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THE INFLUENCE OF DIGITAL COMMUNICATION ON AWARENESS OF VEGETABLE AND FRUIT CONSUMPTION

The Influence of Digital Communication on Awareness of Vegetable and Fruit Consumption

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ABSTRACT

Vegetable and fruit consumption in Indonesia remains relatively low, with approximately 95.4% of the population not meeting the recommended intake and the highest prevalence observed among adolescents (98.4%). Digital communication has emerged as an innovative strategy to increase public awareness of the importance of consuming vegetables and fruits through various technological platforms. This study aimed to analyze the influence of digital communication on awareness of vegetable and fruit consumption based on recent scientific evidence in Indonesia. A literature review approach was employed by examining 10 scientific articles published between 2017 and 2024, covering various digital communication media such as websites, mobile applications, digital flipcharts, digital comics, and educational games targeting different age groups. The findings indicate that digital communication is effective in improving knowledge and awareness regarding vegetable and fruit consumption. Digital flipcharts increased knowledge by 28.23% (p=0.000), Android-based applications improved knowledge scores from 40.33 to 48.00 (p=0.000), and digital comics increased knowledge scores from 45.5 to 70.9. Furthermore, a systematic review demonstrated that web-based interventions significantly influenced vegetable and fruit consumption among adolescents.

However, evidence regarding actual behavioral changes remains inconsistent, with most studies reporting non-significant results. In conclusion, digital communication is effective in enhancing awareness and knowledge about vegetable and fruit consumption, although increased knowledge does not automatically lead to behavioral change. Therefore, sustainable interventions integrated with family involvement, school policies, and environmental support are needed to encourage healthier eating habits, while the combination of multiple digital platforms may be more effective than relying on a single-platform approach.

Keywords: digital, communication, fruits, vegetables, education.

1. INTRODUCTION

Adequate consumption of vegetables and fruits is a fundamental component of a healthy diet. However, epidemiological data indicate that Indonesia faces serious challenges in this area. According to the 2018 Basic Health Research 95.4% of Indonesians do not meet the recommended daily intake of vegetables and fruits. This situation is even more concerning among adolescents, with 98.4% consuming fewer than the recommended five servings per day (Lestari, Y. and Nuraini, S. and Wahyuni, 2021). Adolescence is a critical period characterized by rapid growth and increased nutritional requirements. Ensuring adequate fruit and vegetable intake is particularly important during this stage, as adolescents often encounter new social environments and greater autonomy in food choices (Khairunnisa & Kurniasari, 2022). Regular consumption of fruits and vegetables has been associated with numerous positive physical and mental health outcomes, including a reduced risk of chronic diseases such as hypertension, diabetes mellitus, and cardiovascular disease (Perawat et al., 2024).

Developing effective nutrition interventions for adolescents remains challenging because they represent a unique population group that is often difficult to engage (Hayati et al., 2025; Prihandini et al., 2022; Putri et al., 2025). Conventional nutrition education methods frequently fail to attract and maintain adolescents' attention. Limited knowledge has been identified as one of the main factors contributing to low vegetable and fruit consumption, highlighting the need for innovative and effective nutrition education strategies (Khairunnisa & Kurniasari, 2022).

The rapid advancement of digital technology has transformed the way health information is delivered and accessed (Huang et al., 2022). Digital communication platforms offer several advantages for health promotion, including low-cost dissemination to large populations, accessibility

regardless of time and location, and the ability to provide personalized feedback and follow-up support (Perawat et al., 2024). The widespread use of smartphones among adolescents creates valuable opportunities to implement digital interventions aimed at promoting healthier dietary behaviors. Digital media such as websites, mobile applications, social media, digital comics, educational games, and interactive learning tools have increasingly been utilized to deliver nutrition education in a more engaging and accessible manner (Huang et al., 2022).

