Impact of Multi-Component Nutrition Intervention on Teachers, Parents, and Students toward the Knowledge and Attitude about Fruit and Vegetable Consumption

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Summary Fruit and vegetable (FV) consumption is one of the important components in balanced nutrition, but FV consumption in elementary school students (ESS) grade 5 and 6 was still low. The purpose of this study was to determine the impact of multicomponent nutrition intervention in teachers, parents, and students toward the knowledge and attitude about FV consumption. The study used a quasi-experimental design with a pre-post intervention method with nutrition education to three groups subject using comic and pocketbook in Nganjuk, East Java from February to May 2017. Subjects involved in this research were 10 teachers, 31 parents, and 31 ESS. Data analysis was with the paired difference test in three measurements. Based on Friedman’s test, knowledge and attitudes of participants increased significantly (p<0.05). The types of questions that were being improved were types of FV that contain potassium and the portion of FV that must be consumed. Subjects who belong to the category of having good knowledge also experienced a significant increased (p<0.05). The attitude scores on the three subjects increased significantly (p<0.05). Positive response to the attitude of FV consumption increased in the content of FV. The number of subjects who had a good attitude towards FV consumption also experienced a significant increased (p<0.05). Multicomponent nutrition intervention could improve knowledge and attitudes towards teachers, parents, and ESS regarding FV consumption.

Key Words attitude, fruit and vegetable consumption, knowledge, multicomponent, intervention

Children are the investment of the nation. Quality of health is determined by many factors, one of them is nutritional factors. At the age of entering school, children are able to make their own food choices (1). It makes children vulnerable to choosing the wrong foods, such as lack of FV consumption. The recommendation in Balanced Nutrition Guideline for children aged 10 to 12 is 3 servings/d for vegetables and 4 servings/d for fruit. However, based on the Fibririzani (2), the average FV consumption in children was only 1.3 servings/d and 0.9 servings/d. Dietary habit is formed in the beginning of life, so it tend to stay until adult. So, the children diet have to be a intention to form a healthy diet when they are adult (3). The low consumption of FV is influenced by various factors, one of them is lack of knowledge related to fruit and vegetable consumption in students. Knowledge about FV consumption in teacher and parent also influencing it.

Systematic review from Dudley et al. (4), showed that it’s important to improve capacity of school teacher especially about healthy food consumption. Teacher have capability to inform knowledge, such as information about benefit of FV. Teacher also can give some example about practicing consume FV in daily meal. Teacher is someone who stay with children, except parent. Sometimes, children have more believing in teacher’s words than parent’s word.

Involving parent in children diet like provide and offer FV in daily meal at home. They also can serve FV as lunch in lunchbox (5). There is tendency that the better of parenting in mother, the more types of FV which are liked by children (6).

Prelip et al. (7) conducted an intervention involving teachers and parents, the result was a positive change in knowledge, attitudes, and beliefs about vegetable consumption. Evans et al. (8) conducted a meta-analysis and it showed that multicomponent intervention program are better than just a component of intervention. Thus, multicomponent nutrition interventions that involve teachers and parents are needed to increase knowledge about fruits and vegetables.

MATERIALS AND METHODS

This study used a quasi-experimental design and conducted at Elementary School Balonggebang 1, Nganjuk East Java Province, Indonesia from February to May 2017. The subjects who involved in the study were 10 teachers, 31 parents, and 31 5th grade ESS.

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There were two intervention and three subjects involved in these multi-component interventions. Teachers, parents and ESS received nutrition education, moreover, ESS received FV provision for intervention too.

Nutrition education for teachers and parents was carried out in two meetings with a duration of 60 min/meeting based in Emilia et al. (9) and Maulida (10) study. The educational media used were pocketbooks and power points. The pocketbooks content are: 1) Importance of FV consumption; 2) Type, nutrition content and benefit of FV; 3) Portion of FV must be consumption; 4) Roles of teachers and parent in children consumption of FV; 5) Suggestion for teachers and parents to increasing FV consumption in children; and 6) Food recipe from FV.

Nutrition education for students was conducted in six meetings with a duration of 30 min/meeting. The educational media used were comics and power points. The comics used food dude program concept which developed by Wales University (11). The comics content are: 1) Importance of FV consumption; 2) Effect of FV deficiency; 3) Types of FV; 4) Nutrition content and benefit of FV; 5) Amount of portion FV that should be consumed; and 6) Suggestion to consumed varieties FV. Students also got FV which given at every nutrition education meeting. Fruit was given as fresh fruit (watermelon, melon, pineapple, jackfruit, papaya and banana), while vegetable was given as cooked food (carrot, cabbage, spinach). Each portion was given 100 g in lunchbox at every meeting, because that portion is suggestion portion from Ministry of Health in Indonesia for FV consumption of 11–4 y children.

The questions related to FV consumption consist of four parts. Part one (questions number 1 to 3) were about FV types, part two (questions number 4 to 6) were about sources of vitamins and minerals in FV, part three (questions number 7 to 9) were about benefits of FV, and the last number questioned about portion of FV that must be consumed by children.

Attitudes about FV consumption were expressed in 10 statements as indicated by the agreement of the three subject groups. The statements in this study include: 1) FV consumption must be varied every day; 2) Nutritious FV does not have to be expensive; 3) The content in FV is vitamins and minerals; 4) Spinach and mustard green were examples of vegetables that contain minerals; 5) Vitamin, minerals and lots of fiber contained in fruits and vegetables; 6) Function of fiber to accelerate defecation; 7) Benefits of FV to increase endurance; 8) Benefits of oranges to prevent dry lips; 9) Benefits of carrots for eye health; and 10) Portions of fruit and vegetable consumption in a day.

