



Health Promotion Models to Reduce Childhood Obesity in Elementary School: A Comparison Study between Indonesia and Australia

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aims: There were concrete experience and efforts from Australian and Indonesian government in reducing cases of obesity in society. Cases of obesity among school children in Indonesia have increased with its serious impact. The aim of this research is to compare health promotion models in elementary schools in Indonesia and Australia to reduce obesity prevalence.

Study Design: This study used was qualitative approach, with research focus are health promotion models related to efforts to reduce childhood obesity prevalence in Indonesia and Australia.

Place and Duration of Study: Place of study was in elementary schools in Semarang City,

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Indonesia and Queensland, Australia, between July and December 2014.

Methodology: Data used in this research were secondary data, from previous studies, while supporting data were primary data regarding to focus group discussion (FGD) results and Angelo. Instruments used were observation guide, charging sheet data, as well as focus group discussion, and Angelo. Data were analyzed with the model from Miles and Huber man.

Results: Health promotion model in elementary schools in Indonesia was called school health activity (in *bahasa* called *Usaha Kesehatan Sekolah*-UKS). This program could not be applied properly because of limited and un-competence human resources in the field of health, limited infrastructure, and lack of coordination among relevant stakeholder. Health promotion model in elementary schools in Australia, in line with those in Indonesia, known as the Australian Curriculum, Assessment, and Reporting Authority (ACARA), that was integrated into the school curriculum. This program was supported by the Smart Choice program, Smart Moves, and Stepanie Nation Alexander Kitchen Garden program. Not all schools have implemented the program well, because either state or school had its own regulation.

Conclusion: Alternative models recommended were UKS with high commitment, an integrated health education, and local potential based UKS.

Keywords: Health promotion; elementary school; obesity; childhood; Angelo method.

1. INTRODUCTION

Severe nutritional status and over nutrition are serious problems that can affect development in the future. Elementary school period is a period of growth and learning processes that determine the quality of human resources in the future, which needs attention. Getting the impact of nutritional status on children and student through further study that was monitored for twelve years in school-age children in Chile. Children with problematic nutritional status had a higher tendency to drop out of school or school delays to a higher level. It was associated with brain development, intelligence, and learning achievement [1].

In addition to poor nutritional status, the status of over nutrition (obesity) is also a serious problem. Secular trends of obesity can be said to occur in the world. In a period of 25 years, between 1976 and 1999, obesity prevalence increased doubled in children to 11 years, and tripled in teenagers and this was a global problem [2]. Obesity was associated with mortality and risk of metabolic disease and cardiovascular disease and caused high financial loss treatment.

The prevalence of obesity on adult in Indonesia were 10.3% in 2007, 11.7% in 2010, and to 15.4% in 2013 [3-5]. At the age of 5-12 years, the prevalence of obesity nationally was still very high at 18.8%. Even, its trend had increased from 1.4% (2007) to 18.8% (2013). One of the provinces in Indonesia with that increase was Central Java [3,5]. Government efforts at the

national level, policies, and integrated efforts in food and nutrition sectors to support the development of human resources quality had also been arranged in the form of a National Action Plan on Food and Nutrition 2006-2010. In addition, WHO had established a population-wide policies and initiatives, such as marketing restrictions on unhealthy foods and non-alcoholic beverages to children, nutrition labelling, food taxes and subsidies, physical activity policies, and social marketing campaigns [6]. These are typically designed to alter the food and physical activity environments to make healthier choices the easier choices for individuals within the population.

Based on the MoH of Republic of Indonesia, efforts that had been taken by the government were schoolchildren weight monitoring, health promotion, as well as case detection and management [7]. Implementers of that policy are school health activity (in *bahasa* called *Usaha Kesehatan Sekolah*-UKS) and health centers. The school/UKS is assigned to provide support and motivation for children to carry out a healthy life style as recommended from health centers, as well as try to provide a comfortable environment for the child. In fact, these efforts have not showed the result in line with the expectation, and even national prevalence of obesity continues to increase.

As one of the neighboring country of Indonesia, Australia also has the problem of obesity. In 2011-12, 10.8 million adults were either overweight or obese, and of these 4.7 million

were obese [8]. This report shows that the percentage of adults who were obese varied threefold across local areas, from 14% in Sydney North Shore and Beaches to 41% in Loddon-Mallee-Murray. The percentage of adults who were overweight or obese increased with geographic remoteness and lower socioeconomic status. Yet still half of adults (54%) in the wealthiest urban areas were overweight or obese, and two in 10 (19%) were obese. Overweight and obesity rates are increasing rapidly across Australia. In 1989, 44% of adults were overweight or obese, rising to 63% in 2011–12. In children, the prevalence of childhood obesity has increased three times, from 10% to 30% in 2014 [8].