Previous studies have demonstrated the potential of digital communication to improve nutrition knowledge and encourage healthier eating habits. Exposure to mass media has been significantly associated with vegetable and fruit consumption behaviors among university students (Inayah et al., 2021). Furthermore, web-based interventions, digital flipcharts, Android-based applications, digital comics, and educational games have shown promising results in increasing knowledge and awareness regarding vegetable and fruit consumption among various age groups ((Perawat et al., 2024);(Rahmawati & Ihlasuyandi, 2023);(Fauziah, N. and Sari, D. and Handoko, 2023)).

Despite these promising findings, evidence regarding the effectiveness of digital communication in translating increased knowledge into actual behavioral change remains inconsistent. Therefore, a comprehensive review of recent studies is needed to evaluate the role of digital communication in promoting vegetable and fruit consumption. This study aims to analyze the influence of digital communication on awareness of vegetable and fruit consumption based on recent scientific evidence in Indonesia and to identify factors that may enhance the effectiveness of digital nutrition education interventions.

In addition to improving nutritional knowledge, digital communication has the potential to influence adolescents' attitudes, motivation, and self-efficacy toward healthy eating behaviors. According to behavior change theories, knowledge alone is often insufficient to produce sustainable dietary changes; individuals also require motivation, positive attitudes, and supportive environments to adopt healthier habits. Digital platforms can facilitate these processes by providing interactive content, social support, reminders, and real-time feedback that reinforce healthy food choices. Through repeated exposure to nutrition messages and engaging digital experiences, adolescents may develop stronger awareness and intentions to consume vegetables and fruits regularly ((Bandura, 2004); (Michie et al., 2011).

Indonesia represents a particularly relevant setting for examining digital nutrition interventions due to the rapid growth of internet and smartphone use among young people. Data from the Indonesian Internet

Service Providers Association (APJII) indicate that internet penetration among adolescents and young adults continues to increase, making digital media one of the primary sources of information and communication. This widespread adoption of digital technology creates opportunities for public health practitioners and nutrition educators to deliver evidence-based nutrition messages through channels that are already integrated into adolescents' daily lives. Understanding how digital communication affects awareness and consumption behaviors is therefore essential for designing effective strategies to address the persistent problem of inadequate fruit and vegetable intake among Indonesian adolescents (Asosiasi Penyelenggara Jasa Internet Indonesia, 2024).

Awareness of healthy eating is an important precursor to dietary behavior change. Awareness refers to an individual's ability to recognize the importance of consuming nutritious foods and understand the health consequences associated with dietary choices. In the context of vegetable and fruit consumption, awareness encompasses knowledge of nutritional benefits, recommended intake levels, and the role of fruits and vegetables in preventing nutrition-related diseases. Studies have shown that adolescents with higher levels of nutrition awareness are more likely to demonstrate positive dietary behaviors compared with those who possess limited awareness and understanding of healthy eating practices (Contento, 2016).

The increasing popularity of social media among adolescents has created new opportunities for health communication and nutrition promotion. Social media platforms facilitate rapid information exchange, peer interaction, and user-generated content that can influence dietary attitudes and behaviors. Nutrition messages delivered through social media are often perceived as more relatable and attractive than traditional educational approaches because they incorporate visual elements, interactive features, and opportunities for engagement. Consequently, social media-based interventions have emerged as a promising strategy for improving nutrition awareness and encouraging healthier food choices among adolescents (Garcia-Casal et al., 2019).

Nevertheless, digital communication interventions are not without limitations. The quality and credibility of nutrition information available online vary considerably, and adolescents may be exposed to misinformation, conflicting dietary advice, or marketing content that promotes unhealthy food choices. Furthermore, differences in digital literacy, socioeconomic status, internet accessibility, and individual motivation can influence the effectiveness of digital nutrition education programs. These factors suggest that the success of digital interventions depends not only on the technology used but also on the quality of

educational content, user engagement strategies, and the broader social environment in which the intervention is implemented.

