The Application Design of Nifasku Based On Android for Postpartum Care and Newborn

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Abstract. Entering the puerperium, the mother will experience changes both physically and psychologically. This period is still a vulnerable period for the survival of the mother. Beside, maternal needs during the puerperium will also be different in each woman and also in each period of the puerperium. The implementation of Mobile Health Information Technology (mHealth) in improving health services for postpartum mothers is one alternative solution that can help in providing information and health education for postpartum mothers. For this reason, a health promotion media is designed in the form of applications according to the needs and contains information about childbirth care and newborn care without being limited by space, time, without having to face to face with health workers, especially midwives as milestones in service delivery. The system development method used is Extreme Programming (XP) which consists of planning, design, coding, test. This research has successfully developed an Android-based application design for postpartum care and a newborn care that can facilitate postpartum care in obtaining information about postnatal care and newborn so that the information obtained is easier and more effective.

Introduction

The post-partum period is the period immediately after childbirth that can pose great health risks for mothers and newborns [1]. However, the postpartum and postnatal periods received less attention from health providers since pregnancy and childbirth [2].

The 2017 The Percentage of women who received first puerperal care after childbirth in order births of 6 or more (65%) are lower than women who have just had their first child (88%). The percentage of women who received care after giving birth at a health care facility (94%) was higher compared to women who gave birth elsewhere (56%) [3].

Care in the postpartum period is very important. Not only for survival but also for the future of mothers and newborns. Major changes occur during this period that determines their well-being and healthy future potential [4]. Unfortunately, some mothers and newborns in low-income countries and intermediate did not receive optimal care during this period[5].

Awareness of the importance of health during childbirth in Indonesia is still not optimal due to lack of counseling, health facilities, medical personnel and inadequate infrastructure from local and central government. The approach and touch of information technology make one of the alternative solutions taken to eliminate these gaps, without disrupting the postpartum mother's lifestyle and patterns, requiring health care and education providing care for routine and quality childbirth and newborn care [6],[7].

The application of Mobile Health Information Technology (mHealth) in improving health services for postpartum mothers is one alternative solution that can help in providing health education for postpartum mothers in conducting care during childbirth and newborn care without being limited by space and time and without having to come face to face with health workers, especially midwives, as service providers [8],[9].

Based on this background, an Android-based application design was developed for the care of postpartum mothers and newborns that can facilitate postpartum mothers in obtaining information about postnatal care and newborns so that the information obtained is easier and more effective.

2. Methods
The method used in making this application is as follows:

2.1 Preliminary study stages

a. Observation

Observation is to collect data with research directly on postpartum mothers in the working area of the Tamansari Health Center in Tasikmalaya City to assess the needs of the research subjects.

b. Literature Study

At this stage, the process of finding literature by the objectives of the study is then carried out a deepening of the material on concepts and theories.

c. Interview

Data collection by asking directly to the research subject about what information is needed in the application.

2.2 Systems Development Method

Structured application development using the extreme programming method is a software engineering process that tends to use an object-oriented approach and the target of this method is a team formed on a small to medium scale and this method is also appropriate if the team is faced with unclear requirements or changes-changing requirements very quickly[10] the stages of application development [11] are as follows:

a. Planning

This stage begins by gathering the activity requirements of an application system. In the development of the Android-based Nifasku application at this stage, it starts by analyzing the system requirements and programmer needs.

b. Design

At the design stage, system modeling is done based on the needs analysis results obtained at the planning stage. Besides, modeling is also made of the appearance of the face or interface. The modeling system used is the Unified Modeling Language (UML).

c. Coding (Encoding)

This stage is the implementation of the design of a system model that has been made into a program that produces a prototype of the software. The coding uses the Kotlin Programming language and uses the Android Studio IDE.

d. Testing

This stage is the testing phase of the application that has been built, at this stage is determined by the system user and focuses on the features and functionality of the whole system and then reviewed by the system user. The method used in testing the Android-based Nifasku application is Black-Box Testing by testing the input and output produced by the system.

3. Results and Discussion

3.1 Design

Identification of problems

Based on the results of questionnaires and interviews that have been conducted, it can be identified the problems currently faced by postpartum mothers are as follows

The level of mother's knowledge about care in the puerperium is still lacking.

The level of mother's knowledge regarding newborn care is still lacking.