Many efforts have been executed in Australia to manage obesity such as enable access to healthy food, reducing unhealthy food promotion, and support physical activity as a lifestyle choice with designing the urban that supports physical activity [9]. Australian government's role is significant in the control of obesity, especially in school children. When compared with Indonesia, it appears that Indonesia needs to assess health promotion efforts that have been made in Australia, so the prevalence of obesity in school children can be reduced as much as possible [10].

Based on background above, that 1) There were concrete experience and efforts from the Australian and Indonesian government in reducing cases of obesity in society, 2) The increasing cases of obesity among school children in Indonesia, 3) Serious impact of obesity in school children, 3) School children are in development and growth period that determine the quality of human resource in the future, 4) Efforts have been made but have not been getting the results in line with expectations, 5) School children are also appropriate period to increase knowledge, improve behavior, regarding to nutrition through health promotion. So the aim of this research was to compare health promotion models in elementary schools in Indonesia and Australia to reduce obesity prevalence.

2. MATERIALS AND METHODS

This study was the mapping model of health promotion for elementary school children. The research approach used a qualitative approach, with research focus was health promotion

models related to efforts to reduce childhood obesity in elementary school in Indonesia and Australia. The data used primarily were secondary data (from the previous research), while supporting data were primary data related to the results of observation by the Angelo method (Analysis Grid for Elements Linked to Obesity) [11], focus group discussions (FGD), and supporting situations analysis on elementary school children in Indonesia and Australia.

The framework for the ANGELO process was first developed for use as a practical tool for categorizing and scanning the environment for potential environmental barriers to healthy eating and physical activity. FGD was conducted to obtain input from experts and stakeholders in the field, to facilitate the analysis of the data and obtain construction formulation of comparative models of health promotion. In addition FGD also conducted in order to obtain valid data from Indonesia and Australia. Obtained data were analyzed with Miles and Huber man model. It was a data analysis technique that includes three activities simultaneously, which consists of data reduction, data presentation (display), and drawing conclusions (verification).

Informants in Indonesia determined by purposive sampling, with the eligibility criteria as follows: 1) elementary school in center of Semarang City and with level accreditation of A, 2) nutritional status of students with obesity was higher than average in Central Java Province, 3) school was willing to cooperate in the study, 4) students were in class V, 10 years old, and willing to cooperate in research, 5) parents were the parents of class V students and willing to cooperate. Informant were from four elementary schools in Semarang City (Isriati, Palebon, Petompon, and Pedurangan Kidul), with the number of informants were 23 people, consisting of 4 head masters, 4 teachers of UKS, 4 classroom teachers, 8 people as parents of students, and 3 students.

Informants who full filled Angelo questionnaires were 5 for each elementary school, consisted of headmaster, sports teacher, UKS teacher, and 2 parents. FGD were conducted on September 1, 2014 with researcher team from Semarang State University, Indonesia (6 researchers) and University of Queensland, Australia (2 researchers). Data collection in Australia were focused on health promotion models that have

been conducted in Australia. The data were secondary data from Queensland Health and Education Department reports.

3. RESULTS AND DISCUSSION

Based on the research results, it could be described that obesity in elementary students in this study due to unhealthy behaviors, related to education or knowledge, cultural systems (customs, norms and value), environment, policies or rules and existed curriculum, either school's or family's responsibility, as seen in Fig. 1.

Nutritional status, including obesity, was influenced by an unhealthy life style. It could be described from children foods consumption and activity. It was indicated by the habit to bring unbalanced nutritious food from home, ie rice with fried chicken / egg (fast food), without vegetables and rarely eat fruit. Even more often students brought lunch with a side dish of rice noodles, due to the easier and faster on making and more loved by children. Another was habit of eating snacks that was supported by the parents, by giving pocket money every day ranging from 1-2 Dollar. It can be said that this was in line with the results of research that energy intake and income are associated with the incidence of obesity in elementary school children [12,13].

Snacks that were consumed could be categorized to unhealthy food safety, considering from food preservatives and colors which may be used. Snacks could be said to be of low quality, considering from high carbohydrate, also when viewed from the relatively cheap price and affordable by school children. Nutritional

consumption was caused by poor eating habit, which was not only limited to the third world, but was found also in the United States [14]. In addition, other study found that the nutritional status of urban children in Nigeria were better than rural children. This occurred due to the difference of food eaten in the rural and urban area, and traditional beliefs and practices that were rooted in rural than urban communities that affect nutritional status [15].