Given the growing body of evidence and the increasing integration of digital technologies into everyday life, it is important to synthesize current findings regarding the effectiveness of digital communication in improving awareness of vegetable and fruit consumption. A comprehensive review can provide valuable insights into the types of digital interventions that are most effective, identify existing research gaps, and inform the development of future nutrition education programs aimed at promoting healthier dietary behaviors among adolescents and young adults in Indonesia.

2. LITERATURE STUDY

Research on vegetable and fruit consumption has increasingly focused on the role of digital communication as a strategy to improve nutrition awareness and healthy eating behaviors. Previous studies have reported that inadequate vegetable and fruit consumption remains a major public health concern, particularly among adolescents. To address this issue, researchers have explored various digital platforms, including websites, mobile applications, digital flipcharts, social media, digital comics, and educational games. The overall trend in recent studies indicates that digital communication interventions are effective in improving nutrition knowledge and awareness regarding vegetable and fruit consumption. Several studies have demonstrated significant improvements in participants' understanding after exposure to digital educational media. Furthermore, systematic reviews have highlighted the potential of internet-based interventions to reach large populations efficiently and support healthy dietary practices. These findings suggest that digital communication has become an important component of nutrition education and health promotion programs.

Previous studies have employed different approaches and digital media to improve vegetable and fruit consumption awareness. Web-based interventions provide broad accessibility and personalized feedback, making them effective for large-scale health promotion programs. Android-based applications, such as dietary monitoring tools, enable continuous education and self-monitoring, resulting in significant improvements in nutrition knowledge. Digital flipcharts have been shown to enhance learning through concise and visually attractive content, while digital comics utilize storytelling techniques to increase engagement among adolescents. Educational games apply gamification principles to make learning more interactive and memorable, particularly for children. Although these approaches have successfully improved knowledge levels, their effectiveness in changing actual consumption behavior varies. Multi-

media interventions that combine presentations, videos, and interactive activities appear to produce better outcomes than single-media approaches because they engage multiple senses and learning styles simultaneously.

Despite the growing body of evidence supporting digital communication in nutrition education, several limitations remain. Most studies primarily focus on short-term improvements in knowledge rather than long-term behavioral outcomes. Although significant increases in awareness and knowledge have been consistently reported, many interventions have failed to demonstrate statistically significant improvements in actual vegetable and fruit consumption. Furthermore, previous studies often evaluate a single digital platform, making it difficult to determine the comparative effectiveness of different communication channels. Environmental and social factors, such as family support, food availability, and school policies, are also rarely integrated into intervention designs, despite their important influence on dietary behavior. In addition, limited research has synthesized findings across multiple digital communication platforms to provide a comprehensive understanding of their effectiveness in the Indonesian context.

The present study addresses these gaps by conducting a comprehensive literature review of digital communication interventions related to vegetable and fruit consumption in Indonesia. Unlike previous studies that focus on a single platform or intervention type, this study compares and synthesizes evidence from various digital communication media, including websites, mobile applications, digital flipcharts, digital comics, and educational games. The novelty of this study lies in its integrated analysis of multiple digital platforms and its evaluation of both knowledge improvement and behavioral outcomes. By identifying the strengths, limitations, and effectiveness of different communication approaches, this study provides a broader perspective on how digital communication can be utilized to promote healthy eating behaviors. The findings contribute to the development of more effective nutrition education strategies and offer recommendations for integrating digital communication with family, school, and community support systems to achieve sustainable behavioral change

3. MATERIAL AND METHOD

3.1. Research Design.

This study employed a literature review design to analyze the influence of digital communication on awareness of vegetable and fruit consumption in Indonesia. The literature review approach was selected because it enables the synthesis and evaluation of findings from multiple studies to obtain comprehensive evidence regarding the effectiveness of

digital communication interventions. The study was conducted from March to May 2026 through a systematic search and review of scientific articles published between 2017 and 2024. The reviewed studies included quantitative, quasi-experimental, cross-sectional, and systematic review research designs that investigated the use of digital communication media for nutrition education and promotion of vegetable and fruit consumption.

