[11]. The results of the tests conducted on 42 primary school teachers showed the difference in nutritional knowledge of teachers between primary schools (Table 3) the highest teacher nutrition knowledge achieved by elementary school number 117, followed by elementary school number 123. Teachers in other elementary schools are still classroom teachers who teach almost all the subjects given in elementary school.

Table 1. Total and percentage of answers correct as the results of nutrition knowledge test by elementary school students

SD	MS	KM	PM	PG	SG	AK
117	131	83	83	115	98	119
(a=144)	90,9	57,6	57,6	79,9	68,1	82,6
118	101	60	52	88	67	95
(a=120)	84,2	50,0	43,3	73,3	58,8	70,8
119	61	34	35	49	42	40
(a=73)	83,6	47,9	47,9	67,1	57,5	67,1
120	70	45	37	68	46	67,9
(a=93)	72,7	48,4	39,9	73,1	49,5	72,0
121	92	72	51	93	71	96
(a=129)	77,3	60,5	42,9	79,2	58,7	81,7
122	92	72	81	93	71	96
(a=123)	85,4	56,3	42,9	79,2	58,7	80,7
123	34	53	45	78	63	78
(a=92)	91,3	57,6	48,9	84,4	68,4	84,8
125	39	38	25	43	33	36
(a=60)	56,0	63,3	41,7	71,7	69,0	0,6
TOTAL	637	429	379	610	489	614
(a=84)	78,7	53,4	47,1	75,9	60,4	76,4

Note: MS= Healthy food, KM= food uses, PM = selection and processing of food materials, PG= definition of nutrition, SG= source of nutrients, AK = result of malnutrition

Table 2. Average Score Teacher of Nutrition Knowledge Result

Name of Elementary School	Total of Teachers (person)	Average score of nutritional knowledge
Elementary school number117	5	76,8
Elementary school number118	7	70,0
Elementary school number119	3	65,6
Elementary school number120	5	78,8
Elementary school number121	6	70,7
Elementary school number122	4	64,0
Elementary school number123	5	73,6
Elementay school number125	5	69,6

There seems to be a tendency among teachers and students about nutritional knowledge. (Table 1) shows that the highest average knowledge level of students is grade 4 and grade 6 of elementary school number 117 while for grade 5 of elementary school number 123. This fact can be expressed as an indication that teachers with adequate improvement will be able to deliver better and more clear about nutrition to their students. From analysis of syllabus of teaching program, KTSP refine that nutrition material is given for each class, but only included in the subject of Crafts, Physical Education, natural sciences, social sciences, Islamic Education. The available time to provide nutrition in each subject varies from 2 hours to 165 from all levels from grade 1 to grade 6 in elementary school with the lowest part of nutritional time being Social Sciences while the largest is in crafting, [research of defined intervention delivered in a supplementa Nutrition Assistance Program Education setting can positively impact mediators associated with vegetable intake for fourth-grade students](#)[6].

Table 3. The time available to deliver nutrition materials in each subject and grade level

Subject	GRADE						TOTAL
	I	II	III	IV	V	VI	
	Hour						
Handicraft	20	33	18	0	0	94	165
Physical Education	6	3,0	0	8	3	0	20
Natural Science	0	0	10	0	0	10	20
Islamic Education	2	0	0	0	0	0	2
Social Science	0	0	0	0	4	0	4
TOTAL	28	36	28	8	7	104	211

Based on the results of interviews with elementary school teachers, it turns out they cannot meet the time as stated in the curriculum. At least rendering time is due to the limited knowledge of elementary school teachers about nutrition and few proper teaching books. Of the 43 books to teach used in eight elementary schools studied according to nutrition in curriculum materials. It turns out that most do not match the nutrients that have been listed on the curriculum, and even some are potentially misleading. Based on research data, the model preparation includes curriculum materials that need to be addressed so that it can be made in some kind of guide for teaching by elementary school teachers.

Nutrition knowledge as one of the subjects taught in primary school must be continuously provided from grade 1 to grade 6, although nutritional ingredients are included in some subjects, should the material of all subjects being entered should be arranged in such a way that will suit the stage of development cognitive students. The organization of this nutrition design model is also based on the analysis of the presentation hours of each subject and the grade level and learning objectives as determined in the enhanced curriculum. Evidence was found for the effectiveness of especially [multicomponent interventions promoting a healthy diet in school-aged children in European Union](#)

countries on self-reported dietary behavior. Evidence for effectiveness on anthropometrical obesity-related measures is lacking[8].

The results of time allocation analysis and learning objectives are the minimum materials studied by elementary school students. In formulating the model there should also be the possibility to add descriptions that are deemed necessary and urgent considering the origin cannot be separated from the scope of the learning objectives set forth in the curriculum KTSP. From 211 hours of nutritional material presented to elementary school students, 50 models of educational model are divided into 5 subjects: Handicrafts, Physical Education, Natural Science, Social Science and Islamic Education. In determining the number of models, it is used a benchmark that for 2 hours lessons a model is needed that is described in the class (Table 5). This suggests that many educational models for grade level according to the stage of cognitive development of students in grades 1 and 2 are generally considered to be pre-operational, while students in grades 3 and 4 are concrete operations, while students in the classroom 5 and 6 are formal stages [7].

