PREVENTION OF NON-COMMUNICABLE DISEASES IN PRESCHOOL-AGED CHILDREN THROUGH WHATSAPP GROUP MEDIA

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ABSTRAK

Latar Belakang: Kebiasaan makan pada anak usia prasekolah memiliki peran penting dalam membentuk dasar kesehatan jangka panjang. Rendahnya konsumsi buah dan sayur serta tingginya konsumsi minuman manis telah dilaporkan berkontribusi terhadap peningkatan risiko penyakit tidak menular (PTM) pada usia dewasa. Edukasi gizi kepada orang tua merupakan salah satu strategi utama dalam meningkatkan pola makan anak. **Tujuan:** Penelitian ini bertujuan menganalisis pengaruh edukasi melalui *WhatsApp grup* terhadap perubahan pola konsumsi buah, sayur, dan pembatasan minuman manis pada anak usia prasekolah di TK ’Aisyiyah Padang. **Metode:** Penelitian menggunakan desain *kuasi-eksperimen* satu kelompok *pretest–posttest* dengan 53 responden (*total sampling*). Materi edukasi diberikan melalui *WhatApp grup* selama satu bulan. **Hasil:** Hasil uji *Wilcoxon Signed-Rank* menunjukkan peningkatan skor pengetahuan dari 30,11 menjadi 33,30 ($p < 0,0001$). **Diskusi:** Temuan ini menunjukkan bahwa edukasi berbasis digital berpotensi menjadi media efektif, terjangkau, dan mudah diakses dalam promosi kesehatan keluarga. Penelitian lanjutan disarankan untuk menilai perubahan perilaku aktual dan menggunakan kelompok kontrol.

Kata Kunci: pencegahan, penyakit tidak menular, prasekolah

ABSTRACT

Introduction Eating habits in preschool-aged children play an important role in forming the foundation of long-term health. Low consumption of fruits and vegetables and high intake of sugary drinks have been reported to contribute to an increased risk of *non-communicable diseases* (NCDs) in adulthood. Nutrition education for parents is one of the main strategies for improving children's dietary patterns. **Purpose:** This study aims to analyze the influence of education delivered through *WhatsApp groups* on changes in fruit and vegetable consumption as well as the limitation of sugary drinks in preschool-aged children at TK 'Aisyiyah Padang. **Method:** The study used a *quasi-experimental one-group pretest–posttest design* with 53 respondents (total sampling). Educational material was delivered through a *WhatsApp group* for one month. **Result:** *The Wilcoxon Signed-Rank test* showed an increase in knowledge scores from 30.11 to 33.30 ($p < 0.0001$). **Discussion:** These findings indicate that digital-based education has the potential to become an effective, affordable, and accessible medium in family health promotion. Further research is recommended to assess actual behavior changes and include a control group.

Keywords: prevention; non-communicable diseases; preschool

INTRODUCTION

Preschool age is an important period for forming eating habits that support health. At this stage, children begin to show strong food preferences and learn from their environment, especially from the dietary patterns applied in the family. Children begin to have the ability to determine the foods they prefer to consume and refuse certain types of food. In these conditions, the role of parents and caregivers is crucial in shaping children's eating behavior, as they become role models, decision-makers, and determinants of food availability at home.

The current reality shows that balanced nutrition fulfillment in preschool children is still far from national targets. Based on the 2018 Basic Health Research (Riskesdas), only 5.3% of Indonesian residents consume fruits and vegetables in sufficient amounts according to balanced nutrition recommendations (Kemenkes RI, 2018). This data indicates low awareness and poor practices in consuming healthy foods at the household level, which ultimately affects children's eating behavior. Children who consume insufficient fruits and vegetables may experience micronutrient deficiencies and increased risk of *Non-Communicable Diseases* (NCDs). *The World Health Organization* (2022) states that in the past decade, NCD prevalence among children has increased significantly, especially in developing countries.

On the other hand, the habit of consuming processed foods and sugary drinks presents its own challenge. Sugary drinks, such as carbonated drinks, packaged teas and juices, and other sweetened beverages, are very easily accessible to preschool-aged children. These drinks are often given as rewards by parents who lack education about the long-term risks of such habits. WHO explains that excessive consumption of added sugars from an early age is strongly associated with increased risk of type 2 diabetes mellitus, other metabolic disorders, and weight problems/obesity (WHO, 2022). Low intake of healthy foods combined with high consumption of unhealthy foods becomes a very poor combination for children's growth and development. To prevent these issues, one important intervention is educating parents or caregivers.