Almost all activities were related to children's sports lessons, some activities were like playing around the school yard and only small portion of extra activities, like swimming lessons. Other play activities, especially at home tended to not use a lot of muscle activities, such as playing video games. Activities that used the muscles could be said to be still less portion.

Nutrition parenting was also part of a healthy behavior that might be influenced by economic, educational, but it was also influenced by the social system (social familiarity and social institutions) and cultural systems (customs, norms, value) [16,17]. In this study, healthy behaviors that were associated with the incidence of obesity were affected by education or health-related knowledge, policy or rule, culture system, and environment.

3.1 Angelo Score

After scoring each component, the next step to do was merge the cells to see all items that will be the priority of each component, so easy to make an action plan to develop an evidence based health promotion model. Result of merging cell could be seen in Table 1.

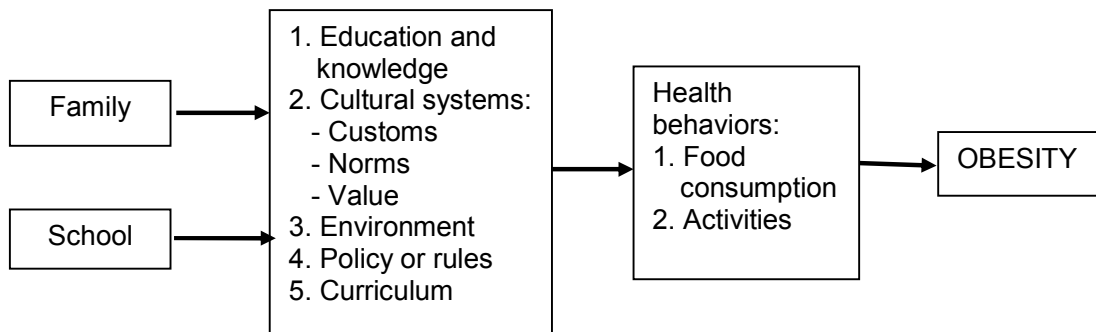


Fig. 1. Factors related to obesity in this research

3.2 Education or Health - Related Knowledge

Health knowledge in the students here was more influenced in school. While the health education of families was obtained from samples of healthy behaviors that were run by parents or students' observations of how health care or parenting that parents did, especially mothers to their children. Based on interviews, it could be said that the description of the knowledge of the student's health was still lacking. This was possible with the curriculum in elementary schools run in which knowledge about the health of the subjects inserted in the sport. There were no specific subjects to health and no special competence teachers in the field of health. Health lesson was given along with sports that dominated by the practice and theory of sport.

Examples in Isriati Schools, within one week, it was scheduled 4 hours for sports, where 3 hours were used for practice and one hour to sports or health theories after *dhuhur* prayer (at 12 am).

This was done, so that the teacher would not be boring, if within 4 hours of practice or theory only. Practically, health lesson was given once a month. Besides, health was also combined with KPDL subjects (awareness to self and environment), which the teacher was from language teacher, art teacher and others including sports teacher).

The material was ever given about healthy food, personal hygiene and environmental cleanliness. But because there were no specific health subjects, then the lesson was not under student concerns. Nutrition education affected the intake of protein and fat intake in students [18,19]. Recommendations to give health education to children from an early age, through increased IEC (communication, information and education), such as the movement of fruit and vegetable consumption, and physical activity, were effective to reduce obesity in elementary school children and to integrate it into the curriculum as well as in extracurricular activities [20-22].

Table 1. The result of the merging cell according to the priority of each component based on Angelo

Student's behavior to be changed	Home/family supporting environment to be improved	School supporting environment to be improved	Student and parent's knowledge/skill to be improved
1) Have breakfast everyday,	1) Parents to be better role models for healthy eating,	1) Higher priority on healthy eating in the school,	1) Know eating plenty of fruit and vegetables keeps you healthy,
2) Increase the amount of fruit eaten,	2) Families to be more supportive of healthy eating,	2) Have strategies to maintain profits with a healthy canteen,	2) Know eating breakfast promotes learning,
3) Increase informal activities that involve being active (e.g. skateboarding, shooting basket ball hoops),	3) More fruit available,	3) Schools have a higher budget for physical education and equipment,	3) Know choices of healthy food,
4) Improve lunch box menu, and	4) More healthy choices for breakfast, and more supportive of sport / exercise.	4) Teachers as better role models for healthy eating, and	4) Have a wide taste for fruit and vegetables, and
5) Increase participation in organized physical activities other than sport (e.g. dance, martial arts).	5) Families to be	5) More relaxed rules on use of school grounds.	5) Know healthy snacks

3.3 Policy or Rule

The rules laid down in the family, such as 1) give pocket money, 2) involve children in extracurricular activities at school and outside of school related to physical activity, including exercise, 3) pick the children up to the school by motor vehicle, either children who live far or near from the school. School's policy in this case was related to the UKS.

