

The Effect Of Virtual Nutrition Education for The Improvement of Mother's Knowledge About Complementary Feeding: Randomized Control Trial

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ABSTRACT

Adequate of nutrition intake necessary to increase for every child. Knowledges of maternal nutrition influences of quality and quantity of nutrition intake of children. The objectives of this study is to investigate of health education by virtual media toward of maternal knowledges of nutrition. The design of this study is a randomized control trial. The intervention group was online education and the control group used offline education following the regular education package from health services at the Community Health Center. Participants in this study were the mother of the child. The sample size was 30 people in the intervention group and 30 people in the control group, chosen randomly. Data analysis used the Wilcoxon Signed-Ranks Test and the Mann U Whitney Test. Results this study about knowledge complementary feeding in the virtual group increased between before and after nutrition education, namely 8.87 ± 1.65 to 11.67 ± 1.82 ($p = 0.000$). Maternal knowledge in the non-virtual group increased from 7.43 ± 2.56 to 12.9 ± 0.99 ($p = 0.000$). The increase in knowledge in the non-virtual education group was significantly higher than the virtual education group ($p = 0.000$). Conclusion is virtual nutrition education can increase maternal nutritional knowledge about complementary foods, even though it is not directly comparable to nutrition education.

Keywords: Virtual education, knowledge, complementary feeding

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INTRODUCTION

South Sulawesi is known as agricultural area, but ironically in this province, there are many children under five who have malnutrition. Basic Health Research 2018 put this area in fourth place in the number of children under five with stunting, higher than Maluku, and Papua. One of the causes of malnutrition is the provision of breastfeeding is not adequately [1]. The quality of complementary foods affects the nutritional status and this is determined by the capacity of the mother's nutritional knowledge[2]. If the mother's nutritional knowledge and skills become good, it is believed that her way of feeding her children will be better. The quality of Complementary Foods is not only determined by the ingredients but also by the mother's knowledge and various other factors. Evidence from several studies shows that factors influencing the quality of complementary foods are knowledge, education, and previous feeding habits of the mother.[3][4][5] For increasingly of the knowledge and ability of individuals or families about nutrition, it can be done by providing nutrition education. Nutrition Education is an effort to change behavior that is not in accordance with nutritional principles. Nutrition education can improve maternal nutritional knowledge. Nutrition education interventions carried out can influence behavior in choosing and consuming foods that meet the nutritional requirements of individuals and families.[6],[7] The Educational activities in the community through face-to-face contact between officers and targets. This method requires the availability of time and place for meetings for both parties (officers and targets). Both parties must have an appointment and free time in order to meet and carry out the learning process. This has become one of the obstacles to implementing nutrition education programs in the field. The development of increasingly sophisticated

information technology provides a major change in communication carried out by society in the modern era. The use of mobile phones, especially *smartphones* in Indonesia, is growing rapidly.[8]

Nutrition education in the current era of information technology does not have to be done face to face. Mobile phones are an important alternative to increase nutritional knowledge [9]. Virtual nutrition education is considered to be more efficient, where officers do not need to come to visit targets. Almost every mother of five in the urban posyandu has an android and is able to operate Whatsapp. Whatsapp is an application that is currently popular among the public, especially mothers. This study aims to determine the effect of nutrition education through the WhatsApp application on maternal nutritional knowledge.[10]

METHOD

Study design

The research uses *Two -group pre-post test design*, it involves two groups namely the intervention and control groups. The target of the two groups was to provide nutrition education about complementary foods. The intervention group received nutrition education virtually using Whatsapp (WA), while the controller given nutrition education is through *Posyandu*. Each respondent in the two groups measured the initial and final knowledge about complementary feeding (CF)

The intervention group setting was carried out through the WhatsApp application, messages were delivered regularly 3 times a week, with a length of 20 words, 3 pictures, content related to complementary foods, for 1 month. The material is distributed in the day Monday is the material the introduction of CF, the risk of giving breastfeeding too early, and the provision of breastfeeding

were late and time began giving breastfeeding. The material that was delivered on Tuesday. After being given the material, a question and answer were conducted On weekends, a post-test is conducted. The control group setting was face-to-face education at Posyandu. Posyandu is a child health service for monitoring child growth once a month. The location of the study was conducted in posyandu virtual and posyandu non-virtual in Paccerakang Subdistrict of Biringkanaya from February to May 2019.