Awareness of the importance of health during childbirth and newborn care at this time is still not optimal.

A variety of innovative and innovative health promotion media are needed so that information on health education, especially regarding postpartum care and newborns, is easier and more effective.

3.2. Needs Analysis

Based on these problems can be identified in the content needs of the android-based childbirth application, namely: Tips for childbirth care, Newborn baby care tips, Kb for nursing mothers, Myths versus Facts on puerperal mothers and newborns.

3.2.1. Design

3.2.1.1.System Modeling
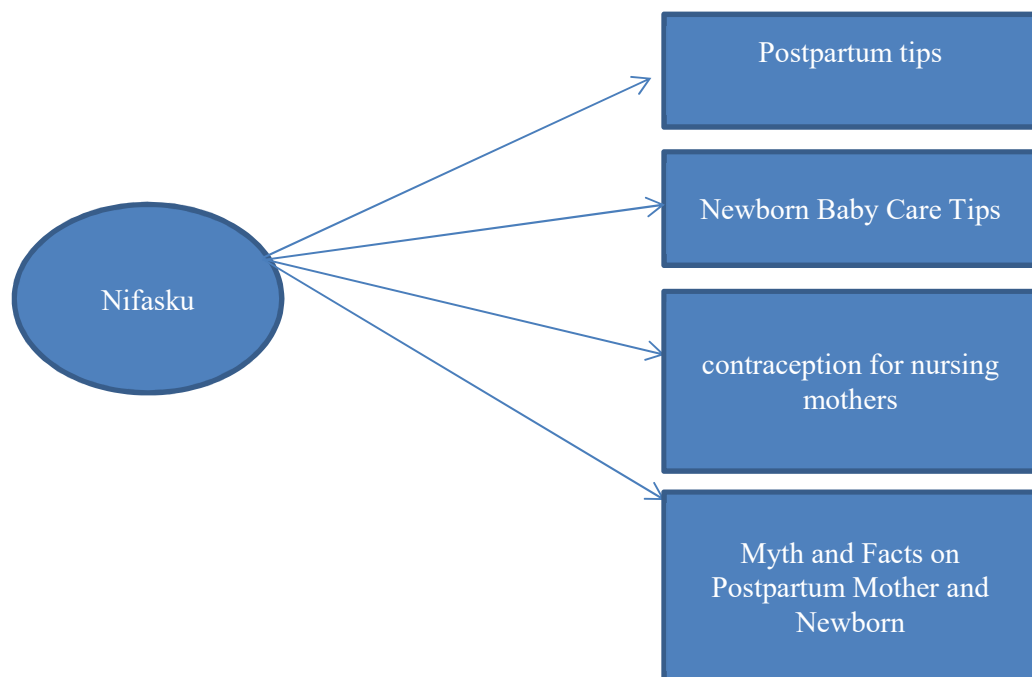
Figure 1. Use case diagram

