

Lecture Notes in Networks and Systems 696

Xin-She Yang
R. Simon Sherratt
Nilanjan Dey
Amit Joshi *Editors*

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Preface

The Eighth International Congress on Information and Communication Technology will be held during 20–23 February 2023, in a hybrid mode, physical at London, UK, and digital platform: Zoom. ICICT 2023 was organised by Global Knowledge Research Foundation and managed by G. R. Scholastic LLP. The associated partners were Springer and InterYIT IFIP. The conference will provide a useful and wide platform both for display of the latest research and for exchange of research results and thoughts. The participants of the conference will be from almost every part of the world, with backgrounds of either academia or industry, allowing a real multinational multicultural exchange of experiences and ideas.

A great pool of more than 1300 papers were received for this conference from across 113 countries among which around 361 papers were accepted and will be presented physically at London and digital platform Zoom during the four days. Due to the overwhelming response, we had to drop many papers in the hierarchy of the quality. Total 46 technical sessions will be organised in parallel in four days along with a few keynotes and panel discussions in hybrid mode. The conference will be involved in deep discussion and issues which will be intended to solve at global levels. New technologies will be proposed, experiences will be shared, and future solutions for design infrastructure for ICT will also be discussed. The final papers will be published in four volumes of proceedings by Springer LNNS Series. Over the years, this congress has been organised and conceptualised with the collective efforts of a large number of individuals. I would like to thank each of the committee members

and the reviewers for their excellent work in reviewing the papers. Grateful acknowledgements are extended to the team of Global Knowledge Research Foundation for their valuable efforts and support.

I look forward to welcoming you to the 8th Edition of this ICICT Congress 2023.

Amit Joshi, Ph.D.
Organising Secretary, ICICT 2023
Director—Global Knowledge Research
Foundation
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The Effect of Online Video in Improving Maternal Nutritional Behavior and Nutritional Status of Stunted Under Five



Titih Huriah, Nurjannah, and Yoyok Bekti Prasetyo

Abstract One of the causes of high stunting in toddlers is mothers' poor behavior in providing toddler nutrition. Health education through online media about stunting is one way to influence mothers' behaviors in preventing stunting. The online video was chosen based on the characteristics of the participants, geographical conditions, and the COVID-19 pandemic. The aim of this study is to determine the impact of educational videos on maternal nutritional behavior and the nutritional status of stunted children. In this study, we employed a quasi-experimental pretest-posttest control group design. The study was conducted in December 2020–February 2021 in the Gondomanan and Umbulharjo Health Cent Yogyakarta. The sample was 26 respondents, divided into the intervention group and the control group with simple random sampling, and each group had 13 respondents. The intervention group was given an education from two videos about nutrition in children and stunting. The data is analyzed using the *Wilcoxon and Mann–Whitney* tests. Health education using online video can increase maternal nutritional knowledge, attitudes, and behaviors with *p values* of 0.003, 0.000, and 0.023, respectively, while the nutritional status of stunted children, there is no difference with a *p value* of 0.626. Online video education can improve aspects of knowledge, attitudes, and nutritional behaviors of mothers but cannot improve the nutritional status of stunted children.

Keywords Online video · Stunting · Nutritional behavior · Nutritional status

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1 Introduction

Children under five are one of the vulnerable groups that should be considered and are in the most crucial developmental phase of life [1]. This phase is the initial foundation in determining the quality of life and is referred to as the “golden period”. The World Bank states that the period of the first 1000 days of life, starting from conception until the child is two years old, is the most important and critical period in improving cognitive and physical development [2].

Globally, some countries are still faced with a double burden of malnutrition, where one of the nutritional problems is stunting [3]. Stunting is the most common symptom of malnutrition when children have a low height for their age [4]. Stunting causes 14% of child mortality and affects one-third of children under five in developing countries [5]. Stunting can result in short-term and long-term cognitive impairment and academic performance deficits [6].

Stunting affected 21.9% or 149 million children under five globally in 2018. The sub-territory of the United Nations consists of; 81.7 million in Asia, 58.8 million in Africa, 4.8 million in Latin America and the Caribbean, and 0.5 million in Oceania [7]. The global prevalence of stunting in 2019 was 21.4% in children under five in developing countries, while the majority of stunting in Tanzania, a developed country in Eastern Africa, was 34% [4].