Nutrition education for parents or caregivers aimed at optimizing children's growth and development must be conducted continuously. Parents must be provided with accurate information and understanding of the benefits of consuming

fruits and vegetables, as well as the negative impacts of excessive sugary drink consumption in children. Continuous interventions have been proven to change perceptions, increase knowledge, and influence behavior in preparing children's meals (Vollmer et al., 2015).

Currently, one of the most commonly used communication platforms in society is WhatsApp. According to a survey by *Asosiasi Penyelenggara Jasa Internet Indonesia* [APJII] (2023), more than 90% of internet users in Indonesia use *WhatsApp* as a communication medium. This indicates that *WhatsApp* holds significant potential when used as a digital-based health education tool. Utilizing the *WhatsApp group* feature as an educational medium can be an effective strategy because it allows interactive communication, easy access, the ability to reread materials, and low cost.

TK 'Aisyiyah Kota Padang is one of the early childhood education institutions under *Pimpinan Wilayah 'Aisyiyah Sumatera Barat* that has a representative number of students and actively involves parents or caregivers in learning activities. Based on initial observations and interviews with the school, it was found that many students still practice unhealthy eating habits, such as low consumption of fruits and vegetables and high intake of sugary foods and drinks brought from home or purchased. This indicates a need for educational interventions for parents or caregivers to increase awareness of the importance of balanced nutrition from an early age. TK 'Aisyiyah has utilized WhatsApp group features for communication between teachers and parents or caregivers, making it highly suitable for implementing digital-based interventions.

In a global context, the issue of unhealthy eating patterns among young children is not only occurring in Indonesia but is also a phenomenon widely reported in many countries. Trends toward increased consumption of foods high in sugar, salt, and fat among preschool-aged children have become a major concern for global health organizations. International epidemiological studies report that early exposure to ultra-processed foods has long-term influences on taste preferences, appetite regulation, and obesity risk (Peng et al., 2023). These findings reinforce the view that nutritional interventions during preschool years are critical in preventing the formation of maladaptive eating habits.

In addition, modern lifestyle changes have accelerated the shift from healthy foods to more practical instant foods. Other studies show that families with high activity levels tend to rely on ready-to-eat foods that are typically low in fiber and high in additives (Horning et al., 2017). Similar conditions are found in Southeast Asia, including Indonesia, reinforcing the importance of research in a local context.

From the perspective of health behavior theory, parental decision-making in choosing foods for children is influenced by various factors such as nutrition literacy, risk perception, environmental support, and social influence. Research shows that increased nutrition literacy has a positive relationship with the adoption of healthy eating patterns in children (Doustmohammadinan et al., 2021). This emphasizes that education not only provides information but also shapes mindsets and stimulates consistent behavior change.

Digital-based educational interventions are receiving increasing attention as public access to communication technology rises. Various studies have tested the effectiveness of digital media in increasing parents' nutritional knowledge. Findings show that messages delivered through messaging apps, including *WhatsApp*, have higher readability and information retention compared to conventional face-to-face counseling (Jordan, 2023). This occurs because digital media allow parents to access information anytime and review materials as needed.

In the context of early childhood education, integrating school–parent communication through digital platforms also contributes to strengthening health messages intended to be conveyed. Schools that successfully utilize *WhatsApp groups* as routine communication media generally have higher parental participation and improved understanding regarding healthy caregiving practices (Moyano et al., 2024). Thus, implementing an educational intervention through digital media in TK 'Aisyiyah Kota Padang has strong empirical foundations and aligns with technological developments.

Previous studies also emphasize that health education delivered through community-based approaches has a more significant impact when involving parents as active partners in the child's learning process. Within the school environment, teachers can reinforce the values instilled through parental education, creating consistency between practices at home and at school. This is essential because preschool children learn through observation and consistent adult behaviors in their environment.

In Indonesia, research on the effectiveness of digital education to improve parental nutritional knowledge remains limited. Most earlier studies focused on face-to-face interventions or conventional counseling programs. Therefore, this study has urgent value because it fills a gap in the literature regarding the use of popular digital platforms such as *WhatsApp* for nutrition education among parents of preschool children.

