Implementation of mobile IMCI (Integrated Management of Childhood Illness) at Primary Health Care

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Abstract. The high infant and under-five mortality rate in Indonesia in 2015 reached 22 per 1000 births and 26 per 1000 live births respectively. The cause of death is infection. The effort to be done is with Integrated Management of Childhood Illness (IMCI). The objective of the study is implementation Mobile IMCI (Integrated Management of Childhood Illness) Application that can be used as a personal care in the management of sick toddlers. This research is a qualitative study. Respondent of this research are administrator, health worker patients who have toddler. Evaluation of implementation Mobil IMCI by EUC Satisfaction. This research had conducted from June to August 2018. All respondents have been satisfied with the IMCI mobile application. Mobile IMCI can be expected to continue to be implemented and evaluated regularly to improve the system.

1. Introduction
The infant mortality rate and under-five mortality rate in Indonesia in 2015 amounted to 22.23 per 1000 live births and 26.29 per 1000 live births [1]. The leading cause of the mortality of infants under 5 years old are acute respiratory infections, fever, and diarrhea [2]. Efforts to overcome children health problem can be done by improving health care management through the utilization of health personnel [3]. Management in health services aimed at empowering health professionals is the implementation of Integrated Management of Childhood Illness (IMCI) or Integrated Management of Childhood Illness (IMCI).

IMCI is an integrated or integrated approach in the management of sick toddlers with a focus on the health of children aged 0-59 months or less than 5 years as a whole. The IMCI is implemented at the first level health care facility or health centre [4]. Nurses and Midwives at the first level health care facilities are given the authority to treat diseases in children under five through IMCI under the supervision of doctors who have been given training. 4-5 The implementation of IMCI consists of assessing infants less than 2 months and children aged 2-59 months, determine the classification, determine the action / treatment, counseling, follow-up services.

The IMCI was first socialized by WHO (World Health Organization) in Indonesia in 1996 and in 2003 IMCI was recommended by the Ministry of Health to be implemented in all primary health care [5]. Efforts to support the successful implementation of IMCI, the Ministry of Health collaborated with WHO to implement ICATT (IMCI Computerized Adaptation and Training Tool) as a computer based IMCI training media.
Based on the health minister's regulation no. 70 of 2013 the implementation of IMCI can involve the participation of the community to improve access to services for sick children in areas where access to health services is difficult. Community participation is one of the determinants of the successful implementation of government programs[6]. The implementation of IMCI can get maximum results if it involves the community. The cause of child mortality can be minimized if the community is able to independently do first aid for sick toddlers. The steps in IMCI for the management of sick toddlers can be utilized by the general public as a guide for early detection and first aid for sick toddlers.

Information technology in Indonesia is growing rapidly. Indonesia ranks 6th out of 25 countries of internet users and around 65 million people or 25% of the total population of Indonesia are smartphone users [7][8]. IMCI development has utilized technology information in the form of ICATT as a computer-based IMCI training facility. In addition to ICATT, the development of IMCI by utilizing information technology can be done through the design and manufacture of IMCI applications as sick toddler personal care. The IMCI application design, it is expected that the wider community can implement sick toddler management in the management chart independently. The design of the IMCI application is done by the waterfall method which is the needs analysis and system design. The IMCI application design is designed according to the needs of users and guided by the IMCI chart, which includes assessment, classification, action / treatment, and counseling. The IMCI application was made based on Android so that health workers are more flexible in using. The objective of the study was implementation Mobile IMCI (Integrated Management of Childhood Illness) Application that is used as a personal care in the management of sick toddlers. The benefits of this study are Community Empowerment in the management of sick toddlers through the Android-based IMCI application (Integrated Management of Childhood Illness) as a sick personal care toddler. Increasing the knowledge and skills of the community in the management of sick toddlers Suppress the amount of pain in children under 5 years of age.

2. Literature Review

a. Integrated Management of Childhood Illness (IMCI)

Integrated management of sick toddlers (IMCI) is an integrated / integrated approach in the management of sick toddlers with a focus on the overall health of children aged 0-59 months in the primary health care unit [4]. IMCI is a standard of care for sick children at the primary health care level primarily by nurses and midwives. The IMCI aims to improve the knowledge and skills of health workers in dealing with sick toddlers, improve the health care system and improve the knowledge and skills of mothers and caregivers in child care and the search for health assistance. IMCI is introduced by WHO as a health care effort that aims to reduce mortality, illness and disability of infants and toddlers in developing countries [9]. IMCI implementation is assisted by using an IMCI chart book that explains the following steps:

1) Assessing the baby's age less than 2 months and children aged 2-59 months
2) Determine the classification
3) Determine the action / treatment
4) Providing counseling for mothers
5) Providing follow-up services

b. The Waterfall SDLC Model

The Waterfall SDLC model is a sequential software development process in which progress is regarded as flowing increasingly downwards (similar to a waterfall) through a list of phases that must be executed in order to successfully build a computer software. Originally, the Waterfall model was proposed by Winston W. Royce in 1970 to describe a possible software engineering practice [6]. The Waterfall model defines several consecutive phases that must be completed one after the other and moving to the next phase only when its preceding phase is completely done. For this reason, the Waterfall model is recursive in that each phase can be endlessly repeated until it is perfected.

