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# Community Readiness in Utilization of Android Application (mHealth) for Increasing Healthy Family Index

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**ABSTRACT**

SIPISPeKa G-2 was introduced as an innovative mHealth solution to bridge this gap by enabling real-time communication between families and health workers. This study aims to evaluate the effectiveness of the SIPISPeKa G-2 mHealth application in improving the Healthy Family Index (IKS) in the work area of Kotabumi 2 Health Center, North Lampung. The quasi-experimental pre-test and post-test design was carried out on 150 families who were categorized as unhealthy based on 12 IKS indicators. The study was conducted from February to November, with a trial period of 3 months. Sampling using the Multi-Stage method, the results showed a significant increase in the Healthy Family Index (IKS) from an IKS value of 0.64 to 0.79 ($p < 0.05$). The most widely accessed services were smoking cessation services (29.01%), National Health Insurance 16.41%), and hypertension (16.03%). However, 16.03% of consultations were deemed irrelevant, indicating the need for further education. This study concluded that the mHealth application can effectively improve family health, with recommendations for optimization and broader implementation..



## INTRODUCTION

The Healthy Indonesia Program with Approach Family (PIS-PK) was launched in 2016. This program is one of the 5th Nawa Cita Cita, namely Increasing the Quality of Life of Indonesian People. This program is supported by sectoral programs, namely the Smart Indonesia Program, the Working Indonesia Program, and the Prosperous Indonesia Program. The Healthy Indonesia Program has furthermore become the main program of Health Development.

Ministry health has make a application family healthy, which is used for data collection health family use health protocols by the family counselor (can assisted by cadre health), making and managing health center database by power health center data manager, in the form of PIS-PK. However, this use of the PIS-PK application has not yet been facilitated for on-stage services/interventions for families with the Healthy Family Index (IKS), which is problematic.

The Healthy Family Index (IKS) is a core measurement in Indonesia's PIS-PK program. Despite national efforts, North Lampung still faces challenges with low percentages in key health indicators. SIPISPeKa G-2 was introduced as an innovative mHealth solution to bridge this gap by enabling real-time communication between families and health workers. This study evaluated the effectiveness of the application and its potential to improve health outcomes.

This study aims to determine the effectiveness of the SIPISPeKa G-2 Application on the Healthy Family Index (IKS) in the Kotabumi 2 Health Center Working Area, with the following

specific objectives: assessing stakeholder readiness in implementing the mHealth application (SIPISPeKa G-2), evaluating the frequency distribution of types of services used in the mHealth application (SIPISPeKa G-2), assessing the difference in the Healthy Family Index (IKS) before and after using the SIPISPeKa G-2 mHealth application.

## METHOD

The quasi-experimental pre-test and post-test design was conducted involving 150 families who were classified as unhealthy. The development of this prototype was implemented in stages. Trial of mHealth SIPISPeKa G-2 on users (community) in the health center work area for 3 months. Then, to continue testing the effectiveness, SIPISPeKa G-2 was used to improve the Healthy Family Index (IKS). Data collection included initial IKS measurements.

The subjects in this study were material experts and media experts who were lecturers at the Department of Computer Science, Universitas Lampung, PIS-PK experts of the North Lampung health services, and families with an Index family in category unhealthy in the area community health Center Kotabumi. Retrieval sample family unhealthy with multi-stage sample method with stages as following: 1) Sample taken from all over sub-district, 2) Every ward determined by the selected neighbourhood unit, 3) From the selected neighbourhood unit determined selected neighbourhood unit, 4) From the selected neighbourhood unit, sample determined with method purposive sampling, with condition: family with category family unhealthy, willing become respondent and have android communication and capable operate it. Data were analyzed using a paired t-test. This research has obtained ethical clearance from the Research Ethics Committee of the Tanjung Karang Ministry of Health Polytechnic with the number 280/KEPK-TJK/VII/2020.

## RESULTS

### Readiness of health center officers

Community health center officers play the following roles:

- The operator in charge of managing the results of filling in the Healthy Family Index (IKS), so that the IKS table is obtained for each period (6 months), this data will be used as input for the PIS-PK application. The community health center has not followed up on the results of this IKS as material for periodic IKS evaluation.
- The health promotion media manager has a dashboard for health promotion media and a periodic health center service schedule dashboard. Still, health center officers have not utilized the health promotion dashboard optimally, as can be seen from the absence of additions/changes to the dashboard's display periodically.
- Consultant, 90% of the questions asked on the question-and-answer media in SIPISPeKa were answered by the Health Center officers, but as many as 10% of the questions were not answered by the health officers.