The World Health Organization (WHO) stated that Indonesia is the third country with the highest stunting prevalence in the South-East Asia Regional (SEAR) region, with an average of 36.4% in 2005–2017, compared to 50.2% in Timor Leste and 38.4% in India [8]. Very short and short prevalence in 2018 was 11.55% and 19.3% [9]. The prevalence of stunting toddlers in 2018 in Yogyakarta was 12.37%, which decreased to 13.86% in 2017. The prevalence of children under five is lowest in the Bantul region at 9.75%, and the highest in Gunung Kidul Regency is 18.47% [10]. The prevalence of stunting toddlers in Yogyakarta City Regency has decreased, but not significantly compared to 2018, which was 12.82%, while in 2019, it was 11.3%.

The Indonesian government has implemented strategies for addressing stunting, including nutritionally sensitive and specific interventions. Handling stunting is a national priority program that must be included in the Government’s Work Plan (RKP). Targets and indicators of stunting reduction are significant to be carried out with a multi-sectoral approach through sustainable programs both in the form of local, central, and regional communities and at the national level [11].

Specific nutritional interventions prevent and reduce dietary problems that are given directly, especially in the first 1000 days of life. Meanwhile, sensitive nutrition interventions mitigate dietary issues that are given indirectly and carried out in various non-health development activities [12]. The health sector only contributed 30%, while the non-health sector contributed 70% to overcoming nutritional problems [13]. Care Settings nutrition consists of 3 components, including (1) Hospital, which refers to care for inpatients, (2) Outpatient, which carried out by patients who still need treatment but do not require hospitalization; and (3) Community, this treatment is carried out outside the hospital and can involve people in the institution [14].

The selection of online media is based on the characteristics of the participants, geographical conditions and the number of desired targets; then, one of the media can use audio-visual. Audio-visual media is considered more attractive than other media because it combines audio, visual, and animation so that the message recipient will understand more quickly and not feel bored when receiving health education [15]. Based on the description above, researchers are interested in researching stunted toddlers and finding out whether online videos are compelling if used as an educational medium to improve nutritional behavior and nutritional status for stunted children.

2 Materials and Methods

The type of this research is a Quasi Experiment with a pre-test–post-test with the control group design. This study was carried out for one month at the Gondomanan and Umbulharjo Health Center in Yogyakarta City. The research sample was 26 stunted children, divided into two the intervention group and the control group with simple random sampling, and each group had 13 respondents. The inclusion criteria in this study were mothers who had children aged 6–59 months with stunting, had a smartphone at home and could follow the intervention to the end. The exclusion criteria in this study were children under five who experienced physical disabilities, family who had changed their homes.

Several methods are used to create an online video: (a) determining the audience, (b) developing a concept based on the purpose of the health education material, such as the concept of children, nutrition in children, definition of stunting, signs of stunting symptoms in children, factors that influence stunting, and efforts to overcome stunting, (c) The process of recording sound with a smartphone and preparing illustrations such as pictures, animation, and text, (d) After the videos and illustrations have been combined, the editing process is carried out using Adobe Photoshop, Adobe Illustrator, and Adobe Audition. The video education is divided into two parts: nutrition and toddlers and stunting, with each audio-visual lasting between 4–5 min.

Researchers assessed the nutritional status of children assisted by cadres or mothers by measuring body length or height. After that, this study's intervention and control groups were given pre-tests regarding maternal nutrition behavior. The intervention group was assigned video-based education related to nutrition in children and stunting. In contrast, the control group was not given intervention and a post-test after providing education to the intervention group. Mothers of stunted children given online video health education using stunting prevention educational media. The content is divided into two videos: children nutrition and stunting. The online video is sent to mothers with children under the age of five via cell phone, and health education is provided every two weeks with different materials for one month. Follow-ups are done every 3–4 days via chat on the WhatsApp. The data is analyzed using the *Wilcoxon and Mann–Whitney* tests.

The research has been approved by the Health Research Ethics Committee (KEPK) of Aisyiyah University Yogyakarta with the number: 1737/KEP-UNISA/XII/2020.

3 Results

Table 1 show the frequency distribution based on the characteristics of stunting toddler respondents (age, sex, and exclusive breastfeeding) and maternal respondents' characteristics (age, mother's age at childbirth, maternal BMI, last education, occupation, parental income, and antenatal care history). Table 1 shows that based on chi-square test analysis, there is no difference in both toddler and maternal characteristics in the control and intervention group with a p value more than 0.05.

Table 2 shows height characteristics and age of toddlers with the highest mean values in the post-test intervention group of 80.65 cm and 28.38 months, respectively.