Data collection was conducted by interviews guided by researchers on subjects with questionnaires and carried out three times, that was before intervention (1st), after an intervention (2nd) and one month after an intervention (3rd). The variables that collected were characteristic, knowledge and attitude about FV consumption on teachers, parents and ESS. Body weight and body height on ESS collected also. Data analysis using Friedman’s test.

RESULTS

Subject characteristics

The teachers who involved in this study were between 28–57 y old with a duration of teaching between 7–34 y. Most of the teachers’ education is bachelor (60%). Most of them were classroom teachers who teach Natural Sciences, Social Sciences, Mathematics, Indonesian and Arts (60%), while others teach English, Javanese,
Religion, and Sports.

Most of the parents who took part in this study were mothers of students who participated in this study (74%). The age was about 29–59 y old. Most of the mothers were housewives (74%) and most of them had the last education was graduated from elementary school (37%).

Students who took part in the study were 5th grade ESS and they were 11–14 y, meanwhile, most of them were boys, 20 people (65%). Based on the body mass index for age (BMI/Age), it was known that most students have normal nutritional status (65%), while students who have wasting nutritional status were 5 people (16%) and overweight nutritional status were 6 people (19%) Subject characteristics can be seen in Table 1.

Knowledge about FV consumption

Overall, from measurements 1st to 3rd, questions that were less than 70% of subjects answered correctly questions were about types of fruits and vegetables containing potassium (second part) and questions about the portion of FV that must be consumed (last part).

The Friedman test results showed that the distribution of subjects who had good knowledge of teachers, parents and students increase significantly ($p<0.05$). After the intervention, in the third measurement, distri-
distribution of subjects who had good knowledge of teachers increased by 40%, in parents it is increased 36% and in students, it is increased by 48%.

**Attitude about FV consumption**

Based on the results of the intervention, there were two attitudes that still need improvement, they were the content of fruits and vegetables were vitamins-minerals and the consumption of fruits and vegetables in a day.

Table 4 showed the maximum score of attitude has increased from the first measurement to the third measurement. While the minimum score has increased in the second measurement, but it decreased in the third measurement. The Friedman test results showed that there was a significant increasing (p<0.05) in the third measurement compared to the first measurement.

Table 5 showed that subjects with good attitudes towards fruit and vegetable consumption increased significantly (p<0.05). The distribution of teachers with attitudes in the good category increased by 30%, in parents increased by 45% and in students 35%.

**DISCUSSION**

Inappropriate food consumption can be avoided with good knowledge about nutrition. Nutrition knowledge is knowledge related to the role of food and nutrition, and food sources of micro and macronutrients. Nutrition education has the aim to instill nutritional knowledge, so it is hoped that nutrition knowledge can form attitudes which are can influence behavior (12). Knowledge related to food can influence eating behavior (13) so that one of the interventions that can be given is nutrition education.

A study by Verawati (14) which provided nutrition education interventions, the feed food source of fiber and exercise in students, showed that most of the students after the intervention have increased of a score, but four months after the intervention was given, the score decreased. Keihner’s (15) research also showed that nutrition education for 4th and 5th-grade students related to FV consumption could increase significantly of student’s knowledge. One common goal of nutrition education is to develop knowledge and attitudes about the role of nutritious food for human health (16, 17). This shows that the purpose of providing nutrition education interventions in this study has reached one of the goals, it is increasing knowledge and attitudes.

Factors that influence individuals or groups in behavior are enabling factors and reinforcing factors (17). Predisposing factors are factors from internal individuals, enabling factors are factors that support behavior in terms of availability and affordability, while outside factors are factors that strengthen behavior such as family, teacher, and other influences. According to Contento (13), children’s environments including schools and families must carry out nutrition education with a focus on improving children’s knowledge, abilities, and practices in choosing food and responding to nutrition and food issues.

Knowledge improvement in students is not only due to nutrition education in these students, but also the influence of the existence of nutrition education conducted on the teacher. Nelson’s research (18) shows that nutrition education held in schools will be difficult if there is no support from the teacher and the administration or low support. Teachers can do learning in class by doing nutritional education about nutritious and healthy food, then direct students to choose healthy snacks available in the school canteen or with recommendations to bring supplies from home (19).

The results of qualitative research conducted by Graham et al. (20) and Power et al. (21), showed that teachers felt that they have a responsibility to provide nutrition and health information to their students. The students also stated that healthy eating behavior was introduced by his teacher in the school environment. The teacher is the main informant in the school environment. Research by Fitriana et al. (17) mentions that teachers were the third position in the source of information that was the most used source of information by students after television and parents.

Parents, especially mothers, can influence the choice of eating children through the provision of certain foods. Giving food to children can educate children to be able to receive, choose and determine the amount of nutritious and sufficient food, so that good eating habits will be formed (22). Parents can teach, give examples and eat FV together with their children, so that it will have a positive impact on children’s eating habits, children’s preferences and the availability of fruits and vegetables at home.

Saifah’s research (23) showed that there was a significant relationship between the role of the family as health promotion, food providers and parenting modeling with the nutritional behavior of school-age children. It showed that the better the role of family, the better the nutritional behavior of school-age children. Tibbs et al. (24) in Barkley (25) show that parenting modeling increases FV consumption and low fat intake in parents so that it impacts indirectly on their children.

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