Furthermore, educational interventions delivered continuously through *WhatsApp* have the potential to create a learning environment that is not only passive but also participatory. Features such as discussions, image sharing, and the delivery of illustrated materials allow parents to engage more contextually in the learning process. This approach aligns with adult learning theory, which emphasizes that knowledge is more effectively received through media relevant to daily life and that allow personal reflection.

Finally, this background highlights that low fruit and vegetable consumption and high intake of unhealthy foods among preschool children constitute a multidimensional problem requiring innovative and adaptive solutions. *WhatsApp-based* interventions represent a potentially effective strategy suited to the needs of Indonesian society today, both in terms of accessibility and cost efficiency, as well as effectiveness in conveying behavior-change messages.

The objective of this study is to determine the influence of education delivered through *WhatsApp groups* on changes in fruit and vegetable consumption and reduction of sugary drink intake in preschool-aged children at TK 'Aisyiyah Padang as an intervention to prevent non-communicable diseases.

RESEARCH METHODS

This research is a *quantitative quasi-experimental study* with a *one-group pretest–posttest design* and has received approval from *Bagian Penelitian & Pengabdian Masyarakat (BPPM) Politeknik 'Aisyiyah Sumatera Barat*. The sample consisted of all mothers who had children attending TK 'Aisyiyah Padang, totaling 53 individuals. All participants signed an informed consent form. *Pretest and posttest data* were collected using a questionnaire created in *Google Form*, which had undergone validity and reliability testing. Before conducting the posttest, respondents received an educational intervention about the importance of consuming fruits, vegetables, and limiting sugary drinks in children. Educational materials were delivered in the *WhatsApp group* twice a week for one month. The posttest was conducted one week after the intervention ended. Data were analyzed using *the Wilcoxon Signed-Rank test* because the

data were not normally distributed. Furthermore, to ensure the rigor of the research process, all stages of intervention implementation followed standardized procedures established prior to data collection. The researchers prepared an educational materials in the form of text, infographics, and evidence-based summaries to ensure consistency across all educational sessions. The materials were reviewed by two experts in communication and child health to ensure content appropriateness and readability for the general public. During participant recruitment, the researchers employed a total sampling approach because all mothers of children enrolled at TK ‘Aisyiyah Padang met the inclusion criteria. These criteria included: (1) having a preschool-aged child actively attending school, (2) being able to use the *WhatsApp* application at a basic level, and (3) willingness to participate in all intervention sessions throughout the study period. To ensure data integrity, an automatic data collection system was established via *Google Form* linked to an encrypted spreadsheet, reducing the risk of input errors. Respondents were assigned anonymous codes to maintain confidentiality and prevent response bias. The questionnaire instrument was tested using item-total correlation and *Cronbach’s alpha*, ensuring that only items meeting reliability standards were included in the final analysis. Throughout the intervention period, participant activity within the *WhatsApp Group* was monitored by the research team to observe engagement, such as responses to educational messages, questions posed, and timing of material access. Although these data were not formally analyzed, documentation was conducted as part of a fidelity check to ensure that the intervention proceeded as planned. In the data analysis stage, *the Wilcoxon Signed-Rank test* was selected because the data were ordinal and did not meet the assumption of normal distribution based on the *Shapiro-Wilk test*. In addition, descriptive analysis was used to examine respondent characteristics, including age, education, and frequency of *WhatsApp* use. The results were presented in tables to facilitate interpretation and to provide a comprehensive overview of knowledge changes before and after the intervention.

RESULTS

Table 1 shows the characteristics of the respondents involved in the study regarding the influence of education through *WhatsApp groups* on changes in fruit and vegetable consumption as well as reduction of sugary drink intake in preschool-aged children at TK ‘Aisyiyah Padang as a *non-communicable disease* prevention intervention. The characteristics included in the table consist of age classification, occupation, and the mother's highest education level. The table explains that the majority of respondents were in the early adulthood category (69.8%), worked as housewives (84.9%), and had completed Senior High School education (49.1%).