Table 3 shows the pre-test scores in the categories of knowledge, attitudes, and behaviors, most of whom have sufficient knowledge and attitudes, both in the intervention and control groups. Meanwhile, in the knowledge category, the pre-test value appears to differ between the intervention and control groups. The post-test value showed different types of knowledge, attitudes, and behaviors, whereas in the intervention group, there was an increase in categories. In contrast, in the control group, there was no difference. There was no difference in types in the intervention group and the control group in the nutritional status variable.

Table 4 shows significant increase in pre-test and post-test scores in the knowledge and attitudes in the intervention and control groups. In contrast, the aspects of maternal behavior commitment and nutritional status of toddlers based on *the Z-score* in the two groups did not significantly differ in values in the pre-test and post-test interventions. Statistical analysis with Wilcoxon Test show P Value < 0.05 for knowledge and attitude in intervention group, which means that knowledge and attitudes improve after watching an online video. The p value for behavior, on the other hand, is greater than 0.05, which means that behavior doesn't change after watching an online video. With a p value greater than 0.05, the Wilcoxon test results in the control group revealed no differences in knowledge, attitudes, or behavior.

The following result of the analysis is to look at the difference value between the control and intervention groups. The pre-test results with Mann Whitney showed no difference in each variable with a p value of > 0.05 , so the researcher analyzed the difference in the post-test value. Table 5 shows the effect of intervention administration on improving aspects of knowledge, attitudes, and nutritional behaviors of stunting toddler mothers. In contrast, in the nutritional status of stunted toddlers, there is no difference between the intervention and control groups.

Based on Table 5, the knowledge and behavior variables have an *effect size* value of more than 0.2 and less than 0.8 with an average category. In contrast, the results in the action variable have an *effect size* value below 0 and 0.2 with a low category.

Table 1 Characteristics of respondents ($n = 26$)

Variable	Intervention group ($n = 13$)	Control group ($n = 13$)	P value*
	n (%)	n (%)	
Toddler Age			0.695
• 6–24 months	6 (46.2)	7 (53.8)	
• > 24 months	7 (53.8)	6 (46.2)	
Gender			0.695
• Male	7 (53.8)	6 (46.2)	
• Female	6 (46.2)	7 (53.8)	
Exclusive Breastfeeding			0.352
• Exclusive	11 (84.6)	9 (69.2)	
• Not exclusive	2 (15.4)	4 (30.8)	
Mother's Age			0.215
• ≤ 20 years	1 (7.7)	1 (7.7)	
• 21–30 years	1 (7.7)	4 (30.8)	
• 31–40 years	10 (76.9)	5 (38.5)	
• > 40 years	1 (7.7)	3 (23.1)	
Mother's Age During Childbirth			0.783
• ≤ 20 years	2 (15.4)	2 (15.4)	
• 21–30 years	4 (30.8)	4 (30.8)	
• 31–40 years	7 (53.8)	6 (46.2)	
• > 40 years	–	1 (7.7)	
BMI Mother			0.129
• Less	–	–	
• Normal	3 (23.1)	8 (61.5)	
• Overweight	7 (53.8)	4 (30.8)	
• Obese	3 (23.1)	1 (7.7)	
Maternal Education			0.887
• Elementary school	1 (7.7)	1 (7.7)	
• Junior high school	4 (30.8)	3 (23.1)	
• Senior high school	6 (46.2)	6 (46.2)	
• Diploma	–	1 (7.7)	
• College	2 (15.4)	2 (15.4)	
Mom's Job			0.352
• Housewives	11 (84.6)	9 (69.2)	
• Private	2 (15.4)	4 (30.8)	
Parents' Income			0.447
• < Minimum wage	6 (46.2)	3 (23.1)	
• Minimum wage	4 (30.8)	5 (38.5)	
• > Minimum wage	3 (23.1)	5 (38.5)	
History of Antenatal Care			0.619
• Less than four times	2 (15.4)	3 (23.1)	
• Four times or more	11 (84.6)	10 (76.9)	

* p value < 0.05 based on chi-square test

Source Primary data, 2021

Table 2 Characteristics of respondents based on length/height and age of children with stunting ($n = 26$)

