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End-User Need Assessment for Developing Electronic Integrated Antenatal Care (e-iANC)

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Abstract

Electronic Integrated Antenatal Care is a web-based application for antenatal care (ANC) data and information management for independent practice midwives. This study aimed to assess the end-user needs for e-iANC development. Their needs for data and information were represented by a use case diagram. Five key stakeholders were identified related to the development of an e-iANC. Interviewing representatives of each informant provided the functions, and information content and flows for each function. The Extended e-iANC needs and promoted insight among all of the actors' perspectives. The use-case scenario for extended e-iANC includes all of the elements of midwifery care include antenatal care, childbirth, puerperium, immunization, and family planning. The deployment of integrated information of extended e-iANC with the primary healthcare applications and the district health department is necessary for comprehensive information on maternal and child care innovation.

Keywords:

Electronic Integrated Antenatal Care (e-iANC), Use-Case Diagram, Midwives

Introduction

In 2017, World Health Organization (WHO) released the global Maternal Mortality Ratio (MMR) was 211 per 100,000 live birth [1]. International Conference on Indonesia Family Planning and Reproductive Health (ICIFPRH) mentioned Indonesian MMR untill 2019 was 305 per 100.000 live birth [2]. Indonesian MMR is far above the target Sustainable Development Goals (SDGs) is 70 per 100.000 live birth in 2030 [3]. To reduce MMR, various efforts are needed including improving the quality of ANC data and information so that it can be faster in making clinical decisions. The e-iANC application as shown in Figure 1 was developed on a web-based basis with a registered trademark.The e-iANC merk has been registered at the Directorate General of Intellectual Property of the Ministry of Law and Human Rights Number: IDM000641676 dated May 13, 2019. It is a tool for midwives in recording and reporting ANC data electronically which is currently its use is still limited only at independent practice midwives.

The features of e-iANC are Patient Registration, Anamnesis, Physical Examination, Laboratory results, Screening of Risk of Pregnancy, Communication, Information, and Education (CIE), Treatment and Follow-up, and Reports.

Usability evaluation of e-iANC for independent practicing midwives has been conducted by the System Usability Scale's (SUS) instrument. The results obtained were 83.1 scores, which means that the application was declared acceptable and good ratings in grades A and B [4]. It recommended of features addition all of the midwifery care and use of e-iANC at primary healthcare sub-district level and the official district health department.

Figure 1. Feature Login e-iANC

To assess user needs for developing information systems are surveying users and use-case technique. A use case is essentially a scenario that describes a system's behavior as it responds to a request that originates from outside of that system [5] [6] [7]. Use cases describe the interaction between a primary actor or initiator of the interaction. Use cases may be described at different levels of complexity and do not require a standard template or structure for documentation, although these are available for use if desired [8][9].

As a follow-up to the previous research recommendation, our study wanted to assess the end-user needs for e-iANC development. Some of the research questions in this study are 1) What midwifery care of independent practice midwives should be added in e-iANC? 2) Who are the healthcare providers other than independent practice midwives? 3) what is the information needed by midwives to monitor and evaluate maternal and child health? 4) where will this application deploy?

Methods

End-user needs assessment is necessary to identify requirements for acceptance and usage of the extended e-iANC. This was carried out by a use-case diagram. This was carried out by use-case diagram. Use-case diagram is a behavioral UML diagram type and frequently used to analyze various systems [5]. They enable you to visualize the different types of roles in a system and how those roles interact with the system. Use-case diagram simplifies the results of the interview with representatives of five key stakeholders: 1. The head of the Health Services Section of West Jakarta Health Office, 2) the midwives coordinator at Duri Kepa Primary Healthcare 3) the head of the

Indonesian Midwives Association of West Jakarta, 4) Two midwives of independent practice.