Table 1. Respondent Characteristics

No	Category	Number	%
1	Age		
	- Early Adulthood	37	69,8
	- Late Adulthood	16	30,2
2	Occupation		
	- Employee	5	9,4
	- Entrepreneur	3	5,7
	- Housewife	45	84,9
3	Final Education		
	- Junior High School	7	13,2
	- Senior High School	26	49,1
	- Higher Education	20	37,7

Next, before performing *the Paired t-test*, a *Shapiro–Wilk normality test* was conducted to ensure that the data were normally distributed. The results showed

that the data were not normally distributed ($p < 0.05$), so a *non-parametric test—Wilcoxon Signed-Rank Test*—was used to measure the difference in mean score changes before and after the intervention.

Table 2. Wilcoxon Signed-Rank Test Results

Intervention	Mean	SD	*P*
Pre-test	30,11	6,06	<0,0001
Post-test	33.30	5,10	

Table 2 explains the results of *the Wilcoxon Signed-Rank Test* conducted to evaluate the effect of the educational intervention. The analysis showed that the average participant score increased from 30.11 during *the pre-test* to 33.30 during *the post-test*, with *standard deviations* of 6.06 and 5.10 respectively. *The p-value* of <0.0001 indicates that the improvement in fruit and vegetable consumption patterns and the reduction of sugary drink intake in preschool-aged children at TK 'Aisyiyah Padang was statistically significant after receiving the education through the *WhatsApp Group*.

DISCUSSION

The results of this study show that education related to increasing fruit and vegetable consumption as well as limiting sugary drinks through *WhatsApp Group* had a significant impact on improving parents' knowledge at TK 'Aisyiyah Padang. The average *pre-test score* of 30.11 increased to 33.30 in *the post-test*, and *the Wilcoxon test* results showed $p < 0.0001$. These findings indicate that the educational intervention was effective in increasing parents' knowledge regarding healthy eating patterns for preschool children. This is consistent with previous studies that emphasize that children's eating behavior is strongly influenced by parenting practices and family dietary patterns (Craigie et al., 2011; Rasmyssen et al., 2006; Pearson et al., 2009).

Changes in parents' knowledge are important given their role as the primary decision-makers regarding food availability at home. Previous studies show that parental involvement and understanding of healthy foods are closely associated with increased fruit and vegetable intake as well as reduced consumption of sugar-rich foods among young children (Pearson et al., 2009; Yavuz and Selcuk, 2018; Patrick, 2005). Thus, the increased knowledge found in this study indicates potential positive behavioral changes in children's eating practices.

In addition, the use of digital media such as *WhatsApp Group* proved to be an effective means of delivering health education. Digital media offer ease of access, time flexibility, and allow recipients to review the material repeatedly. Previous studies have shown that health education delivered through digital platforms increases parental engagement and improves children's feeding practices (Feroz, 2020; Harris and Pomeranz 2021; Jalil et al., 2025). Therefore, the educational strategy used in this study is relevant and aligned with technological advancements in health promotion.

The increase in knowledge is aligned with efforts to prevent non-communicable diseases from an early age. *The World Health Organization* emphasizes that children's dietary patterns greatly influence metabolic disease risks in adulthood (WHO, 2020; Swinburn et al., 2019). Therefore, education on fruit and vegetable consumption as well as limiting sugary drinks becomes essential as a preventive measure to promote long-term health.

However, this study has several limitations. First, *the single-group design* without a control group limits the ability to conclude that the knowledge changes were entirely due to the educational intervention. Second, this study only assessed changes in feeding behavior through questionnaires, not actual consumption behaviors, so the true impact

on children's eating patterns cannot be confirmed. Third, the relatively short intervention duration may not be sufficient to produce deeper behavioral changes. These limitations are consistent with previous findings showing that knowledge improvement does not always lead directly to behavioral change.

Nevertheless, this study provides an important contribution to the development of digital-based health education strategies. The findings show that *WhatsApp Group* is a practical, affordable, and easy-to-implement medium for nutrition education for parents. Further studies are recommended to include control groups, directly monitor behavior changes, and extend the educational duration so that more comprehensive impacts can be observed.

Furthermore, the results of this study offer relevant implications for health practitioners, early childhood education institutions, and policymakers. The increase in parental knowledge after the intervention shows that communication media already familiar to the public, such as *WhatsApp*, can serve as an effective channel for expanding access to nutritional information. This is particularly important given that many families in Indonesia have limited time to attend face-to-face counseling sessions. *WhatsApp* allows information to be delivered periodically and accessed easily, enabling education to be carried out without disrupting parents' daily activities. This approach is consistent with studies emphasizing that educational interventions via short messages or instant messaging apps can improve information retention and health behaviors within families (Dolwick & Persky, 2021).

