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# The Role of Information and Communication Technology in Increasing Awareness and Practice of Healthy Nutrition in the Community

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**ABSTRACT**

*Nutritional problems remain a serious challenge in global public health, including in Indonesia. Malnutrition and unbalanced nutritional consumption often contribute to various health problems, such as stunting in children, obesity, and non-communicable diseases such as diabetes and hypertension.The Internet, social media, health apps, and other digital tools provide opportunities to inform the public about the importance of proper nutrition and offer practical strategies for adopting healthy eating patterns.This study aims to explore the role of ICT in improving community nutrition awareness and practices, and to analyze how the use of technology can support nutrition interventions more effectively.This study uses a quantitative approach. The qualitative approach was used to gain a deeper understanding of the experiences, perceptions, and barriers experienced by the community and health workers in using ICT for nutrition education.The sample of this study included 10 respondents for the quantitative part, which were divided into 5 treatment groups and 5 control groups. The study was conducted at the Batang Kuranji Health Center which was implemented in June 2024. The results in both groups before the provision of educational media tended to be lower in the control group (infographics) and the treatment group (web), with a comparison of poor attitude results of 60%-40%. Community attitudes towards the use of IT in improving nutrition practices showed varied responses.*

***Keywords :*** *Knowledge, Attitude, Practice of Health Nutrition*


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## INTRODUCTION

Nutritional problems are still a serious challenge in global public health, including in Indonesia. Malnutrition, poor nutrition, and unbalanced nutritional consumption often contribute to various health problems, such as stunting in children, obesity, and non-communicable diseases such as diabetes and hypertension (Ministry of Health, 2018). One of the main factors influencing people's nutritional behavior is the low knowledge and awareness of the importance of a healthy and balanced diet. (Ministry of Health, 2024).

In today's digital era, information and communication technology (ICT) has great potential to be an effective tool in disseminating nutrition and health information more widely and easily accessible. The internet, social media, health applications, and other digital devices offer opportunities to educate the public about the importance of good nutrition and practical ways to implement a healthy diet (Diskominfo, 2024). According to data from We Are Social (2023), more than 73% of Indonesia's population are active internet users, indicating that ICT can be a powerful tool for disseminating health information (Kemp, 2024; Thompson, 2024).

Various digital platforms, such as mobile applications, educational videos, and social media campaigns, have been shown to increase health awareness and practices among the public. Nutrition education, either through applications specifically designed to monitor diet or through health campaigns on social media, can change public perceptions about the importance of a balanced nutritional intake (Firman, 2023; Rizal Mutaqin et al., 2024; Suri & Irwansyah, 2021). In addition, ICT allows for more interactive communication between the public and health experts, so that the public can more easily obtain valid information that suits their needs.

However, despite the enormous potential of ICT in increasing nutritional awareness, there are still challenges related to accessibility, digital literacy, and the quality of information disseminated. Therefore, in-depth research is needed to understand the extent to which ICT has played a role in increasing nutritional awareness and practices in the community, as well as what factors can optimize the role of this technology in public health efforts.

This study aims to explore the role of ICT in improving community nutrition awareness and practices, and to analyze how the use of technology can support nutrition interventions more effectively.

## METHOD

This study used quantitative and qualitative approaches (mixed methods). The quantitative approach was used to measure the extent to which the use of information and communication technology influences nutritional awareness and practices in the community. The qualitative approach was used to gain a deeper understanding of the experiences, perceptions, and barriers experienced by the community and health workers in using ICT for nutrition education. Some exploration techniques that can be used are in-depth interviews to obtain in-depth information about personal experiences, perceptions and barriers from respondents related to ICT users in nutrition education. Conducting focus group discussions, understanding shared perceptions from the community and health workers and the barriers faced in using ICT for nutrition education.

Conducting document or digital content analysis, the aim of exploring materials delivered through ICT in nutrition education to assess quality, content, and possible technical barriers..

The research population is the general public of productive age (18-50 years) who have access to and use information technology. This study included people aged 18 to 50 who had access and were able to use information technology to search for information about nutrition and health. Those who had never used information technology (ICT) as a source of information and did not have internet access were excluded.

The sampling technique used a purposive sampling method to ensure that the research subjects had used ICT in the context of nutrition education. This study was conducted using a google form that was shared on social media. The research sample included 10 respondents carried out at the Batang Kuranji Health Center in June 2024. There were two groups, namely the intervention group (n = 5) and the control group (n = 5). The intervention group was given a website about nutrition knowledge and practices, while the control group was given infographics. The intervention group was gathered in one whatsapp group that was sent information about nutrition and healthy practices via the website.

The quantitative instrument is a questionnaire consisting of 4 sub-questions related to the use of technology (internet, social media, health applications), nutritional knowledge, nutritional awareness, and daily nutritional practices. A 5-point Likert scale is used to measure the level of nutritional awareness and practice. The qualitative instrument is a semi-structured interview guide used to explore in-depth information about user experiences in utilizing ICT to improve nutritional knowledge and practices, as well as the obstacles they face.