The head of the Health Services Section of the West Jakarta Health Office concerned with all elements of information which are needed to monitor, and evaluate maternal and child health. The midwives coordinator at Duri Kepa Primary Healthcare is concerned with maternal and child health data completeness and accuracy. The head of the Indonesian Midwives Association of West Jakarta is concerned with the quality of midwifery care to improve maternal and child health. Subsequently, the midwives of independent practice are direct delivery of midwifery care include antenatal care, childbirth, puerperium, immunization, and family planning.

Semistructured interviews included questions discussing data sources; the collection, processing, analysis, and reporting of maternal and child health data; stakeholder perspectives of extended e-iANC; the impact of data quality on maternal and child health; and expectations of an extended e-iANC. Each interview lasted approximately 30 minutes. The responses were recorded using paper notes with the addition of a digital tape recorder for the midwives to ensure accuracy of recording of midwifery care detail; these were subsequently transcribed. Each transcript was validated in a face-to-face meeting with each individual actor from whom it was obtained. The responses were categorized in terms of objectives, functions, sources, reasons, and quality requirements of data, as part of an integrated report. Content analysis techniques were used to interpret the interview responses.

Results

Our interviews identified the need for extended e-iANC by adding all of the midwifery care include antenatal care, childbirth, puerperium, immunization, and family planning. Informants found an e-iANC as in figure 2 has been provided antenatal care data real-time so faster intervention pregnancy woman. Unfortunately, it does not facilitate comprehensive midwifery care.

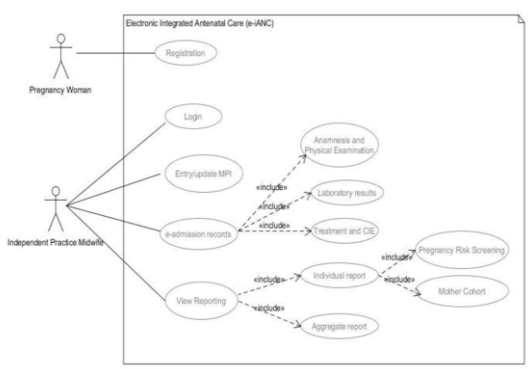

Figure 2. Use-case of e-iANC

"Frankly, e-iANC is easy to use and helpfulness faster intervene antenatal care but not all off at midwifery care like as family planning, puerperium, and immunization" (Informant 4)

"I think it's great because I don't keep paper for antenatal care data and reporting" and I view the mother cohort soon" I need extended e-iANC for the other midwifery care" (Informant 5)

Informants also indicated that district health reporting requirements presented a burden. Primary health centers must implement district health reporting policies. Although this process has been computerized, all tasks are currently completed with commodity software (spreadsheets and word processors):

"In fact we want to do it with computerization, but we only run district health office policies, still using the existing software spreadsheet alone." (Informant 2)

"Still manual applications (spreadsheets and word)." (Informant 1)

The need to manually count and collate information from paper forms was seen as delaying local area monitoring, leading to inaccuracies in screening risk scores and delaying antenatal care interventions.

"The information generated at this time only meets the needs that have been established according to the report of PWS, i.e., K1, K4 [district health reporting requirements] and birth attendants, and often too late." (Informants 1 and 2)

The mandatory to improve quality midwifery care would be accommodated with extended e-iANC. We will appreciate it when extended e-iANC was realized. " *(Informant 3).*

Participants responded enthusiastically to the suggestion of an extended e-iANC as in figure 3.