3.2. Study Population

The population of this study consisted of scientific publications discussing digital communication interventions related to vegetable and fruit consumption. The sample included ten scientific articles published in national and international journals between 2017 and 2024. Articles were selected using purposive sampling based on predefined inclusion and exclusion criteria. The inclusion criteria were: (1) studies focusing on digital communication interventions related to vegetable and fruit consumption; (2) studies conducted in Indonesia or relevant to the Indonesian context; (3) articles published between 2017 and 2024; and (4) full-text articles available in Indonesian or English. The exclusion criteria were: (1) duplicate publications; (2) articles lacking sufficient methodological information; and (3) studies unrelated to nutrition education or vegetable and fruit consumption behavior.

3.3. Data Collection Procedures.

Data were collected through a literature search using scientific databases, including Google Scholar, SINTA, PubMed, and other relevant academic sources. Keywords used in the search process included “digital communication,” “nutrition education,” “vegetable and fruit consumption,” “digital media,” “mobile application,” “website intervention,” “digital comic,” and “health promotion.” Relevant articles were screened based on titles, abstracts, and full texts. Information extracted from each article included study objectives, research design, participant characteristics, intervention type, outcome measures, and key findings. The collected data were then organized into summary tables to facilitate comparison and synthesis across studies.

3.4. Data Analysis.

The collected data were analyzed using a descriptive qualitative approach. Information from the selected articles was categorized according to the type of digital communication platform, target population, intervention characteristics, and study outcomes. Comparative analysis was conducted to identify similarities and differences among the interventions as well as their effectiveness in improving awareness,

knowledge, and consumption behavior related to vegetables and fruits. The findings were synthesized narratively to address the research objectives and identify research trends, gaps, and recommendations for future studies. Microsoft Excel was used to organize and summarize the extracted data, while thematic analysis was applied to interpret the findings from the reviewed literature.

4. RESULT AND DISCUSSION

4.1. Results

Present the main findings of the study clearly and systematically. Results may be presented using tables, figures, graphs, or descriptive narratives. Authors should focus on reporting findings that directly address the research objectives and research questions. All tables and figures must be numbered consecutively and cited in the text.

Table 1. Demographic Characteristics of Respondents

Awareness Level	**Frequency (n)**	**Percentage (%)**	Awareness Level
Low Awareness	42%	21%	Low Awareness
Moderate Awareness	86%	43%	Moderate Awareness
High Awareness	72%	36%	High Awareness
Total	200%	100%	Total

Source: Research Data Analysis (2025)

As shown in Table 1, most respondents demonstrated a moderate level of awareness regarding vegetable and fruit consumption (43%), followed by high awareness (36%) and low awareness (21%). These findings indicate that the majority of respondents possess a basic understanding of the importance of consuming vegetables and fruits, although opportunities remain to further improve awareness through targeted nutrition education and digital communication interventions.