Participants were mothers whose inclusion criteria were literate, had a smartphone, were willing to participate in this study. The exclusion criteria were not continuing participation due to moving residence, unable to be contacted due to smartphone interference. The outcome primer variabale of this study was the mother's knowledge of complementary foods, including consistency, quantity, and frequency of complementary feeding.

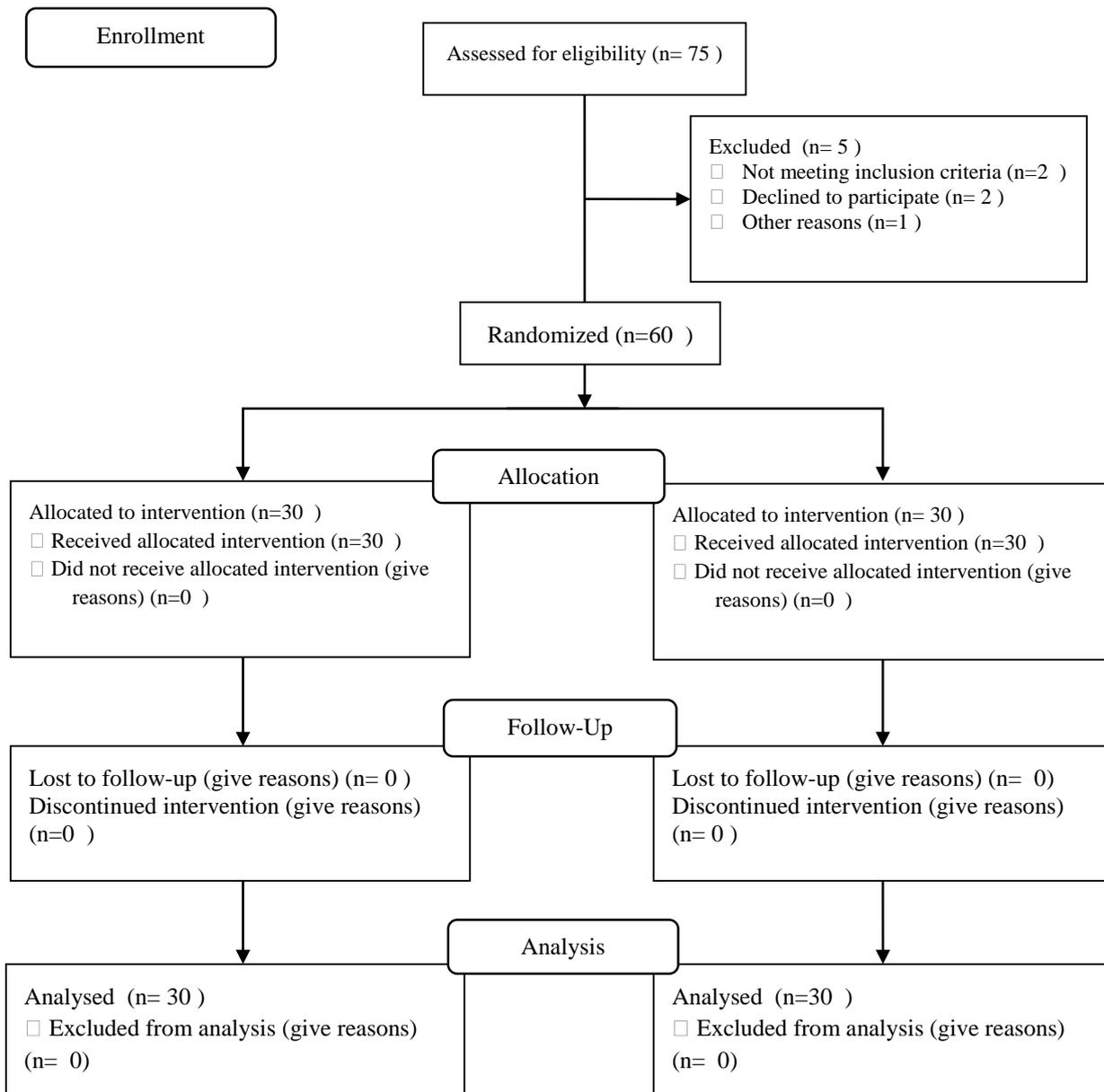


Figure 1. Flow Diagram RCT Virtual Nutrition Education

Data Source and Measurement

The Mother's knowledge about the timing of solids contains about the age of first given solids, age of the child was first given the food is pulverized, the age of the child was first given the family food, and how many times a given food is mashed, soft, and family meals, the

