

*Nutritional Information Media for Elementary School Children:
A Literature Review*

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Abstract

This study aims to review researches on media formats applied for educating school children about nutrition. This is an introductory research for determining suitable media for nutritional information provision of elementary school children in Indonesia. The data is collected from database of Scopus, Indonesian Scientific Journal Database (ISJD), Pubmed and Google scholar. This research answers some following research questions: (1) What kinds of media for conveying nutritional information to elementary school children? (2) How is the effectiveness of those media? The study showed that there are 15 kinds of media for conveying nutritional information. Then we explored whether the media has effectiveness as increasing knowledge, motivation, awareness, changing attitude and/or changing behavior. The practical implication of this research is conducting further research by measuring empirically appropriate media for educating elementary school children on nutrition in Indonesia.

Keywords: nutritional information, elementary school children, information media

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Introduction

Reported by Unicef (2018a) that almost half of children death is caused by malnutrition. It is contributing to the number of child mortality about 3 million worldwide per year. In developing countries children is the most susceptible community group suffering nutritional problems. For example, one of three children, who are stunted in the period of 2011-2017, is occurred in Southeast Asia (Indonesia, Philippines, Vietnam, Cambodia, and Lao), South Asia (India, Pakistan, Nepal, Bangladesh, and Bhutan) and most countries in Africa. Meanwhile, giving optimal feeding to children is essential for survival, growth and development (Unicef, 2018b). However, in some developing countries are not up to a half children benefit such as in Southeast Asia (Indonesia, Vietnam, Cambodia, and Lao), South Asia (India, Pakistan, Nepal, Bangladesh, and Bhutan), and most countries in Africa. Furthermore, Iodine (Unicef, 2018c) and Vitamin A (Unicef, 2018d) deficiency are major causes in childhood illnesses in developing countries such as in some countries in Africa. Indonesia Ministry of National Development Planning and United nations Children's fund, (2017) reported that 8.4 million or 37 per cent Indonesian children are stunted and suffer from chronic malnutrition. The children who suffers stunted includes children from the wealthiest households. Meanwhile, one of ten children is acutely malnutrition. Pahlevi and Indarjo (2012) reported that the most of elementary schoolchildren (58%) in a school in Semarang, the sixth biggest cities in Indonesia has malnutrition status. Meanwhile, almost a half of school kids in the district of Bolaang Mongondow Utara suffers anemia (Arifin et al., 2013).

The low level of nutritional knowledge of elementary school kids in Indonesia is assumed as a reason of inadequate nutrition intake. Conveying nutritional knowledge to parents and also schoolchildren could prevent malnutrition through improving their awareness, attitudes, and behaviors. De Castro Barbosa et al. (2016) argued that since elementary school students tend to consume unhealthy foods for breakfast and lunch, nutritional knowledge should be delivered continuously and integrated into the academic program, therefore the behavior for eating healthy food especially in school will be achieved. Additionally, Ghaffari et al. (2017) showed that the suitable design and program in nutritional education will improve awareness, attitudes, and behaviors of students. Likewise, Verawati et al. (2016) reported that based on Anova test to student kids, nutritional education provided influence their attitudes to nutrition intake. Soheila et al. (2016) also conveyed that nutritional education is useful to improve nutritional knowledge, attitude and performance of primary school students. Furthermore, tailored nutritional education for elementary-school students is effective in changing student behaviors. In the meantime, the research result in Indonesia showed that conveying nutritional knowledge to student influence the awareness but not the behavior (Yulia et al., 2018).

Using media in educating nutrition knowledge would be more interesting and ease to be understood by student kids. Rohmah et al. (2016) conveyed that demonstration media in nutritional education for elementary school kids should be employed to make them more interested in the material. Various media has already studied for nutritional education among others are poster (Fitriana et al. 2015), leaflet (Fitriana et al., 2015), comic (Hamida et al. 2012)(Nugroho, 2018), games (Mellecker et al 2013), images (Lobo & Martins, 2014), messages (Lee et al., 2017), booklet (Zulaekah,

2012), etc. To date no paper reviews various types of media to convey information about nutrition to school children.

Based on several reasons aforesaid this research aims to identify the kinds and effectiveness of the media applied to improve nutritional knowledge of elementary school kids. The questions that would be answered are (1) What kinds of media applied for nutritional information provision for elementary school children? (2) How effective is the media? This paper outputs are the list of media and their effectiveness for nutritional learning of elementary students. The output would be useful for the media development for educating nutritional knowledge to schoolchildren in Indonesia. The implication of this research is should be comparing among media to find the most or the combination of appropriate media. In the future an empirical study to find media of choice is conducted.