Another thing to consider in the design of nutrition education models is the role of students who are expected to be agents of change in Nutrition Innovation for families[9]. Thus, for every model created by the student is constantly invited to always compare the eating habits that have been given theory in the classroom. Teachers are also expected to play a role so that it will continue to encourage students to try to help improve family eating habits.

Table 4. The number of models of nutrition education of each grade according to the stage of cognitive development

NO	Subject	Hr	Total of M	Stage of cognitive development
I	Islam	2	2	Pre operationalThe use of symbols and the design of internal responses, for example in a game language and imitation
	Physical education	6	6	
II	Handicraft	20	5	Concrete operation
	Physical education	3	2	
III	Handicraft	33	9 (4)	Students are able to think in terms of a concrete object (real object). Able to develop negotiation process provocation and identity
	Natural Science	10	5	
IV	Handicraft	18	6 (2)	Formal operations
	Physical Education	3	3	
V	Social Science	4	1	Able to think systematically against things that are abstract and hypothetical.
	Physical Education	3	2	
VI	Natural Science	10	5	
	Handicraft	94	17 (15)	
Total		211	61	

The design of the nutritional learning model should also be made in such a way that family members can participate to learn nutrition material. The tasks assigned to students in the form of interesting worksheets can be shown to their families to learn together. The principle of learning with family members at home is highly prioritized by the ultimate goal of improving family eating habits. Students targeted for this study were grades 4, 5 and 6 of eight elementary schools in Kentucky sub-district. Nutrition materials in Palembang go to 5 subjects in elementary school that is handicrafts, physical

education, natural sciences, social sciences, and Islamic Education, a total of 211 hours given from grade 1 to grade 6 listed in the curriculum KTSP.

Principles of Preparation of Nutrition In elementary school is based on the results obtained after students are asked questions about knowledge about nutrition. The questions are written tests including nutritional knowledge that includes healthy food, the use of food for the body, how to choose and manage food, nutritional definition, nutritional sources and as a result of malnutrition. Based on answers from grade 6 students the average score of 73.1 is better than the average grade score of 5 is 67.4, while the grade 4 score is 59.3. The influential change from father education, the higher the father's education, the higher the nutritional value of the students.

Teachers that less successful in teaching nutritional materials are caused by nutritional material included in other subjects, nutritional material not specifically delivered. It would be better if teachers who teach nutrition are able to keep up with the current science. This is in line with opinion that the factors that influence learning outcomes can be divided into two factors, namely internal and external factors. Internal factors are formed from the students themselves, such as physical and spiritual health, attitudes, intelligence and talents, interests, motivations, learning habits[5]. Meanwhile, external factors come from outside students, such as family environment, school environment, and teachers.

Many US medical schools still fail to prepare future physicians for everyday nutrition challenges in clinical practice. It cannot be a realistic expectation for physicians to effectively address obesity, diabetes, metabolic syndrome, hospital malnutrition, and many other conditions as long as they are not taught during medical school and residency training how to recognize and treat the nutritional root causes[10]. In line with the results achieved by students, it is influenced by the quality of teachers. From the mentioned discussion, it can be concluded that the nutrients are better delivered by subject teachers than by the homeroom teacher because the homeroom teacher has given some material so that nutritional material is not delivered due to the limited knowledge base. School teachers about nutrition and there are few suitable books for it. 43 textbooks on nutrition materials used by eight elementary schools were examined in accordance with the suitability of the nutritional curriculum. It turns out that most do not fit the nutritional material that has been listed in the curriculum, and even some are potentially misleading. Based on the results of research data, the information from these focus groups was used to design a parent nutrition education programme especially designed to respond to the needs of the LAUSD parents, the majority of whom are low-income [17].

Based on the data analysis there is a tendency between teachers and students' nutritional knowledge, it appears that the average level of highest student knowledge is grade 4 and grade 6 of elementary school number 117 while for grade 5 it is elementary school number 123. This fact can be expressed as a hint that teachers with improvement adequately will be able to provide a better and clearer way of nutritional material to their students. From the syllabus analysis of the KTSP teaching program it is enhanced that nutritional material is provided for each class, but only included in the subject Crafts, Physical Education, natural sciences, social sciences, Islamic Education. The time available to provide nutrition in each subject varies from 2 hours to 165 from all levels from grade 1 to grade 6 in elementary school with the lowest time share in nutrition is Social Sciences while the largest.

4. Conclusion

Nutrition is needed for student's growth and development, energy, thought, and endurance that can optimize brain growth and development. This research was conducted on elementary school students in Sako Kenten Palembang who have the potential to receive nutritional education, so that students can convey knowledge about nutrition to the environment of every family, especially parents and siblings. The results of this study have different nutritional values between class and between schools, grade 6 has a higher value than grade 5, and grade 5 students are higher than grade 4. The highest grades are from elementary school 117 and elementary school 123, while the lowest score is elementary school 125. This change influences the education of fathers, the higher the education of fathers, the higher the nutritional value of students. Nutrition education in primary schools is not given specifically, but nutritional problems are included in the subject and art skills, physical and health education, natural

sciences, social sciences and islamic education. Physical education and health teachers are more enthusiastic in teaching nutrition compared to classroom teachers. Nutrition education must be given exclusively to health and nutrition subjects which are not combined with other subjects in accordance with research findings.

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