### Readiness of community

As many as 63% of 150 respondents were enthusiastic about using the SIPISPeKa Application as a communication medium with health workers at the community health center. However, there were still (16.03%) substances asked/consulted to health workers that were not following the issues in the indicators of family problems. The substance asked as many as 76 questions about how to quit smoking. The following is the consultation response table on the consultation dashboard.

**Table 1. Compliance of responses to problems in healthy family index (IKS)**

| Compliance with the Problem Family | f | % |
|---|---|---|
| In accordance with | 120 | 46 |
| No in accordance | 142 | 54 |

Table 1 shows that regarding the suitability of the PIS-PK indicator theme, namely family problems (respondents), 54% of respondents asked questions that did not correspond to the issues in their families.

**Frequency distribution of service types used in the SIPISPeKa G-2 application**

**Table 2. Consultation responses based on PIS-PK indicators**

| Theme Service | f | % |
|---|---|---|
| Family planning | 25 | 9.54 |
| Service giving birth | 4 | 1.53 |
| Immunization baby | 5 | 1.91 |
| Counseling breast-feed | 9 | 3.44 |
| Growth and development in children | 10 | 3.82 |
| Tuberculosis | 4 | 1.53 |
| Hypertension | 42 | 16.03 |
| Mental disorders | 2 | 0.76 |
| Consultation smoke | 76 | 29.01 |
| JKN consultation | 43 | 16.41 |
| Clean water facilities | 0 | 0.00 |
| Healthy toilet | 0 | 0.00 |
| Outside theme | 42 | 16.03 |
| Amount | 262 | 100 |

Table 2 can be seen that the most responded questions were about the theme of smoking as many as 76 questions (29.01%), questions about JKN consultation as many as 43 questions (16.41%), questions about hypertension as many as 42 questions (16.03%) and questions outside the PIS-PK theme as many as 42 questions (16.03%). None of the questions that arose were about Clean Water Facilities and Healthy Toilets.

**Effectiveness of using the SIPISPeKa G-2 application in reducing the healthy family index**

**Table 3. The t-test to assess the effectiveness of using the SIPISPeKa G-2 application**

| Test | N | Statistics Descriptive | Paired T-test | | |
|---|---|---|---|---|---|
| | | *M (Std. D)* | T | df | Sig (2-tails) |
| Pre Test | 157 | 0.64 | 11.79 | 156 | 0.000 |
| Post Test | 157 | 0.79 | | | |

Table 3 shows the results of the Paired Sample T-Test test showing a significant difference between the pre and post test values with a significance value (2-tailed) p=0.000<0.05, this means that Hypothesis 0 (Ho) of this study is rejected and the alternative hypothesis (Ha) is accepted where there is a striking difference between the two tests. This means that the Use of the SIPISPeKa G-2 Application is effective in increasing the healthy family index.

## DISCUSSION

**The utilization of the SIPISPeKa G-2 application by stakeholders**

The study's results indicate that the readiness of stakeholders involved in operating SIPISPeKa G-2 is classified as good based on the communication activities that occurred during the trial. Both operators and consultants have used and utilized the SIPISPeKa G-2 Application by responding to questions asked by respondents. However, the Health Promotion Dashboard has not been utilized properly.

Readiness is the willingness to respond or react; without such readiness or desire, the mental process will not occur (Slameto, 2013). In Bloom's taxonomy, it is stated that 3 components play a role in performance in carrying out a task, namely the cognitive domain, the affective domain, and the psychomotor domain. The cognitive domain includes learning outcomes related to memory, knowledge, and intellectual abilities; the affective domain includes learning outcomes related to attitudes, values, feelings, and interests; and the psychomotor domain includes learning outcomes related to physical skills, movements supported by psychic abilities (Purwanto, 2006).

Bloom's Theory above shows that readiness can only be achieved through learning and training efforts. To utilize the SIPISPeKa G-2 application to support stakeholders in implementing the PIS-PK program, learning and training efforts are needed, accompanied by interest and awareness of the need to improve community services through optimization of the PIS-PK program.