Methods

Data Sources and Searches

Scopus, Indonesian Scientific Journal Database (ISJD), Google Scholar and Pubmed were searched for relevant English language studies. The search included a various combination of search terms: “nutritional education”, “elementary”, and “media”, then followed by searching each kind of media.

Study Selection

The lead author reviewed to determine whether the articles was suitable to the criteria: (1) published at last 10 years (2) written in English; and (3) reported on the subject of nutritional education media for elementary student. The studies with the subject were not elementary student or student at the age of 6 to 13, and not measuring media for educating food and nutrition were excluded. We found 15 kinds of media, which is showed in Table 1.

Results and Discussion

Various media for educating nutrition of elementary school children

Table 1 below provides 15 kinds of media for nutritional education of the elementary school children.

Table 1. The list of media and sources

No	Media name	Sources
1.	Recall tool	(Torres, 2017)
2.	Application on smartphone	(Lee et al., 2017)(Yang et al., 2017)
3.	Poster	(Fitriana et al., 2015)
4.	Leaflet	(Fitriana et al., 2015)
5.	Game in class/room	(Katz et al., 2014)(Gambir & Nopriantini, 2018)(Joyner et al., 2017)(Jones et al., 2014)
6.	Game in computer	(Mellecker et al., 2013)(Morgan et al., 2014)(Rosi et al., 2015)(Sharma et al., 2015)(Baranowski et al., 2011)(Cullen et al., 2016)
7.	Combination between game in computer and story immersion	(Wang et al., 2017)
8.	Garden	(McAleese & Rankin, 2007)(Hutchinson et al., 2015)(Davis, Martinez, Spruijt-Metz, & Gatto, 2016)(Parmer et al., 2009)(Heim, Stang, & Ireland, 2009)(Bontrager et al., 2014)(P. Morgan et al., 2010)
9.	Video	(Gaspar et al., 2016)
10.	Booklet	(Zulaekah, 2012)
11.	Online Comic	(Thompson et al., 2013)
12.	Printed Comic	(Hamida et al., 2012; Hartono, Wilujeng, & Andarini, 2015; Nugroho, 2018; Widajanti, Suryawati, & Sugihantono, 2019)(Leung et al., 2014)
13.	Game board	(Gunawan et al 2017)(Torre et al., 2016)
14.	Card	(Wahyuningsih et al 2015)(Torre et al., 2016)(Lakshman et al., 2010)
15.	Salad bar	(Ohri-Vachaspati, P et al., 2016)

The effectiveness of the media

The effectiveness of the media based on recent study is following:

1. Recall tool

The tool is a collecting information aid about 24-hour food and nutrition practices of students. Then teacher uses the information as discussing materials with student aged 8–12 years at the classroom. Researcher had not explored the effectiveness of the tool.

2. Application on smartphone

Both researchers had not tested the effectiveness of the media. Lee et al. (2017) was developing a platform, which was consisted of main features of six levels of food items (namely, vegetables, fruits, sugar-sweetened beverages, fast food and instant food, and snacks) and behavioral change stages (namely, pre-contemplation, contemplation, preparation, action, and nutrition information contents) in the form of Trans-Theoretical Messages (TTM). Meanwhile, Yang et al., (2017) built a mobile platform system called HAPPY ME to prevent childhood obesity.

3. **Poster**

Poster is used as a media aid at a lecture 45-60 min about nutrition in a class with fifth grade students aged 10-12 years old. Respondents liked poster because the text size, which is bigger than text of leaflet and multimedia (Fitriana et al., 2015). Respondents accept poster as a media for providing information about nutrition. Based on quasi experiment technique result poster was assumed effective to educate children about the important of breakfast and improve attitude as well as practice of children to have breakfast.
4. **Leaflet**

Leaflet also is applied as a media aid to educate fifth grade students aged 10-12 years during lecture 45-60 min. Comparing to poster and multimedia, this media has benefit could be carried easily and read at any time. The research finding showed that leaflet was better compared to poster and multimedia in educating nutrition and increase breakfast habit in children (Fitriana et al., 2015).
5. **Game in class/room**

Educating nutrition through gaming in class/room increased knowledge and changed behavior of schoolkids. Four researchers developed a different game. Katz et al., (2014) created a game called nutrition detective, which has objective to increase the food-label literacy skills of children. Meanwhile, Gambir & Nopriantini (2018) created a smart ball game and counselling to improve knowledge, habit, nutritional value information, and arrangement of breakfast food. Afterwards, Jones et al. (2014) then developed by Joyner et al. (2017) created Fit game to improve food and veggie consumption of elementary school children. The game consists of various activities in class/room.
6. **Game in computer**

