Jurnal Riset Kesehatan

FOOD RECALL MOBILE APPLICATION DESIGN AS A MEASURING TOOL FOR INDIVIDUAL AND FAMILY FOOD CONSUMPTION

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Abstract

The information technology development has been used to create SITAMARI (daily food record system) that can be used as an assessment that correlates with a daily intake of food or the eating habit of the society that has been designed to be easy to use, efficient, and precise. The goals of this research were to design the SITAMARI application as the learning media of the Food Consumption Survey practice of the nutrition major's students. For now, the SITAMARI application is still in the development stage and thus hasn't been launched online for a larger audience. This research used the quasi-experimental design of one group pre-test-post-test. Research subjects are 25 3rd-grade Diploma III Nutrition students, aged 18 – 25 years old, who have already understood 24 hours food recall method, and have a well-working Android smartphone. A pre-test questionnaire was given, followed respectively by the treatment and the same questionnaire as the post-test. Lastly, the Likert questionnaires about their perception after using the application were filled out. The statistical analysis using the paired sample t-test showed that t-calculated < t-table with a significant probability value of 0.00 < 0.05. It was concluded that the use of the application is effective in the students' learning. The user satisfaction survey showed the application was attractive in design and easy to use and increased knowledge in Food Consumption Survey. However, the results of the food recall calculation still need to be validated comparatively with the manual food recall format.

Keywords: *food recall; smartphone; android; online application*

1. Introduction

The food consumption survey is a series of activities measuring food consumption for individuals, families, and community groups using a systematic measurement method, assessing nutrient intake, and evaluating nutrient intake as an indirect way of assessing nutritional status (Sirajuddin, Surmita, and Astuti 2018). An individual form of food consumption survey is a food reminder or food recall (FAO 2018). The food recall method aims to describe the condition of individual nutritional intake or individual eating habits and to measure the amount of food consumed by participants in the last 24 hours (Par'i, Wiyono, and Harjatmo 2017).

Many factors can affect data quality, such as discrepancies in measuring with instruments, inappropriate data collection time, instruments that are not by the objectives, practitioners' ability to collect data on the participant's diet history, the participant's memory, the ingredients listed in the composition of the food used is not available daily for the participants and inaccurate interpretation of the results. Technological advances can be a solution to address these existing problems (Utami 2016). Advances in science and technology are currently able to support methods development for making food consumption surveys in the community easier and more efficient (Eldridge et al. 2018). Mobile is

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one of the easily available technology products, and almost all people can operate it in their daily life, especially now that mobile phones have entered the smartphone era (Afifuddin 2013).

The research conducted by (Wellard-Cole et al. 2019), using the EaT Smartphone Application for collecting food intake data in children aged 18 to 30 years shows that the method of collecting food intake using a smartphone can be one way acceptable and the results are valid for collecting food intake data. The smartphone-based food recall application is a powerful tool to determine individual nutrient intakes in the last 24 hours, and analyze the nutrients in food ingredients including energy, protein, fat, carbohydrates, fiber, and other micronutrients in addition to finding out a list of ingredients in food.

The study aimed to design a food recall application as a medium for measuring food consumption for individuals and families of the students to achieve future competencies as a dietitian.

2. Method

The research applies one group experimental design. The sample size is 25 participants, all of which are students of the Nutrition Program of Health Polytechnic of Sorong in their 3rd Grade that had participated in food consumption survey practice and understood the 24-hour food recall method, and have a well-working Android phone. They were given the SITAMARI application on their Android mobile phones that has been developed by Android Programmer. SITAMARI is the abbreviation for *Sistem Pencatatan Makanan Harian* (Daily Food Record System). The SITAMARI application design includes several menus including a welcome screen menu, profile, body mass index (BMI) calculator, recommended dietary allowance (RDA) calculator, food diary, and consumption history.

Primary data collection was carried out by conducting a pre-test to evaluate the participants' knowledge of the food recall method, followed by conducting a demonstration of how to operate the SITAMARI application by the instructors. Next, a post-test was conducted to evaluate the participants' knowledge of the food recall method, followed by a survey to measure their satisfaction with the SITAMARI application. The questions were tested for validity using product-moment correlation or Pearson correlation (Purwanto 2018). The significance value of 5% was applied to the r table. Knowing that all the t-calculated values were bigger than 1,717, it could be concluded that the questions were valid.

Data analysis methods include univariate analysis to describe variables descriptively, and bivariate analysis using paired t-tests on the results of pre-and-post-tests to see the effectiveness of using the SITAMARI application in the learning process (Sugiyono 2021).

3. Result and Discussion

SITAMARI Application

The SITAMARI application is made with Android Studio using a laptop with a minimum RAM specification of 3GB. An Android application is made in five main steps, i.e.:
1. Create a project in Android Studio
2. Creating Interfaces
4. Request Data Adapter
5. Display data using *RecyclerView*
6. Displays a collection of databases using a dataset (Kurniawan 2020).

The making of the application followed the waterfall model process which is developed from the systematic and sequential information system (Sasmito 2017). Some features that have been designed in the SITAMARI application include:
1. Profile menu, to fill application user profile.
2. Nutritional info menu, containing food portion information in the form of food photos. This is used as a tool for interviewers in estimating the size and weight of food or drink.
3. Add a participant menu, to add participants and fill in the participant's data.
4. BMI calculator menu, to find out the participant's body mass index based on the inputted data.
5. RDA calculator menu, which is created according to the AKG table (*Angka Kecukupan Gizi* or Recommended Dietary Allowance) issued by the Health Ministry of Indonesia (Kementerian Kesehatan RI 2019).
6. Food input menu is the core feature of the SITAMARI application. This is where the participants input the data on their daily food intakes in the form of weight and type of food ingredients according to TKPI (*Tabel Komposisi Pangan Indonesia*/ Indonesian Food Composition Table) issued by the Health Ministry of Indonesia (Kementerian Kesehatan, Indonesia Kementerian Kesehatan Direktorat Jenderal Kesehatan Masyarakat Tabel Komposisi Pangan Indonesia, and Kesehatan 2018).