From a theoretical perspective, the findings of this study also reinforce health promotion models that emphasize the role of self-efficacy and access to information in shaping health behavior. When parents receive information that is simple, structured, and repeated, their ability to make decisions related to healthy food increases. In addition, educational communication through *WhatsApp Groups* does not only provide text but can also be supplemented with visuals, videos, and discussions, thereby strengthening the learning process. This finding is consistent with Bandura's social learning theory, which states that observation and social interaction can accelerate changes in knowledge and behavior. Several studies also show that digital interventions increase parents' motivation and commitment to practicing healthy eating habits with their children (Zarnowiecki et al., 2020).

A deeper analysis reveals that interactions within *WhatsApp Groups* play an important role in the educational process. Two-way communication allows parents to ask questions, seek clarification, and discuss everyday experiences. This element provides added value not always found in one-way educational methods such as leaflets or posters. The informal discussion environment also reduces psychological barriers often encountered during face-to-face counseling sessions. Studies indicate that supportive digital environments increase the likelihood of new health behaviors being internalized more strongly (Li et al., 2016). Thus, the effectiveness found in this study is derived not only from the educational content but also from the interpersonal communication dynamics facilitated by the digital platform.

In addition to the limitations already described, several potential biases should be considered. First, the Hawthorne effect—changes in behavior because participants know they are being studied—may influence the post-test results. Second, the use of self-report questionnaires is prone to social desirability bias, where parents may provide answers they perceive to be more socially acceptable. Third, participants' digital literacy skills may influence their ability to understand the materials delivered through *WhatsApp*. Although the platform is relatively easy to

use, not all parents are accustomed to reading long informational texts on their phones, which could affect variation in knowledge improvement. Literature emphasizes that the effectiveness of digital education is strongly influenced by the digital literacy level of its recipients (Hernández, 2023). Future research should consider these factors to provide a more comprehensive assessment.

For future studies, adopting a mixed-methods approach is strongly recommended to combine quantitative and qualitative analyses. This approach would enable researchers to not only measure knowledge improvement but also understand parents' subjective experiences in participating in digital education. Direct observation of children's dietary behaviors or using digital food diaries could also provide more objective data regarding the impact of knowledge changes on actual behavior. Moreover, *quasi-experimental designs* with a control group would increase internal validity and allow stronger causal conclusions.

This *WhatsApp-based* educational program also has the potential to be expanded into a broader community-based initiative. For example, discussion groups could be integrated with joint activities between schools and local health centers, generating synergy in promoting early childhood health. Community health volunteers could also be involved as facilitators or reinforcement agents for the educational messages. Other studies have shown that the integration of digital interventions with community programs produces multiplied effects on health behavior change (Garcia et al., 2022). Strengthening these collaborations can help ensure sustainability and long-term impact.

The cultural context and dietary habits of Indonesian families must also be considered when interpreting the results. Local culinary traditions, which tend to be rich in flavor and high in sugar but low in fiber, may present challenges in promoting healthy eating habits. Therefore, educational interventions should be adapted to local cultural contexts, such as through recommending healthy menus using regionally available foods. Culturally tailored education has been shown to improve acceptance and effectiveness of interventions (Tiwana et al., 2024). This can be a direction for developing future interventions that are more aligned with community needs and easier to implement.

Overall, the discussion reinforces that educational interventions delivered through *WhatsApp Groups* are not only effective at increasing parental knowledge but also have broad potential for implementation in school and community settings. Despite methodological limitations, the results of this study provide a strong foundation for developing more comprehensive and sustainable digital-based interventions. By considering cultural factors, communication dynamics, and integration with community programs, early childhood health education can be significantly strengthened.

CONCLUSION AND SUGGESTIONS

Education delivered through *WhatsApp Group* has been proven effective in improving parents' knowledge, which influences changes in fruit and vegetable consumption patterns and limits sugary drink intake among preschool-aged children. Digital-based interventions are practical, economical, and accessible strategies in family health promotion. Future studies should involve a control group and measure actual behavioral changes.

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