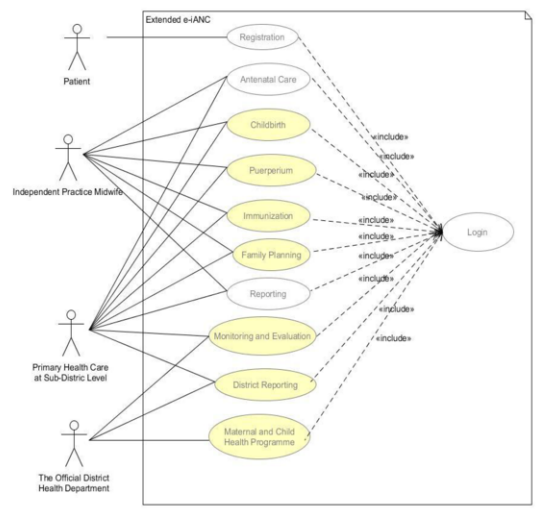

Figure 3. Use-case of Extended e-iANC

The extended e-iANC has been developed by integrated information from the independent practice midwives with primary healthcare at the sub-district level and the district health department. The midwives primary healthcare at the sub-district level could deliver midwifery care, and the midwife coordinator could access district reporting, monitor, and evaluate the indicator of maternal and child health in real-time.

The head of the Health Services Section of the West Jakarta Health Office could monitor, and evaluate the indicator of maternal and child health in real-time, and develop evidence-based maternal and child health programs.

Discussion

Integrated information of midwifery care taking into consideration stakeholder requirements has been proposed and evalu-

ated for an extended e-iANC context. This context is particularly interesting as it combines the presence of comprehensive information management, in maternal and child health as a primary goal, and with the possible interaction with a range of midwives, and healthcare provider, and decision-maker.

This discussion considers the methodological innovation as well as highlighting some issues that were learned in the development of the architecture and its application. This design a blueprint that can both demonstrate and integrate the necessary requirements of information flow and content, according to different perspectives so the system can serve the needs of the patient, of the midwives, and of designers, to enable the continuous improvement of the system. The methodology builds on classical architecture principles with a step-by-step process so that different stakeholder perspectives are documented and then combined; this, in turn, is integrated with the five stakeholders' perspectives.

In the informational needs assessment, it is essential that the resulting information reflects a cross-section of the different categories of stakeholders implicated in the information system's use and continuing development. By selection the stakeholder representatives, while ensuring their relevant knowledge and experience, it was decided to limit participation to persons with prior knowledge of the ongoing project due to their involvement in other phases of planning and development. The three main categories (midwife, midwife coordinator, and head of the Health Services Section).

Each participant was interviewed with questions pertaining to the objectives related to expand midwifery care and need quality of data of them from their perspective, associated functions, and sources of data relevant to these functions. The head of the Health Services Section of the West Jakarta Health Office concerned with all elements of information which are needed to monitor, and evaluate maternal and child health. The midwives coordinator at Duri Kepa Primary Healthcare is concerned with maternal and child health data completeness and accuracy. The head of the Indonesian Midwives Association of West Jakarta is concerned with the quality of midwifery care to improve maternal and child health. Subsequently, the midwives of independent practice are direct delivery of midwifery care include antenatal care, childbirth, puerperium, immunization, and family planning.

This study not only reinforces this classic approach, it is integral to the dialogue between designers and end-users in this complex environmental setting, and progressive ongoing design is essential to success. The overall criteria emphasize that the design pathway and the full user opportunity are always in evidence. The inclusion of UML did not restrict this dialogue and benefits from its joint role of being broadly understandable and supporting the software programming specifications.

The preliminary implementation evaluation by benchmark case study whether the design meets end-user needs. The midwife's primary healthcare at the sub-district level could deliver midwifery care, and the midwife coordinator could access district reporting, monitor, and evaluate the indicator of maternal and child health in real-time. The head of the Health Services Section of the West Jakarta Health Office could monitor, and evaluate the indicator of maternal and child health in real-time, and develop evidence-based maternal and child health programs. Further experimental studies with this intervention will need to be carried out in order to gauge how this intervention compares with comprehensive midwifery care prior to undertaking a cost-effectiveness analysis.

Conclusions

The use-case scenario for extended e-iANC includes all of the elements of midwifery care include antenatal care, childbirth, puerperium, immunization, and family planning. The extended e-iANC has been developed by integrated information from the independent practice midwives with primary healthcare at the sub-district level and the district health department. The deployment of integrated information of extended e-iANC with the primary healthcare applications and the district health department is necessary for comprehensive information maternal and child care innovation.

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