consistency of CF contains information about the form of food aged 6- 8 months, the form of food aged 9-12 months, and the form of food aged > 12 months, the number of CF were collected by interviews used a questionnaire by the enumerators. This data collection was carried out twice,

namely before and after the nutrition education intervention.

Statistical Analysis

Data processing is done using a data processing application program. Before inputting the data, the data is subjected to an editing process to prevent incorrect data input. The data that has been inputted is then processed descriptively and analytically. The descriptive analysis uses an average (mean) and percentage (%) values. To find out the knowledge between before and after

education in each group was tested using the *Paired t-test* statistical test and if it did not meet the requirements continued with the *Mann Whitney* test using alpha 95%. The data that has been processed is analyzed, then presented in table form accompanied by an explanation in narrative form.

RESULTS

Characteristics of Samples

Table 1. Characteristics of Participants

Variable	Virtual Group		Non-Virtual Groups	
	n	%	N	%
Age (years):				
19 years old	1	3.3	2	6.7
20-30 years	17	56.7	11	36.7
31 - 40 years	8	26.7	11	36.7
41-50 years	3	10.0	5	16.7
≥51 Years	1	3.3	1	3.3
Education:				
SD	2	6.3	3	10.0
Junior High	4	13.3	8	26.7
High school	12	40.0	16	53.3
S1 / S2 / S3	12	40.0	3	10.0
Occupations				
Civil servants	7	23.3	2	6.7
Entrepreneur	1	3.3	0	0
IRT	22	73.3	28	93.3
Total	30	100	30	100

Table 1 shows that the mothers of children under five who were the subjects of these two research groups had quite high similarity characteristics, especially those related to

age, occupation, and religion. However, in terms of educational level, it appears that virtual groups have a higher proportion of higher education levels..

Table 2. The Mean Scores of Nutritional Knowledge for Virtual and Non Virtual Groups

Group Education	Pretest	Posttest	Change	P value
	Mean ± SD	Mean ± SD	Mean ± SD	
Virtual	8.87 ± 1.65	11.67 ± 1.82	2.8 ± 2.68	0.000 ^(a)
Non-virtual	7.43 ± 2.56	12.9 ± 0.99	5.46 ± 2.59	0.000 ^(b)

a) Paired T-Test

b) Mann U Whaitney Test

Table 2 above shows that there is an increase in maternal nutrition knowledge score in the two groups, both of the virtual group or of non - virtual group. Maternal nutritional knowledge in the virtual group increased significantly between before and after nutrition education ($p = 0.000$). Maternal nutritional knowledge also increased significantly in the non-virtual group. The increase in maternal knowledge in the non-virtual education group was greater than the virtual education group ($p = 0.000$). The change in knowledge in the non-virtual education group reached 5.46 points, a double increase compared to

the increase in the virtual education group (5.46 vs 2.8 points).

DISCUSSION

The main result of this study was that there was a significant difference in knowledge scores about CP, in the two groups. It can be seen that the increase in maternal nutritional knowledge in the virtual group is still not able to match the non-virtual group that receives direct education. However, the use of online or virtual media as

a medium for nutrition education will be able to cover the shortcomings in nutrition education directly.

Social media, and the internet in general, is expanding rapidly all over the world. The use of social media in healthcare settings is increasing daily as it pertains to community engagement.[11][12]. Instagram shows potential as a source of public health information. Its data collection and metadata availability may limit its use in comparison to platforms like Twitter[13]. Brands are using social media platforms such as Instagram to market their products to growing number of consumers. Public health bodies need to engage with emerging media platforms[14].