7. History menu, to see the total analysis of nutrients at each mealtime (morning, afternoon, evening, and interlude)

Furthermore, the results of the analysis can be used as a part of nutritional education for the community to improve a better diet according to balanced nutrition guidelines (Citra Palupi et al. 2022).
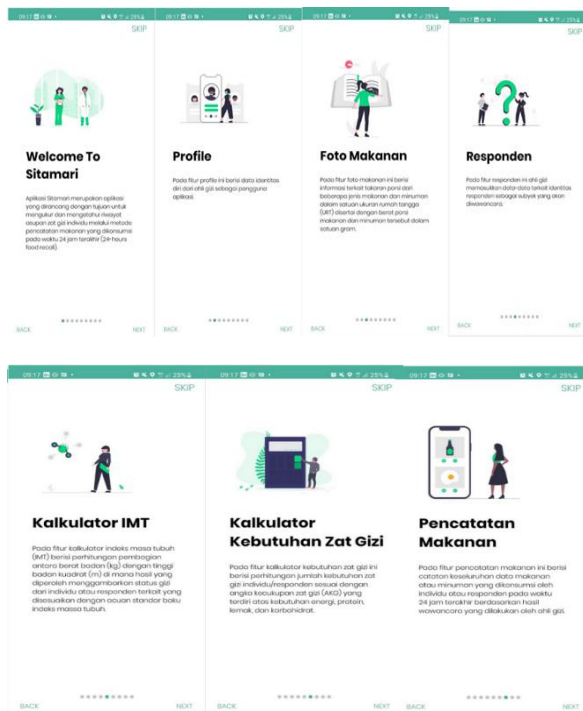

Figure 1. Some features of the SITAMARI Application

Effectiveness of SITAMARI Application

A pre-test of 10 questions was given online to the participants before starting the socialization of using the application. The treatment was sequentially given in the form of a SITAMARI trial. Next, a post-test was carried out on the results of using the application. The results showed an average of 56.4 for pre-test and 77.6 for post-test, or a 45.3% increase.

In addition, the statistical analysis revealed a correlation coefficient value of 0.049 with a significant value of 0.815. With a significant value higher than that of the probability (0.815 > 0.05), no relationship can be said available between the pre-test and post-test variables. Meanwhile, the paired-samples test output table revealed a sig. value (2-tailed) of 0.00 < 0.05, so H0 is rejected and H1 is accepted (Sugiyono 2021). Conclusively, a difference exists in the average results of the trials between the pre-test and the post-test application. It means that the SITAMARI application is effective in increasing food consumption survey knowledge for the students. This is in line with Akmal and Susanto's research (Akmal and Susanto 2018), which found that the use of smartphone-based learning applications was effective in improving the ability of class XI IPS students at SMA N 7 Banjarmasin in local history lessons about physical revolution. In Surmita, et al., (2019) with their research about Food Digital Map, an online android used as a guidance for teenage girls' food consumption gave a significant effect on balancing nutritional intakes and carbohydrate requirements (Surmita, Widartika, and Fitria 2019).

Of the 25 participants who filled out the survey using the SITAMARI application, 67% of participants strongly agreed and 23% agreed that its design was attractive. Seventy-three percent of them strongly agreed and 26% agreed with the questions. Only one question did not receive 'agree' for the answer, which is the question regarding the installation process of the SITAMARI application.

This is due to the registration process for new users of the SITAMARI application using OTP (one-time-password) verification. Being a code sent via SMS, OTP often takes a long time to obtain and is highly dependent on the quality of the user's internet network signal. From the survey results, it can be concluded that the SITAMARI application is easy to use and understand and can be used as a tool for students to carry out 24-hour food recall.

Applications programmed as supporting media can make learning more effective depending on the intended use (Amanda et al. 2020). It is hoped that the SITAMARI application can be a learning tool for the Food Consumption Survey, especially in the COVID-19 pandemic situation which limits community activities, including students' practices in class. With the rapid development of technology as it is today, teenagers are becoming familiar with Android-based smartphones with various applications embedded in them (Muflih and Puniawan 2017). Thus, by making an android application to digitize food recall, it is hoped that it can improve students' abilities in conducting food consumption surveys using the food recall method.

Table 1. Statistic Calculation Results of Effectiveness Test

Treatment	n	Average	Std. Dev	Correlation	df	T	Paired T-Test Significance
Pretest	25	56.40	13.53	0.815	24	-6.093	0.000
Post-test	25	77.60	11.05				

Table 2. Participant Perception of The SITAMARI Application

Question Group	Strongly Agree	Agree	Slightly Agree	Disagree	Strongly Disagree
Is the SITAMARI Application design attractive?	67%	33%	0%	0%	0%
Is SITAMARI Application easy to use?	73%	26%	1%	0%	0%

4. Conclusion and Suggestion

An Android-based Daily Food Recording System application has been developed as a medium for measuring food consumption. From the survey results on the use of the application, 67% of the participants strongly agree and the remaining 23% agree that the application design is attractive. 73% of participants strongly agree, and the 26% participants agree that the SITAMARI application is easy to use. From the results of statistical analysis, it has been proven that the use of the SITAMARI application has a positive impact on participants' understanding of the Food Consumption Survey. However, it is necessary to test the validity of the calculations on the SITAMARI application menus by comparing them with food recall manually and it is necessary to develop applications so that they can be used offline and used on operating systems other than Android.

5. Acknowledgments

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