UKS has 3 main programs, called Trilogy UKS, i.e. development of healthy school environment, health education at school, and health services at school. If this program applied well, it will form a healthy student behavior which may ultimately decrease the obesity prevalence in students.

UKS school was required by all schools that expressed by headmaster and their staff. But in this case, UKS could not be apply as planned, because of the lack of strong commitment from the school and institution builder involved, as mentioned in Joint Decree from 4 ministers (Minister of Education, Health, Religion and Home Affairs). This program done was more depending on school policy itself. This resulted in a different picture of the UKS between public and private school under the certain foundation, which has the same accreditation and with relatively the same criteria (location in the city, with students from the middle class and above). In private elementary, decision maker was on chairman of the foundation, with the headmaster along with the staff as proposer and policy implementers. Private elementary schools were also very concerned with the facilities provided at the school, such as facilities related to the UKS. It might determine the number of applicants to the school.

3.4 Culture System

Culture system, in the form of customs, norms and values could be a factor influencing obesity in students, but might also as potential that needs to be used to support the improvement of the nutritional status of students, such as:

1. The habits to bring food box to the school supported by the family and reinforced by school development policy. But, that food had to consider the guide healthy food (nutritionally balanced menu). The habit of bringing their food like instant food or unbalanced nutrient content was a factor

contributing to the incidence of student obesity.

2. The existing norms and values, which was clearly illustrated in Isriati School was the potential, that students have a close relationship, having a high confidence of teachers and respected teacher, so that in entering the health knowledge will be easier. Besides, exemplary teachers become the best education for their students. Many family or parents also entrusted the care of their children to teachers. This was a high potential regarding to a student's education, including health education.

3.5 Environment

Environment, either at school and home. The environment is everything around, either living things, inanimate, real or abstract objects, including other humans, and the condition formed is due to the interaction between the elements in nature [23].

Environmental influence on childhood obesity could be an environment at school and at home. School was an institution designed for the teaching of students under the supervision of the teacher, while the home / family was place for children growth and development with the supervision of parents, where both the environment might shape the knowledge, attitude, and behavior of children who would build the personality of the child [24]. In terms of the school environment such as the condition, responsibilities, relationships, and systems of regulation and existing activities, both teaching and learning activities in the classroom and outside of school hours activities such as extra-curricular, would affect the lifestyle of children, who were directly reflected in the child's diet and activity.

Home environment/family was an indirect factor affecting obesity in children [25]. Family environmental factors such as parenting and cultural habits such as cooking, food preparation, priority food in the family, and the distribution of meals for family members [26, 27]. Parenting and culture in an unhealthy home environment and not in accordance with the needs of the child might support the incidence of obesity.

In relation with these environmental factors, the result was strengthened by the results of

research conducted by previous study, about influence of social and physical environment around the living place to the nutritional status of children in the UK (United Kingdom). The presence of healthy norms contained in the network of parents who know each other and are willing to keep the neighborhood kids that influence obesity or nutritional status of children in the UK. Social cohesion had been shown to affect health at the neighborhood level, that was increasing social contact and social transactions between people could help the adoption of healthier behaviors [28].

Models of health promotion or health education related to obesity in elementary school in Indonesia, was UKS with programs consists of: development of healthy school environment, health education at school, and health services at school. UKS program that run on almost all school was health education at school included in the curriculum, which the lesson integrated with sports, with a limited portion. It could be concluded that the program of UKS in most school in Indonesia were not run properly. Some of situations that did not support such as: 1) limited human resources and not competence in the field of health, 2) lack of infrastructure of UKS, 3) lack of coordination between stakeholders. Various models of health promotion research that had been conducted by several institutions, such as universities had not been applied in a school program.

Models of health promotion in elementary schools in Australia, in line with those in Indonesia, namely health education integrated to the school curriculum called the Australian Curriculum, Assessment, and Reporting Authority (ACARA). Portion of physical education was more than health education. Human resources problems that do not comply with the competence of the health sector was also an obstacle. As a strategy to support health education, health education was integrated through curriculum and implemented in each school. Support program was programs related to the selection of healthy food consumption, the promotion of sports activities and development a preference for healthy foods, and facilitate student recall of healthy food. Not all schools had implemented programs well and authorities in the implementation were along with state and each schools.