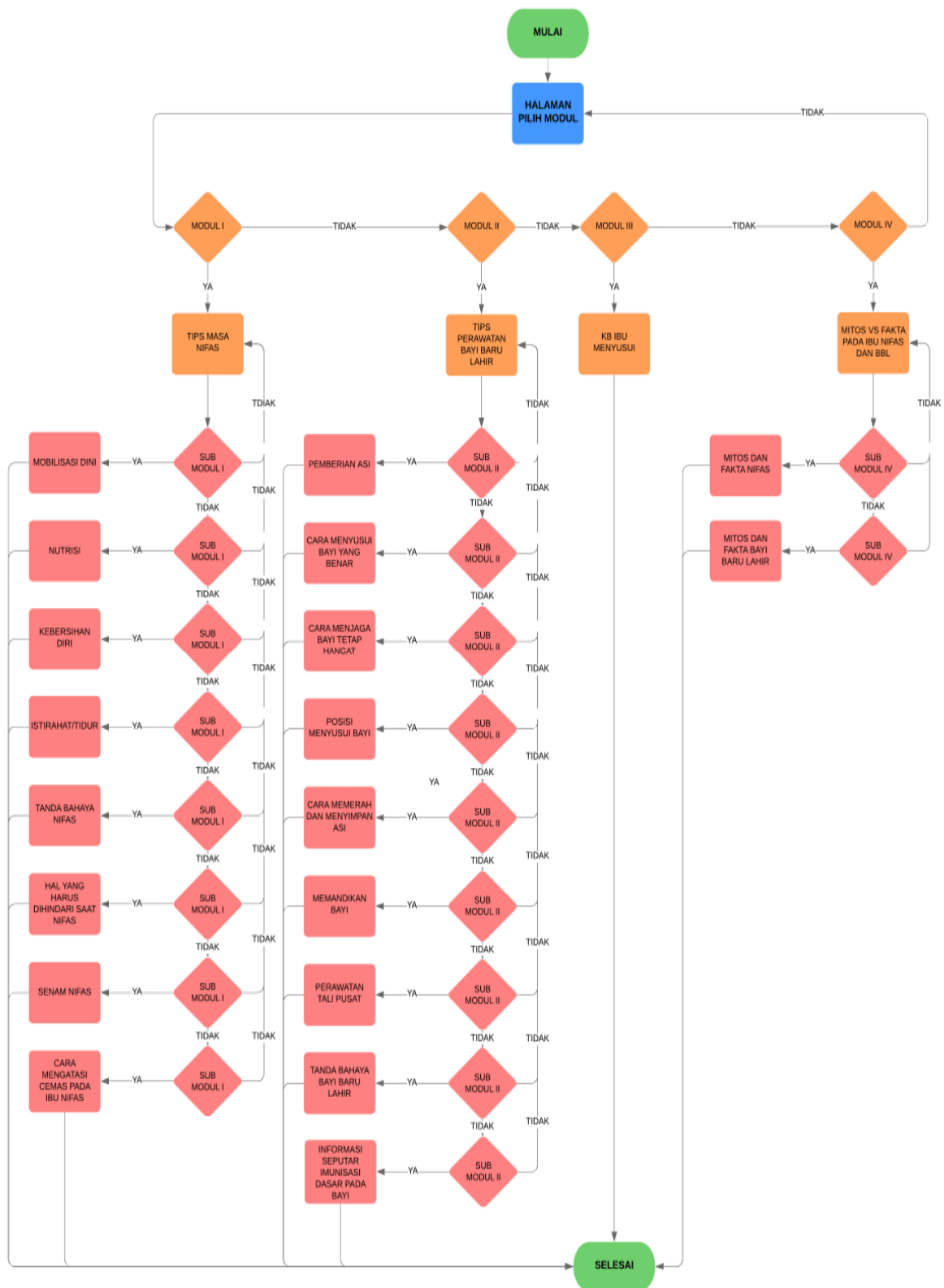**Figure 2.** Nifasku application flowchart