Research variable	Intervention group ($n = 13$)				Control group ($n = 13$)			
	Pre-test		Post-test		Pre-test		Post-test	
	Min-Max	Mean \pm SD	Min-Max	Mean \pm SD	Min-Max	Mean \pm SD	Min-Max	Mean \pm SD
Height (cm)	63-95	79.39 \pm 10.61	65-96	80.65 \pm 10.55	62-95	77.70 \pm 10.78	64-97	78.98 \pm 10.61
Age (month)	8-54	27.38 \pm 15.19	9-55	28.38 \pm 15.19	8-51	25.92 \pm 15.34	9-52	26.92 \pm 15.34

Source Primary data, 2021

Table 3 Effect of online video on mothers behavior and toddlers nutritional status in intervention and control group ($n = 26$)

Research variables	Intervention group ($n = 13$)		P value*	Control group ($n = 13$)		P value*
	Pre-test ($n, \%$)	Post-test ($n, \%$)		Pre-test ($n, \%$)	Post-test ($n, \%$)	
Knowledge	2 (15.4)	11 (84.6)	0.002*	2 (15.4)	3 (23.1)	0.564
• Good	7 (53.8)	2 (15.4)		7 (53.8)	6 (46.2)	
• Enough	4 (30.8)	–		4 (30.8)	4 (30.8)	
• Less						
Attitude	4 (30.8)	10 (76.9)	0.007*	2 (15.4)	1 (7.7)	0.317
• Good	6 (46.2)	3 (23.1)		8 (61.5)	9 (69.2)	
• Enough	3 (23.1)	–		3 (23.1)	3 (23.1)	
• Less						
Behavior	7 (53.8)	9 (69.2)	0.083	4 (30.8)	4 (30.8)	0.655
• Good	5 (38.5)	4 (30.8)		5 (38.5)	5 (38.5)	
• Enough	1 (7.7)	–		4 (30.8)	4 (30.8)	
• Less						
Nutritional Status (<i>Length/height-for-age</i>)	2 (15.4)	2 (15.4)	1.000	3 (23.1)	3 (23.1)	1.000
• Very Short	11 (84.6)	11 (84.6)		10 (76.9)	10 (76.9)	
• Short						

* p value < 0.05 based on Wilcoxon test

Source Primary data, 2021

4 Discussion

The results showed that providing education using online videos can offer changes in the level of knowledge of stunted mothers related to nutrition and stunting in the work area of the Gondomanan Health Center. This study supports research conducted by [16] states that health education provided through video can increase knowledge faster than verbal education and can provide patient satisfaction. Another benefit of video-based education is that patients can rewatch the video at specific intervals.

Audio-visual media in the form of online video used for education has advantages, one of which is that it is easier for someone to accept because they can combine the senses of sight and hear simultaneously [17]. The provision of audio-visual media education proves it is very effective because mothers can continue to repeat and re-understand what has been explained or conveyed [18].

The need for information and opportunities obtained by mothers can increase after mothers access knowledge from online sources so that health-related education can be carried out quickly and precisely [19]. Other studies explained that mothers with higher education are sometimes less likely to apply the knowledge they have gained regarding the fulfillment of nutritious food intake. On the contrary, poorly

Table 4 Effect of online video on mothers behavior and nutritional status among intervention and control groups (*n* = 26)

Research variables	Pre-test (<i>n</i> = 13)		<i>P</i> value*	Post-test (<i>n</i> = 13)		<i>P</i> value*
	Intervention (<i>n</i> , %)	Control (<i>n</i> , %)		Intervention (<i>n</i> , %)	Control (<i>n</i> , %)	
Knowledge	2 (15.4)	2 (15.4)	1.000	11 (84.6)	3 (23.1)	0.003*
• Good	7 (53.8)	7 (53.8)		2 (15.4)	6 (46.2)	
• Enough	4 (30.8)	4 (30.8)		–	4 (30.8)	
• Less						
Attitude	4 (30.8)	2 (15.4)	0.571	10 (76.9)	1 (7.7)	0.000*
• Good	6 (46.2)	8 (61.5)		3 (23.1)	9 (69.2)	
• Enough	3 (23.1)	3 (23.1)		–	3 (23.1)	
• Less						
Behavior	7 (53.8)	4 (30.8)	0.136	9 (69.2)	4 (30.8)	0.023*
• Good	5 (38.5)	5 (38.5)		4 (30.8)	5 (38.5)	
• Enough	1 (7.7)	4 (30.8)		–	4 (30.8)	
• Less						
Nutritional Status (<i>Length/height-for-age</i>)	2 (15.4)	3 (23.1)	0.626	2 (15.4)	3 (23.1)	0.626
• Very short	11 (84.6)	10 (76.9)		11 (84.6)	10 (76.9)	
• Short						

* *p* value < 0.05 based on Mann–Whitney test

Source Primary data, 2021

Table 5 Effect size calculation results of online video

Variable	The average score in the intervention group	The average score in the control group	<i>SD</i>	<i>d</i>	Category
Knowledge	0.50	0.05	0.67	0.68	Average
Attitude	0.51	0.02	0.64	0.77	Average
Behavior	0.5003	0.0482	0.83	– 0.54	Low

* Effect size based on Cohen’s Formula

educated mothers are more feasible to seek information about nutritional food intake for toddlers [20].