The use of the WA application in health communication significantly affects the knowledge of patients or message recipients, which can be accessed anytime and anywhere. This advantage makes WA effective as a means of education.[15]. Messaging Apps or "Messengers" are Apps and platforms that enable messaging and exchanging documents and/or multimedia element. Hangouts; Telegram; Whatsapp; Facebook Messenger; Viber; Skype; Tango; OoVoo; Snapchat. This educational message through WA was also reported in other studies to be effective in increasing knowledge or understanding of the material.[16]. There are many advantages of using virtual methods in studies, one of which is increasing the range of communication and the accuracy of mapping a wider demographic dimension.[17]

The development of increasingly sophisticated technology provides a major change in communication carried out by society in the modern era. In particular, the use of WA social media in conducting education is now being used frequently because it has proven to be very helpful in terms of time, place, and budget in the learning process and message delivery. it is consistent with research Giansanti, 2020, about the use of Whatsapp as a communication medium satisfaction.

The things that cause the knowledge of a small number of respondents are still lacking and do not increase, namely that there are still respondents who are less interactive and passive in WA classes, so researchers need to remind them by conducting private chats or group chats with respondents to participate in the WA class that is being used. One study tested the effectiveness of virtual communication on patients' perceptions of anxiety scores. The result of the study is that virtual communication model is believed to be one of the communication management strategies with patients that increase their attention.[18]. The use of mobile technology devices has also been used as a medium of communication in sports nutrition interventions in Australia, particularly in monitoring physical activity. The basic principle is the same in this study, utilizing cellular technology for nutrition education to clients [19]. Barriers to communication can be overcome by utilizing smartphone technology. This has been reported in a study examining its effect on increasing client motivation.[20]

The generalization of the results of this study is that health education is currently appropriate to use various means including the WA application. Conditions where social media activities are very widely used. The advantage of this method is its very wide reach with flexibility in terms of timing and content. The content of the message can be controlled so that it assumes that the recipient of the message has the same perception.

The limitations of this study are the minimal sample size, the control over access to information from participants

cannot be maximized, because of free access to other media. Strong suspicion that this occurred in the control group, although it was not included in the intervention group, it also had good knowledge. On the other hand, Indonesians use social media the most.

CONCLUSION

Virtual nutrition education through the Whatsapp (WA) Group application can increase maternal nutritional knowledge about complementary foods, even though the increase has not matched the effect of direct nutrition education.

CONFLICT OF INTEREST

The authors declare that they have no competing interests

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REFERENCE

1. Kemenkes, "Basic Health Research Report of Indonesia Year 2018," *Riskesdas 2018*. pp. 182–183, 2018.
2. C. Hall *et al.*, "Maternal Knowledge of Stunting in Rural Indonesia," *Int. J. Child Heal. Nutr.*, vol. 7, no. 4, pp. 139–145, 2018, doi: [10.6000/1929-4247.2018.07.04.2](https://doi.org/10.6000/1929-4247.2018.07.04.2).
3. WHO, "The importance of infant and young child feeding and recommended practices," in *Infant and young child feeding*, Switzerland, 2004.
4. G. Hondru *et al.*, "Age-appropriate feeding practices in Cambodia and the possible influence on the growth of the children: A longitudinal study," *Nutrients*, vol. 12, no. 1, pp. 1–14, 2020, doi: [10.3390/nu12010012](https://doi.org/10.3390/nu12010012).
5. Sirajuddin *et al.*, "Complementary feeding practices influences of stunting children in Buginese ethnicity," *Indian J. Forensic Med. Toxicol.*, vol. 14, no. 3, pp. 1227–1233, 2020.
6. T. Mbogori, M. Murimi, and A. Ruhul, "Nutrition Education Intervention: Using Train the Trainer Approach to Reach Populations With Low Literacy in Turkana, Kenya," *J. Nutr. Educ. Behav.*, vol. 47, no. 4, pp. S81–S82, 2015, doi: [10.1016/j.jneb.2015.04.215](https://doi.org/10.1016/j.jneb.2015.04.215).
7. H. Alderman and D. Headey, "How Important is Parental Education for Child Nutrition?," *J. Nutr.*, vol. 94, 2017, doi: [10.1016/j.worlddev.2017.02.007](https://doi.org/10.1016/j.worlddev.2017.02.007).
8. E. H. Id, K. Siste, T. Wiguna, and I. Kusumadewi, "Temperament profile and its association with the vulnerability to smartphone addiction of medical students in Indonesia," pp. 1–12, 2019.
9. M. M. Chau, M. Burgermaster, and L. Mamykina, "The use of social media in nutrition interventions for adolescents and young adults—A systematic review," *Int. J. Med. Inform.*, vol. 120, pp. 77–91, 2018, doi: [10.1016/j.ijmedinf.2018.10.001](https://doi.org/10.1016/j.ijmedinf.2018.10.001).
10. K. M. Klassen, C. H. Douglass, L. Brennan, H. Truby, and M. S. C. Lim, "Social media use for nutrition outcomes in young adults: A mixed-methods systematic review," *Int. J. Behav. Nutr. Phys. Act.*, vol. 15, no. 1, 2018, doi: [10.1186/s12966-018-0696-y](https://doi.org/10.1186/s12966-018-0696-y).