Table 1. Example coding

No	Code	File Name and Image	Description
| 1 | ```kotlin
class MainActivity : AppCompatActivity() {
  override fun onCreate(savedInstanceState:
Bundle?) { super.onCreate(savedInstanceState)
  setContentView(R.layout.activity_main)
    tips_pertama.setOnClickListener {
      startActivity( Intent(this,
TipsMasaNifas::class.java)) }
    tips_kedua.setOnClickListener {
      startActivity(Intent(this,
TipsPerawatanBBL::class.java))}
    tips_ketiga.setOnClickListener {
      startActivity(Intent(this,
DescInformasiKB::class.java)) }
    tips_keempat.setOnClickListener {
      startActivity(Intent(this,
MitosDanFaktaActivity::class.java)) }
    tanya_bidan.setOnClickListener {
      startActivity(Intent(this,
TanyaBidanActivity::class.java)) }}}
``` | MainActivity.kt | The file is a function of the main Menu Page. |

3.2.1.2. Testing

The purpose of this test is to find out if the Nifasku application has met the purpose of making the application, which is to provide information on childbirth and newborn care.
Per-Menu Testing

Table 2. Scenarios for the puerperium tips menu

No	Scenario	Test Case	Expected results	The Result Obtained
1	The user opens the application	The user clicks on the application	The initial screen of the application appears	As expected
2	The user selects the Puerperium Tips menu	The user clicks the Postpartum Tips button	A selection of puerperium tips appears	Following the expected results
3	The user chooses self mobilization options	The user clicks the self-mobilization options button	A button description button for self-mobilization options appears	Following the expected results
4	The user chooses the Nutrition option	The user clicks the Nutrition button	A button description for selected Nutrition choices appears	Following the expected results
5	The user chooses the Personal hygiene option	The user clicks the Personal hygiene button	The button for the description of personal hygiene choices appears	Following the expected results
6	The user selects the Rest / sleep option	The user clicks the Rest/sleep button	A button description breakdown appears for the choice of rest / sleep	Following the expected results
7	The user chooses the puerperal alert option	The user clicks the puerperal alert button	Button options description button appears. Signs of childbirth danger	Following the expected results

No	Scenario	Test Case	Expected results	The Result Obtained
8	The user chooses the choice of things to avoid during childbirth	The user clicks the button What should be avoided during childbirth	Button options description button appears. Things that should be avoided during childbirth	Following the expected results
9	The user chooses the Postpartum Gymnastics option	The user clicks the puerperal gymnastics button	Appears button description of puerperal gymnastic choice tips	Following the expected results
10	The user chooses the choice How to deal with postpartum mother anxiety	The user clicks the button for how to resolve the postpartum anxiety	Appears button description options for how to overcome postpartum mother anxiety	Following the expected results

Table 3. Scenarios for the on newborn care tips menu

No	Scenario	Test Case	Expected results	The results obtained
1	The user opens the application	The user clicks on the application	The initial screen of the application appears	As expected
2	The user selects the Newborn baby care tips menu	Users click the New baby care tips button	A selection of new baby care tips appears	As expected
3	The user chooses the ASI option	The user clicks on the ASI button	A button description button for selected breastfeeding options appears	Following the expected results
4	The user chooses the choice of how to breastfeed properly	Users click the button on how to breastfeed properly	The display appears a description of tips on how to breastfeed properly	Following the expected results
5	The user chooses the choice of how to keep the baby warm	The user clicks the button for how to keep the baby warm	A description of tips appears to keep the baby warm	Following the expected results
6	The user chooses the choice of breastfeeding position	The user clicks the nursing position button	A description of the breastfeeding position appears	Following the expected results
7	The user chooses the choice of how to express and store milk	The user clicks the button for how to express and store ASI	A description of tips on how to express and store milk is shown	Following the expected results
8	The user chooses the choice of bathing the baby	Users clicking click button bathing a baby	A description of tips for bathing a baby appears	Following the expected results
9	The user chooses the umbilical cord treatment options	The user clicks on the umbilical cord care button	The display appears a description of umbilical cord care tips	Following the expected results
10	The user chooses the newborn danger alert option	The user clicks the newborn danger button	A description of the danger signs for newborns appears	Following the expected results
11	The user chooses the choice of information about basic immunization in infants	Users click the information button about basic immunization in infants	A description of the information about basic immunization in infants appears	Following the expected results

Table 4. Scenario contraception menu tests for nursing mothers

No	Scenario	Test Case	Expected results	The results obtained
1	The user opens the application	The user clicks on the application	The initial screen of the application appears	As expected
2	The user selects the Kb menu for nursing mothers	Users click the KB Tips button for nursing mothers	A description of KB information for breastfeeding mothers appears	In accordance with the expected results

Table 5. Scenarios test the myth menu versus facts in the puerperium and newborns

No	Scenario	Test Case	Expected results	The results obtained
1	The user opens the application	The user clicks on the application	The initial screen of the application appears	As expected
2	The user chooses the Myth and Facts menu on postpartum and BBL mothers	The user clicks the Myth and Fact button on the puerperal mother and BBL	The choice of myths and facts of the puerperal mother and BBL	In accordance with the expected results
3	The user chooses the Myth and facts of puerperal mothers	The user clicks the Myth and facts, postpartum mother	A description of the myths and facts of the puerperal mother appeared	In accordance with the expected results
4	Users choose the Myth and facts of newborn choices	Users click the Myth button and the facts of the newborn	A description of the myths and facts of the newborn baby appears	In accordance with the expected results

4. Conclusions and Recommendations

Based on the results of the study, it can be concluded that the android-based puerperal application developed in the cellphone version 5 Lollipop can be a means of health education media about childbirth and newborn care information so that the information obtained is easier and more effective.

Recomendations for the development of this application is that it is necessary to improve the features of the postpartum application with three-dimensional simulations, videos and the consultation feature with midwives.

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