The results showed that providing education using online videos can change the level of knowledge of stunting toddler mothers. Knowledge will affect the attitudes mothers. Previous research [21] states that insufficient maternal knowledge can cause the formation of negative attitudes toward stunting prevention efforts. In line, a study conducted by [22] noted that health education using videos has proven effective in improving the knowledge and attitudes of toddler mothers. Maternal nutritional

knowledge can influence the mother's attitude and behavior toward selecting food-stuffs and affect the family's nutritional status. A person in determining attitudes is controlled by the knowledge he has gained [23]. Family knowledge level affects family attitudes and behaviors regarding health status [24].

The prevalence factor of stunting can be significantly reduced when families adopt attitudes related to washing hands before eating. According to this study, children as young as 12 years old crawl and stand frequently exposed to the environment, such as putting contaminated objects into their mouths. So that some children experience stunting caused by chronic diarrhea, recurrent infection and not getting the proper treatment for the first two years (< 24 months) in the process of growth and development [4]. The study's results prove that knowledge and improved attitudes can change the behavior of stunting toddler mothers in the work area of the Gondomanan Health Center. In line with the study's results [25] the knowledge mothers possess about mothers changes behaviors and dietary habits in the family.

Parents, especially mothers, are responsible for healthy feeding behaviors for children under five. Some mothers of toddlers assume that formula feeding can replace breast milk, even though mothers know breast milk provides many benefits for the growth and development of toddlers. Behavioral-based nutrition education interventions for children resulted in a substantial increase in maternal involvement in physical activity, providing fruits, vegetables, and fulfilling animal proteins as a promoter for child growth, but significantly did not affect the increase in child height. The results showed that although mothers' knowledge, attitudes, and behaviors increased, there was no difference in the nutritional status because children under five sometimes prefer snacks outside to consuming nutritious food. Other causes were the time length of the intervention was too short, the duration of stunting experienced by toddlers, so it will be difficult to change the nutritional status in one month, and the measurements made by cadres may be invalid. However, these results are inversely proportional to the studies carried out by [25] that there is a significant relationship between the knowledge of toddler mothers and the *High For Age* (HAZ) index.

Maternal knowledge, attitudes, and behaviors impact children's health. The effect of exclusive breastfeeding is enormous on the nutritional status of children, so the *World Health Organization* (WHO) recommends the implementation of increasing breastfeeding for the first six months, which is one of the efforts to achieve the WHO Global Nutrition Target 2025 related to reducing the prevalence of stunting in toddlers [21]. Nutritional problems can occur due to ignorance or lack of information related to correct and appropriate nutrition [20].

The nutrition status of mothers under five has an essential role in the fetus growth, the healthy baby and the development of toddlers' long-term life. The family's economic situation, family income, and parents' education level are indirect factors that can be attributed to the prevalence of stunting. Families who are not low incomes will find it easier to access information and health services so that it will not cause nutritional problems in children. Fulfillment of children's dietary needs is carried out by exclusive breastfeeding for the first six months, without adding extra food. Working mothers with their abilities can better meet the nutritional needs of children

but are limited in terms of meeting dietary needs directly in children, so working mothers have an essential role in caring for children.

Maternal nutrition is essential and must be provided optimally, even before conception, so that the growth of the fetus in the womb can develop properly. Insufficient allocation of costs in meeting inappropriate needs and resources in the family can lead to poor health and suboptimal nutritional status the family determines the child's health status based on treatment related to meeting the child's dietary needs in daily life [23].

5 Conclusions

Developing an educational model using online videos for mothers of stunted children is considered adequate. The results showed that education with videos influenced healthy behavior in aspects of knowledge, attitudes, and behavior. However, there was no improvement in the nutritional status of stunting toddlers. This result is because the stunting condition experienced by toddlers has been long enough, making it difficult to change the nutritional status of toddlers within one month. For further research, it can provide longer intervention with more respondents so that can improve research results.

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