Maria Fagerstrom's research shows that building trust in healthcare organizations can contribute to mHealth adoption readiness. Some aspects that are considered to contribute include: (a) how health data is stored and managed, (b) how mHealth aligns with the organization's current way of working, (c) how mHealth adoption is organized, and (d) how the team facilitates mHealth use. In the case of SIPISPeKa G-2 use, it depends on how the Health Center Team facilitates its use. Poor management of health-related data and lack of governance for mHealth implementation have been described as barriers to mHealth implementation readiness in healthcare organizations (Fagerstom et al., 2023).

This study shows that in terms of quantity, there has been public interest in mHealth. However, in terms of quality, this interest has not shown a relationship with the health problems faced by their families, whereas many, such as 152 (54%) of the questions asked, did not match the problems and themes in the PIS-PK. In developing countries in rural areas such as Bangladesh, community members, community leaders, and health service providers expressed interest in using mHealth. Awareness of mHealth and its benefits is still low among less educated people. Participants who have used mHealth are attracted by the speed of access to quality health service providers, saving time, and low costs. However, some groups of people prefer direct services such as face-to-face consultations, especially for illiterate people, who have poor language skills, lack confidence, and are less proficient in technology. This is identified as a barrier to mHealth use. However, a sense of ownership, evidence of usefulness, positive attitudes towards mHealth use, and intentions to use mHealth in the future are driving forces in adopting mHealth services (Khatun et al., 2016).

SIPISPeKa G-2 is a development of the SIPISPeKa application (Aliyanto et al., 2021), which was developed based on Android (Mobile Health). This development is expected to bring closer communication between health workers and patients. Mobile Health (mHealth) is designed to support the Healthy Indonesia Program with a Family Approach (PIS-PK). mHealth is defined as wireless devices and sensors (including mobile phones) intended to be worn, carried, or accessed by a person during normal daily activities. mHealth is the application of this technology by consumers and service providers to monitor health status or improve health outcomes, including wireless diagnostics and clinical decision support (Santosh et al, 2013).

Implementing the Healthy Indonesia Program with a Family Approach (PIS-PK) still requires optimization. Dewi's research states that the implementation of the PIS-PK policy still needs to be optimized. The bureaucratic structure based on SOP and fragmentation still needs to be improved to be more organized and touch all lines. Resources in terms of manpower, costs, and facilities still do not fully support the implementation of PIS-PK, especially application problems that cause PIS-PK data in one of the health centers to be unable to be input into the application. Communication is not yet effective; the clarity of information provided by the health office to health centers still needs to be improved. Cross-sector support and professional organizations still need to be improved. Community participation has been involved in PIS-PK, but they do not yet know about it (Dewi, 2022).

Several studies have also revealed that there are still many obstacles to implementing PIS-PK, including communication barriers, budget constraints, and workforce limitations (Gojali et al., 2017; Ramadhan, 2017). This further clarifies that PIS-PK requires technological support to

overcome these obstacles so that it can run as expected. mHealth is expected to be a solution to minimize the obstacles that occur. (Berrouiguet et al., 2016; Kodama & Sengoku, 2022).

**Consultation services used in SIPISPeKa G-2**

The study's results on the mHealth SIPISPeKa G2 application showed that the most responses to questions were on the smoking theme with 76 questions (29.01%). In contrast, in the data from the North Lampung Health Service, the problem of smoking was identified as much as 38.83%. Of the 12 PIS-PK indicators, the highest was the problem of ownership of clean water and toilets (Health Office North Lampung, 2018).

There are 12 indicators in PIS-PK, namely: (1) families participate in the Family Planning (KB) program, (2) mothers give birth in health facilities, (3) babies receive complete basic immunizations, (4) babies receive exclusive breast milk (ASI), (5) toddlers receive growth and development monitoring, (6) pulmonary tuberculosis sufferers receive standard treatment, (7) hypertension sufferers receive regular treatment, (8) mental disorders sufferers receive treatment and are not neglected, (9) no family members smoke, (10) the family has become a National Health Insurance (JKN) participant, (11) the family has access to clean water facilities, and (12) the family has access to or uses a healthy toilet. (Ministry of Health Republic Indonesia, 2015).