11. Z. Surani *et al.*, "Social media usage among health care providers," *BMC Res. Notes*, pp. 1–5, 2017, doi: [10.1186/s13104-017-2993-y](https://doi.org/10.1186/s13104-017-2993-y).
12. K. Rolls, M. Hansen, D. Jackson, and D. Elliott, "How Health Care Professionals Use Social Media to Create Virtual Communities: An Integrative Review Corresponding Author :," vol. 18, 2016, doi: [10.2196/jmir.5312](https://doi.org/10.2196/jmir.5312).
13. S. Muralidhara, M. J. Paul, and M. J. Paul, "# Healthy Selfies : Exploration of Health Topics on Instagram Corresponding Author :," vol. 4, pp. 1–12, 2018, doi: [10.2196/10150](https://doi.org/10.2196/10150).
14. A. J. Vassallo *et al.*, "Junk Food Marketing on Instagram: Content Analysis Corresponding Author :," vol. 4, pp. 1–11, 2018, doi: [10.2196/publichealth.9594](https://doi.org/10.2196/publichealth.9594).
15. H. K. and P. L. Vincenzo Giordano, "WhatsApp messenger as an adjunctive tool for telemedicine: An overview," *Interact. J. Med. Res.*, vol. 6, no. 2, 2017.
16. D. Giansanti, "WhatsApp in mHealth: an overview on the potentialities and the opportunities in medical imaging," *mHealth*, vol. 6, no. 3, pp. 19–19, 2020, doi: [10.21037/mhealth.2019.11.01](https://doi.org/10.21037/mhealth.2019.11.01).
17. H. Moseson, S. Kumar, and J. L. Juusola, "Comparison of study samples recruited with virtual versus traditional recruitment methods," *Contemp. Clin. Trials Commun.*, vol. 19, p. 100590, 2020, doi: [10.1016/j.conctc.2020.100590](https://doi.org/10.1016/j.conctc.2020.100590).
18. D. Stewart, M. Mete, and H. Groninger, "Virtual reality for pain management in patients with heart failure: Study rationale and design," *Contemp. Clin. Trials Commun.*, vol. 16, p. 100470, 2019, doi: [10.1016/j.conctc.2019.100470](https://doi.org/10.1016/j.conctc.2019.100470).
19. A. K. Jansson *et al.*, "Integrating smartphone technology, social support and the outdoor built environment to promote community-based aerobic and resistance-based physical activity: Rationale and study protocol for the 'ecofit' randomized controlled trial," *Contemp. Clin. Trials Commun.*, vol. 16, p. 100457, 2019, doi: [10.1016/j.conctc.2019.100457](https://doi.org/10.1016/j.conctc.2019.100457).
20. P. D. O' Halloran *et al.*, "Embedded Motivational Interviewing combined with a smartphone app to increase physical activity in people with sub-acute low back pain: Study protocol of a cluster randomised control trial," *Contemp. Clin. Trials Commun.*, vol. 17, no. December 2019, p. 100511, 2020, doi: [10.1016/j.conctc.2019.100511](https://doi.org/10.1016/j.conctc.2019.100511).