Quantitative data from the questionnaire were analyzed using descriptive and inferential statistics. Descriptive statistical analysis was used to describe the characteristics of respondents and patterns of ICT use in nutrition education. While inferential statistical analysis, such as linear regression or correlation tests, was used to see the relationship between ICT use and nutritional awareness and practices. Data from in-depth interviews This method involves open-ended questions to conduct direct interviews between respondents and researchers. Questions are structured in a semi-structured manner, which allows for flexibility and deepening on the research topic. Offline in-depth interviews were conducted in person at a location convenient to the respondent, such as their home, workplace, or other social environment. Thematic analysis techniques were used to further explore the meaning of the offline in-depth interviews. Relevant themes, such as experiences, perceptions, and challenges related to the use of ICT in nutrition education, were identified through this analysis, and also helped to systematically interpret the data. The steps of analysis include coding, grouping themes, and interpreting data to understand the factors that influence the effectiveness of ICT use in nutrition education.

This study complies with the principles of research ethics, including obtaining approval from the ethics committee in the form of compliance with the principles of research ethics, informed consent, participant confidentiality and privacy, participant freedom, minimal risk to participants, transparency in data use, monitoring and evaluation of research, special considerations in ICT users, the obligation to report conflicts of interest, compliance with applicable regulations, consent from

all respondents, and maintaining the confidentiality of respondent data. Respondents will also be given the right to withdraw from this study at any time.withoutconsequence.

## RESULTS

### 1. Information Technology Knowledge Regarding Health Nutrition Before and After

**Table1. Information Technology Knowledge Regarding Health Nutrition Before and After**

| Knowledge | Pre-test | | | | Post test | | | | *p-value* |
|---|---|---|---|---|---|---|---|---|---|
| | Not enough. | | Good. | | Not enough. | | Good. | | |
| | n | % | n | % | n | % | n | % | |
| Control | 2 | 40 | 3 | 60 | 0 | 0 | 5 | 100 | 0.03 |
| Maintenance | 1 | 20 | 4 | 80 | 0 | 0 | 5 | 100 | 0.01 |

### 2. Attitudes Towards Information Technology Regarding Health Nutrition Before and After

**Table 2. Attitudes Towards Information Technology Regarding Health Nutrition Before and After**

| Attitude | Pre-test | | | | Post test | | | | *p-value* |
|---|---|---|---|---|---|---|---|---|---|
| | Not enough. | | Good. | | Not enough. | | Good. | | |
| | n | % | n | % | n | % | n | % | |
| Control | 3 | 60 | 2 | 40 | 0 | 0 | 5 | 100 | 0.08 |
| Maintenance | 3 | 60 | 2 | 50 | 0 | 0 | 5 | 100 | 0.05 |

### 3. Health Nutrition Practices Using Paired Sample t-test

**Table 3. Health Nutrition Practices Using Paired Sample t-test**

| Exercise | Pre-test | | | | Post test | | | | *p-value* |
|---|---|---|---|---|---|---|---|---|---|
| | Not enough. | | Good. | | Not enough. | | Good. | | |
| | n | % | n | % | n | % | n | % | |
| Control | 3 | 60 | 2 | 40 | 0 | 0 | 5 | 100 | 0.016 |
| Maintenance | 3 | 60 | 2 | 50 | 0 | 0 | 5 | 100 | 0.004 |

### 4. Interviews with Respondents on Knowledge of Information Technology and Health Nutrition

Through interviews with several respondents, it was found that the initial knowledge of healthy nutrition among the community tends to be low, especially regarding the use of information technology (IT). Most respondents only knew basic information about nutrition and were unfamiliar with the use of apps or digital platforms that provide nutrition-related information. However, after training and socialisation on the use of IT, there was a significant increase in knowledge. Some respondents admitted that it was easier to access nutrition information through health apps or websites that provide nutrition guidance. Respondent 1 stated, "I just found out that there are apps that can tell me about healthy eating. Before, I only knew from friends or family."

**5. Respondent Interviews on Attitudes Towards Information Technology in Nutrition Practices**

People's attitudes towards the use of IT in improving nutrition practices showed varied responses. Initially, some respondents were sceptical about the effectiveness of IT in changing their nutrition habits. However, over time, many of them began to show positive attitudes and were motivated to use IT as a tool in practising healthy eating. Respondent 2 said, "I used to think these apps were not that important, but after I tried them, I found that they can help me organise my meals and see my daily nutritional intake."

**6. Interview Respondents' Changes in Nutrition Practices Through Information Technology**

Interviews also revealed tangible changes in people's nutrition practices after they were exposed to information through IT. Respondents recognised that easy access to nutrition information through technology, such as health apps and websites, helped them to be more disciplined in following a healthy diet. Respondents who previously tended to neglect their diet now pay more attention to what they consume. Respondent 3 shared, "Before this app, I used to eat carelessly, but now I am more conscious about the nutrition of the food I consume every day."