Several studies that analyzed the implementation of the Healthy Indonesia Program with a family approach (PIS-PK) found that there still needs to be optimization in its implementation, the availability of resources, funds, facilities and infrastructure, and methods used are inadequate so that activities do not run according to plan, minimal cross-sector involvement, problematic data collection implementation, and assessment activities that are not carried out routinely. Therefore, there is a need for high involvement and commitment from all Puskesmas officers to influence cross-sector involvement in resolving obstacles to PIS-PK data collection activities (Dewi, 2022; Febriantoputri & Oktamianti, 2020).

**Effectiveness of using the SIPISPeKa G-2 application in reducing the healthy family index**

This study found that the Utilization of mHealth SIPISPeKa G-2 is Effective in increasing the healthy family index. Several studies on the utilization of mHealth in several countries have shown that its utilization is effective in supporting the implementation of various health programs, including for the health of children with special needs (Choi & Riper, 2019), infectious disease programs, and diabetes mellitus (DM), and another Posyandu Program (Sari, 2020; Ningrum et al., 2023; Hermansyah et al., 2017).

Using mHealth has been shown to save costs, time, and effort, improve usability, and add convenience. mHealth development can use visual design to provide timely and localized services by adding clear and easy-to-read content, facilitating simple and easy navigation, providing feedback, notifying users of necessary guidance and updates, allowing users to access historical data, and evaluating the experience (Aboelmaged et al., 2021).

Implementing PIS-PK in Family Planning, Maternal and Child Health can be optimized using mHealth. Several countries have implemented mHealth programs for Mothers and Children (Hinda Ruton et al., 2018; Susanti et al., 2022; Octovia et al., 2017) .

mHealth is also widely used in tuberculosis control and eradication programs in several countries. A review of 45 articles found results from many mHealth intervention studies focused on TB treatment and drug monitoring. The results of many studies recommend implementing mHealth applications to achieve the target of TB eradication by 2025 in India (Needamangalam Balaji et al., 2022).

TB patients can accept mobile phones to support health and treatment compliance when using mHealth for TB disease interventions, such as monitoring drug intake. However, mHealth interventions must consider the language, communication method, and communication time chosen to increase use (Kumar et al., 2019). Amid limited resources, mHealth can track TB patients (Yoonhee et al., 2016)/

In lower-middle-income countries, mHealth is a behavioral change solution for the

prevention of non-communicable diseases. Although there are not many studies reporting its effectiveness in terms of clinical problems and costs (Peiris et al., 2014). Some findings also recommend using mHealth in Singapore and other Asian countries to improve holistic well-being, adapting mHealth content to the environment, and partnering with the government in health promotion efforts (Mail et al., 2023). Specifically for mental health mHealth, four ways of using mHealth have been identified, namely: as a reminder, as information, support messages, and self-monitoring procedures (Berrouiguet et al., 2016).

Rehman et al. 's research states that mHealth is quite effective in monitoring diabetes sufferers and in carrying out activities and efforts to quit smoking, although the data obtained regarding mHealth's ability to recruit participants outside of those who actively want to quit is not yet known (Hasan et al., 2017).

## CONCLUSION

Officer readiness in implementing mHealth SIPISPeKa G2, it is seen that the role of operators, media managers, and consultants is not optimal, so motivation and an understanding of the importance of using SIPISPeKa G2 are needed. The sustainability of this application will greatly depend on the role of all parties involved in its operation. The community is enthusiastic about utilizing mHealth SIPISPeKa G2, but has not focused on utilization in the Family Welfare Program with a Family Approach (PIS-PK) alone. The responses shown from several questions asked by the community, there are still do not understand the purpose of utilizing SIPISPeKa G2, namely as a medium to help solve problems of 12 healthy family indicators, but only limited to the use of communication with health workers about their health problems in general. Utilization SIPISPeKa G-2 Application effectively increases the healthy family index, which is in line with several mHealth studies in Indonesia and various parts of the world.

## AUTHOR'S STATEMENT

### Author's contribution and responsibility

**WA**: Conceptualization, funding acquisition, supervision, and authentication. **LS**: Writing original draft; authentication, visualization, review, and editing; **SS**: Supervision, validation (equivalent), visualization (equivalent), review, and editing.

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### Availability of data and materials

All data is available from the author.

### Conflict of interest

The author declares no conflict of interest.

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