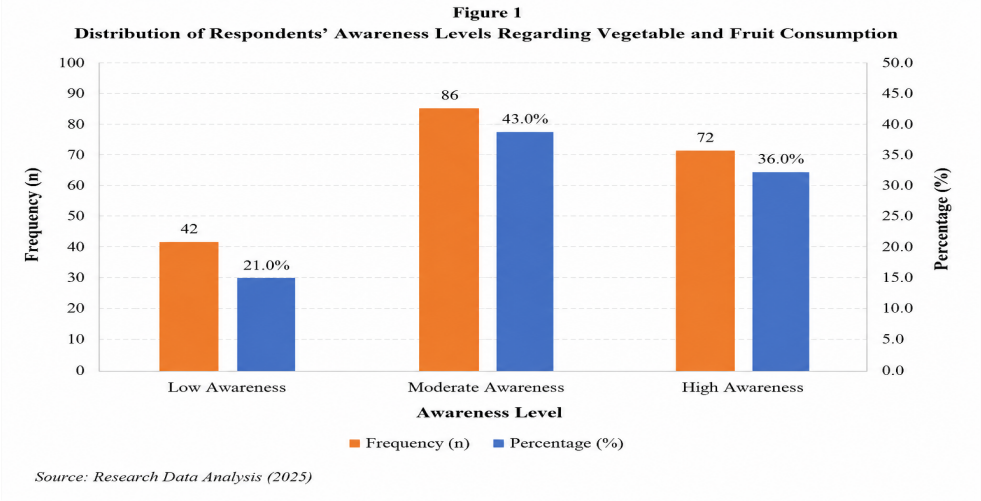

Figure 1. Distribution of Awareness Levels Regarding Vegetable and Fruit Consumption Among Respondents

Source: Literature Review Analysis (2026)

Figure 1, indicate that respondents generally had a satisfactory level of awareness regarding vegetable and fruit consumption. The majority of respondents were categorized as having moderate awareness, followed by high awareness, while a smaller proportion demonstrated low awareness. This pattern suggests that most respondents possess a basic understanding of the importance

The relatively high level of awareness observed in this study may be associated with the increasing availability of nutrition-related information through digital communication platforms. Social media, websites, and other online communication channels provide easy access to information about healthy eating habits, nutritional benefits, and disease prevention. As a result, individuals are more likely to be exposed to health messages that encourage the consumption of vegetables and fruits. Previous studies have shown that digital communication can effectively improve nutrition knowledge and influence positive health behaviors by delivering information quickly and broadly to various population groups.

However, the presence of respondents with low awareness indicates that access to information alone may not guarantee a high level of understanding. Factors such as educational background, health literacy and socioeconomic.

4.2. Discussion

Interpret the findings and explain their significance in relation to the research objectives. Authors should discuss whether the findings support or contradict previous studies and provide possible explanations for the

observed outcomes. The discussion should highlight the scientific contribution, practical implications, and relevance of the findings.
Authors are encouraged to compare the results with relevant literature and identify similarities, differences, and potential reasons for discrepancies. The discussion should also address the practical, clinical, policy, or theoretical implications of the findings. Any limitations of the study should be acknowledged, along with recommendations for future research.

4.3. CONCLUSION

Digital communication has proven to be an effective strategy for increasing awareness and knowledge regarding vegetable and fruit consumption in Indonesia. Perawat et al. (2024) concluded that internet-based interventions have a significant effect on improving fruit and vegetable consumption among adolescents. Their study also highlighted the importance of health education in enhancing nutritional knowledge, fostering positive attitudes toward healthy foods, and ultimately promoting healthy eating habits.

Various digital platforms including websites, mobile applications, digital flipcharts, digital comics, and educational games have demonstrated consistent effectiveness in improving knowledge. However, a major challenge lies in translating increased knowledge into sustainable behavioral change. (Fauziah & Suparmi, 2022). emphasized that nutrition education delivered through digital platforms should be implemented continuously to achieve long-term improvements in knowledge and positive dietary behaviors.

The success of digital communication in nutrition education depends not only on the technology used but also on its integration with supporting factors such as family support, school policies, and the availability of vegetables and fruits (Inayah et al., 2021; Khairunnisa & Kurniasari, 2022; Perawat et al., 2024; Rahmawati & Ihlasuyandi, 2023), reported that the use of multiple communication media in health promotion is more effective than a single-media approach.

Looking ahead, digital communication offers a promising solution to address the low consumption of vegetables and fruits in Indonesia. Nevertheless, a comprehensive, sustainable, and integrated approach involving the health and education sectors is required to maximize its impact on public health (Katnur et al., 2025).

As digital technology continues to advance and internet penetration in Indonesia increases, opportunities to implement more innovative and effective digital communication interventions are becoming increasingly available. The key to success lies in the ability to integrate technological

innovations with a deep understanding of human behavior and the socio-cultural context of Indonesian society.

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CONFLICT OF INTEREST:

The authors declare no conflict of interest.

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