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Essentially, the Waterfall model comprises five phases: Analysis, design, implementation, testing, and maintenance. Analysis Phase: Often known as Software Requirements Specification (SRS) is a complete and comprehensive description of the behavior of the software to be developed. It implicates system and business analysts to define both functional and non-functional requirements. Usually, functional requirements are defined by means of use cases which describe the users’ interactions with the software. They include such requirements as purpose, scope, perspective, functions, software attributes, user characteristics, functionalities specifications, interface requirements, and database requirements. In contrast, the non-functional requirements refer to the various criteria, constraints, limitations, and requirements imposed on the design and operation of the software rather than on particular behaviors. It includes such properties as reliability, scalability, testability, availability, maintainability, performance, and quality standards. Design Phase: It is the process of planning and problem solving for a software solution. It implicates software developers and designers to define the plan for a solution which includes algorithm design, software architecture design, database conceptual schema and logical diagram design, concept design, graphical user interface design, and data structure definition. Implementation Phase: It refers to the realization of business requirements and design specifications into a concrete executable program, database, website, or software component through programming and deployment. This phase is where the real code is written and compiled into an operational application, and where the database and text files are created. In other words, it is the process of converting the whole requirements and blueprints into a production environment. Testing Phase: It is also known as verification and validation which is a process for checking that a software solution meets the original requirements and specifications and that it accomplishes its intended purpose. In fact, verification is the process of evaluating software to determine whether the products of a given development phase satisfy the conditions imposed at the start of that phase; while, validation is the process of evaluating software during or at the end of the development process to determine whether it satisfies specified requirements. Moreover, the testing phase is the outlet to perform debugging in which bugs and system glitches are found, corrected, and refined accordingly. Maintenance Phase: It is the process of modifying a software solution after delivery and deployment to refine output, correct errors, and improve performance and quality. Additional maintenance activities can be performed in this phase including adapting software to its environment, accommodating new user requirements, and increasing software reliability.

c. End User Computing Satisfaction

The EUCS has undergone significant testing and development in the last decade and currently uses 12 items to represent five underlying dimensions of end-user satisfaction: content, accuracy, format, ease of use, and timeliness. Recent work on the EUCS has established that it is best represented by a factor structure in which the five underlying [10].

d. Android
Android is a collection of software aimed at mobile devices including operating systems, middleware, and key applications. The Dalvik Virtual Machine (DVM) One of the key elements of android is the Dalvik Virtual Machine (DVM). Android runs on the Dalvik Virtual Machine (DVM) not in the Java Virtual Machine (JVM), in fact there are many similarities with the Java Virtual Machine (JVM) like Java ME (Java Mobile Edition), but Android uses its own Virtual Machine that is customized and designed to ensure that some features run more efficiently on mobile devices [11].

3. Research Methodology

This research is qualitative study. Responden of this research are administrator (someone who managed application), health worker (midwives dan nurses) two people each and two patients who have toddler. The research step are:

4. Results And Discussion

Integrated management of sick toddlers (IMCI) is an integrated / integrated approach in the management of sick toddlers with a focus on the overall health of children aged 0-59 months in the primary health care unit [4]. IMCI is a standard of care for sick children at the primary health care level primarily by nurses and midwives. The IMCI aims to improve the knowledge and skills of health workers in dealing with sick toddlers, improve the health care system and improve the knowledge and skills of mothers and caregivers.
in child care and the search for health assistance. IMCI is introduced by WHO as a health care effort that aims to reduce mortality, illness and disability of infants and toddlers in developing countries [9]. Mobile IMCI is Android Application. Android is a collection of software aimed at mobile devices including operating systems [11].

Based on observation and interview to respondents:

“............aplikasi ini mempermudah saya dalam mengisi form MTBS daripada harus mbolak mbalik pedoman, banyak sekali form yang harus saya isi .....” (midwife-1)

“..........cepat ya mbak, ngisinya…pake aplikasi ini enak, ada kesimpulannya, masuk kategori yang mana .....” (nurse-1)

“.........kategorinya jelas, persis seperti di panduannya .....” (midwife-2)

“..........dari dulu memang perlu aplikasi yang seperti ini, gampang dipakek, jadi semua bias diisi, sangat membantu orang .....” (nurse-2)

“..........tempo hari anak saya panas, batuk-batuk ada pileknya, enak saya liat di HP, saya harus apa..., disitu ada semua But .....” (patient-1)

“..........aplikasinya mudah dipakek ya Bu, tinggal klik aja ada semua di situ, ibu-ibu gak perlu repot tanya-tanya ke orang .....” (patient-2)

Mapping the results interview with respondents :

<table>
<thead>
<tr>
<th>Table 1. Mapping answer for Respondents</th>
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<tbody>
<tr>
<td>content</td>
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<tr>
<td>b. Meet needs</td>
</tr>
<tr>
<td>c. Help meet need</td>
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<tr>
<td>d. Sufficient information</td>
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The EUCS has undergone significant testing and development in the last decade and currently uses 12 items to represent five underlying dimensions of end-user satisfaction: content, accuracy, format, ease of use, and timeliness [10].

5. Conclusion

All respondents have been satisfied with the IMCI mobile application.

6. Suggestion

Mobile IMCI can be expected to continue to be implemented and evaluated regularly to improve the system.

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8. Reference