Based on research, game in computer could increase knowledge and change attitude as well as behavior of children regarding healthy food. Mellecker et al (2013) tested computerized nutritional games, which utilizing feet to control mouse functions on a foot gaming pad. Meanwhile, Morgan et al. (2014) created Avatar, then children could change the body size of Avatar to match their perceived ideal and healthy appearance. Then, Rosi et al. (2015), Sharma et al. (2015), Baranowski et al. (2011), and Cullen et al. (2016) improved children's eating habits through an edutainment technological platform.
7. **Combination between game in computer and story immersion**

Further, Wang et al. (2017) tested the effectiveness of the combination between computerized nutritional game and story immersion. They showed that the media improved the motivation of Chinese children to Diet and Physical Activity.
8. **Gardens**

Research finding showed that gardening at school increase knowledge and change behavior of the elementary students in consuming healthy food. McAleese & Rankin (2007) developed some activities of gardening such as weeding, planting, watering, and harvesting during at least 12-weeks period, as well as programs such as a salsa making workshop, class cookbook, "add a veggie to lunch day", herb drying, and food experiences to improve fruits and veggies consumption of children. Meanwhile, Davis et al. (2016) developed 12-week nutrition, cooking,

and gardening trial, called LA Sprouts program and Bontrager et al. (2014) created program of Wisconsin Farm to School (F2S) to increase students' fruit and vegetable intake. All programs showed that school gardens yielded positive impact. However, Hutchinson et al. (2015) argued it was required specialists to run impactful program. Nevertheless, Parmer et al. (2009), Heim et al. (2009), and Morgan et al. (2010) showed that school gardens was an effective media to increase fruit and vegetable knowledge and behavior change among children.

9. Film Video

Gaspar et al. (2016) developed a serial of videos for lessoning about nutrition and cooking. The media had not tested yet for the effectiveness.

10. Booklet

Media could improve the nutrition knowledge of students when booklet applied along lecture and discussions session about nutrition (Zulaekah, 2012).

11. Online Comic

Thompson et al. (2013) created online obesity prevention program consisted of an animated and interactive comic for reducing obesity risk among girls. The media was still in development process.

12. Printed Comic

Applying a cross sectional research Widajanti et al (2019) argued that comic increase the knowledge of children attitude about food and nutrition. Meanwhile, based on quasy experiment Nugroho (2018) and Hamida et al (2012) conveyed that comic improve the knowledge of schoolkids. Additionally, comic does not influence the behavior of children (Nugroho, 2018). In the meantime, comparing between lecture and comic (Hartono et al., 2015) showed that both media increase the nutritional knowledge of school kids and there is no significant difference between two media. Likewise, Leung et al. (2014) reported that manga comic can promote fruit intake of minority urban youth in New York city.

13. Board Games

(Gunawan et al., 2017) explained that this media increased the motivation of students to learn and consume various kinds of fish. Meanwhile, Torre et al. (2016) applied board games to promote physical activity to overcome obesity and overweight in children.

14. Card

Wahyuningsih et al. (2015) argued that card was a media that is able to increase significantly the nutritional knowledge of studentkids. This opinion was supported by Torre et al., (2016) with GiochiAMO program which include media of card and Lakshman et al. (2010) with their 'Top Grub' card game.

15. Salad Bars

Ohri-Vachaspati et al. (2016) studied that growing number of schools in US applied salad bars as a program to offer a variety of fruits and vegetables to students. Salad bars become a media to improve fruits and vegetables consumption of students.

Based on the description aforesaid, the effectiveness of media is summarized in Table 2.

Table 2. Summary of the effectiveness of the media

No	Media name	No test	Increasing knowledge	Increasing motivation	Increasing Awareness	Changing Attitude	Changing Behavior
1.	Recall tool	✓					
2.	Application on smartphone	✓					
3.	Poster		✓				
4.	Leaflet		✓				✓
5.	Game in class/room		✓				✓
6.	Game in computer		✓			✓	✓
7.	Combination between Game in computer and story immersion			✓			
8.	Garden		✓				✓
9.	Video	✓					
10.	Booklet		✓				
11.	Online comic	✓					
12.	Printed comic		✓		✓	✓	
13.	Game board	✓					
14.	Card		✓				
15.	Salad Bar	✓					

Conclusion

Media selection to educate student kids becomes a critical issue, since there are various media and their effectiveness. Most media have level of effectiveness in increasing knowledge of school children. Only a few media such as leaflet, game in computer, game in class/room and garden are claimed to be able to change behavior of children to food and nutrition. Meanwhile, the media that studied by many researchers are printed comic, game online, and garden. In the future, it is required to study the media of choice to educate children kids about healthy food and nutrition.

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