Based on the analysis of the research, the principal factors to construct alternative models of health promotion in elementary schools in Indonesia were as follows:

1. The level of obese in elementary school students was likely due to unhealthy behavior, that influenced by the lack of health education given at school.
2. School was a great place to educate students regarding to the potential-potential, such as norms and values that existed in the school environment. Besides, the school was also a place of formally education.
3. UKS was a program that was very useful and needed by the school, with complete program to support student health.
4. On the one hand, in fact UKS could not run properly due to lack of commitment from each stakeholder, including schools.
5. There were several models of health promotion or health education programs from Indonesia and Australia which could be used as a source to prepare several alternative models in Indonesia, particularly in the city of Semarang, Central Java, as a pilot model.
6. The existence of cultural systems, social systems and applicable curriculum as a consideration in formulating the model recommendations

Based on analysis above, several alternative models of health promotion in elementary schools were UKS model with high commitment, integrated health education, and local potensial based UKS.

3.6 UKS Model with High Commitment

UKS, which existed since 1992, needs to be revitalized with several improvements and also with high commitment, to actualize Trilogy UKS. There was a need to make a clear job description for each stakeholders, related to joint decree (Ministry of Education, Health, Religion and Ministry of Home Affairs), as well as obligations to be performed by the school. Schools were required to attempt to have a minimum standard for the implementation of the UKS, as follows:

1. Human resources improvement: one person was designated as the coordinator of UKS in the school is under the responsibility of the headmaster.

2. Minimum facilities and infrastructure: available 3 bed, thermometer, measuring instrument height and weight, and standard medicine.
 3. UKS program implementation: annual program and the implementation of Trilogy UKS by the school.
 4. Monitoring and evaluation: conducted each year in writing.
 5. Partnering with a healthcare institution (private or public)
4. Partnership Program
Schools could start to collaborate with the stakeholders, to increase students' knowledge of health, for example by the university which conducts community service and research activities in the field of school health that were required to provide education about health. It could also collaborate with NGOs in health or with a local clinic/public health center.

3.7 Integrated Health Education

Based on the responsibilities of the school as an educational institution for its students, health education activities carried out in schools was education combined between theory, practice, and curriculum with other health promotion undertaken by schools independently or in cooperation with partners. So that health education in schools was applied with a variety of programs that were integrated, as follows:

1. Integrated into Health Curriculum
Health curriculum is justified to the current situation, that health education was given in conjunction with sports and inserted into awareness to self and environment subjects.
2. Smart Choices Program
This program was adopted from existing programs in Australia, as selection strategy for a healthy diet. Schools made posters about the food and drinks that were categorized into 3 groups: green, were foods that should be eaten in large amounts, 2) orange, were a food group that should be chosen carefully and 3) red, were food groups should be consumed rarely. Posters placed in each classroom and center activity place. The program should also be supported by the provision of the recommended types of food, especially in the school cafeteria
3. Kitchen Garden Program
This program was adopted from existing programs in Australia which has been implemented in Australia. This program was an implementation of a given theory, especially regarding to the provision of healthy and nutritious foods. Schools strived for providing a place for students to grow plan as ingredients, then cooked by students into healthy foods in the school kitchen.

3.8 Local Potential Based UKS

As a combination from first and second alternative model. UKS program was more based on ability and creativity of its school. In this case, the school must have a commitment to try to have the required minimum standards for the implementation of the UKS. UKS trilogy was a program that was able to be applied by strengthening the school potential as an educator of students. Strengthening the education of students was done by an integrated health education programs.

4. CONCLUSION

Based on the results and analysis in this study, the conclusions obtained were as follows:

1. The health promotion model or health education in elementary schools in Indonesia was applied by UKS program. This activity could not be applied properly with the unsupported situations such as: (1) limited and un-competence human resources in the field of health, (2) limited UKS infrastructure, (3) lack of coordination among stakeholders.
2. The health promotion model in elementary schools in Australia was called the Australian Curriculum, Assessment, and Reporting Authority (ACARA). It was supported by the Smart Choice program, Smart Moves and Stepanie Nation Alexander Kitchen Garden Program. Not all schools have implemented the programs because each state has its own regulation.
3. The recommended alternative model in Indonesia were: 1) UKS model with high commitment, 2) an integrated health education, and 3) local potential based UKS.

Health promotion model or health education that can be recommended to be applied at elementary school in Central Java province should consider equal school condition with in Australia. Its consideration are: 1) in urban areas, 2) high accreditation school, 3) willingness to cooperate. Based on the recommended alternative models in the discussion, the three models can be applied, and thus can be selected one model as recommendation for health education programs in elementary school.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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