## DISCUSSION

### 1. Knowledge

Table 1 provides important insights into how health nutrition knowledge can be significantly improved through the use of educational media, such as infographics and web-based platforms. The study revealed that both methods contributed to a significant increase in participants' knowledge, underscoring the effectiveness of the targeted educational intervention. In the control group, exposed to infographics, there was a marked increase in health nutrition knowledge from 60% to 100%, with a statistically significant value ($p = 0.03$). Similarly, the treatment group, using the web-based learning tool, experienced an impressive increase in knowledge, increasing from 20% to 100%, with a more significant (p) value (0.01).

These findings suggest that both educational media, both infographics and web-based platforms, effectively delivered important nutritional knowledge to participants. This improvement was reflected in the posttest results, where all participants showed an increase in the "good" knowledge category, a substantial increase from the pretest, which showed a distribution of participants with varying levels of knowledge, including some in the "poor" category.

The broader implications of this study emphasize the importance of nutrition education in improving public health (Dewi et al., 2023). Educating individuals about the role of nutrition, daily nutrient requirements, and the consequences of nutrient imbalances (either deficiencies or excesses) has a direct impact on health outcomes. Other studies have shown that inadequate nutrient intake can lead to a variety of health problems among adolescents. Therefore, it is essential to provide appropriate nutrition education to this age group. Understanding the nutritional value of food can encourage adolescents to adopt healthier eating habits (Sari et al, 2023)

It is essential to address ingrained dietary habits, many of which originate from family practices and are formed during childhood, as these can have long-term impacts on a person's nutritional status and health (Scaglioni, 2018).

**2. Attitude**

Table 2 presents the findings regarding attitudes towards healthy nutrition. The results showed that before the introduction of educational media, attitudes towards healthy nutrition were relatively low in both the control group (infographics) and the treatment group (web). However, after the implementation of educational media, there was a significant increase in attitudes towards healthy nutrition in both groups. The control group (infographics) and the treatment group (web) showed a significant increase in positive attitudes, as reflected in the percentage changes observed in the results of the study.

This increase highlights the effectiveness of both educational tools in shaping positive attitudes toward health nutrition. This underscores the idea that educational interventions, regardless of the medium, can significantly influence an individual's attitude toward nutrition (Akhiryani, Kekalih, Khusun, 2023). Furthermore, this study supports the idea that knowledge and education—whether acquired through visual means, auditory learning, or personal experience—play an important role in shaping one's perspectives and behaviors, although they are not the sole determinants.

Balanced nutrition education, as demonstrated by this study, equips respondents with the ability to make informed decisions regarding their dietary choices, aligning their habits with recommended nutritional guidelines. By providing accurate and comprehensive nutritional information, educational media enables individuals to understand the importance of nutrition and empowers them to implement healthier eating patterns in their daily lives (Femyliati, Fikri, & Andriani, 2023). This, in turn, helps foster long-term commitment to healthier lifestyle practices.

**3. Health Nutrition Practices**

Table 3 illustrates the results of healthy nutrition practices that after the provision of educational media, the results increased. The belief that the body needs healthy food is very important, especially when combined with an understanding of balanced nutrition. This depends on a person's desire to change unhealthy eating habits to healthier foods. In addition, a person must be able and willing to regulate habits such as eating healthy foods, exercising regularly, and getting enough rest to be healthy and fit. Thus, a balanced and healthy nutritional pattern will be fulfilled. Educational media, including websites and infographics, effectively convey the importance of nutrition and help individuals understand their dietary needs. For example, a study highlighted that web-based education significantly increased balanced eating behavior among high school students, showing how digital platforms can improve knowledge and attitudes about nutrition (Lathifa, 2020). For example, nutritional education interventions have been shown to improve not only knowledge but also emotional and cognitive control among participants (Raut, 2024).

**4. The Role of Information Technology in Raising Awareness of Healthy Nutrition Practices in the Community**

From the interviews, it can be concluded that information technology plays an important role in increasing awareness and healthy nutrition practices in the community. Increased knowledge, attitudes and changes in nutrition practices through the use of IT show that the accessibility of digital information is a crucial factor in changing people's behaviour. This is consistent with technology adoption theory where acceptance and use of technology is influenced by ease of access and relevance of information. In addition, the increase in positive attitudes towards IT use after respondents experienced direct benefits in their daily lives suggests a link between perceived benefits and continued use. The use of health apps and digital platforms also enables people to be more proactive in managing their diet and general health.

This study reinforces previous findings that IT can be an effective intervention tool in health promotion, especially in nutrition. As a recommendation, IT-based health programmes should continue to be developed and expanded to cover more communities, especially in areas with limited access to conventional health information.

## CONCLUSION

There was a significant increase in nutritional knowledge in both the control group (infographics) and the treatment group (web). Respondents' knowledge before the provision of educational media was low, but after the provision of education, the majority of respondents showed an increase to the good knowledge category. Before the provision of educational media, attitudes towards nutrition tended to be less good in both groups. However, after the educational intervention, attitudes changed significantly to a more positive direction. This shows that the nutritional education provided successfully influenced respondents' views on the importance of balanced nutrition. Healthy nutritional practices also increased after the provision of educational media. This education motivated respondents to better understand the importance of healthy food and encouraged changes in healthier eating habits.

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