

## ORIGINAL ARTICLE

# Digitization of KIA Books Using a Human Centered Design Approach to Improve Maternal and Child Health

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## ABSTRACT

**Introduction:** Maternal and fetal health is one of the assessment indicators the most important level of health in society. However, in fact the death rate for pregnant women in Indonesia is still relatively high as is the case in Indonesia East Java. The causal factors include: namely the limited and lack of health service facilities communication between postpartum and cadres or midwives about condition, resulting in late recognition danger sign of postpartum. **Materials and methods:** This research was conducted using two approaches, namely quantitative and qualitative or mixed methods and 149 respondents and 26 informants, to reduce MMR in Paciran Primary health care. This study was also carried out to determine the dominant variable that affects mother's behavior in an effort to reduce MMR in accordance with the existing theory. **Results:** Post partum Mother's intention to contribute to the reduction of MMR in this study was influenced by the good factor directly or indirectly. This is indicated by the score  $p < 0.005$ . The study also shows that it is very important for the health workers to be able to communicate well with individuals and communities. **Conclusion:** The present study will help to reduce maternal fatalities, and will help to build systems and processes that will allow control the behaviour of the postpartum mother and determine the cause of death as well as its contributing factors.

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the number of maternal deaths in Indonesia reached 7,389, showing an increase from 2020, which had 4,627 deaths, and from 2019, which had 4,221 deaths (5). This high maternal mortality rate also makes Indonesia the country with the highest maternal mortality rate in Southeast Asia.

## INTRODUCTION

Health and mortality problems are closely related to the maternal mortality rate (MMR). In addition to being used as a health indicator, measures of maternal mortality are also used as indicators of people's welfare or the quality of human development. (1) This is based on the fact that the change in size is closely related to changes in the social and economic conditions of the community. (2) Mother and child are family members who need special attention and priority in terms of healthcare services. This is related to the statement by the Ministry of Health of the Republic of Indonesia (3), which mentions that the maternal mortality rate and infant mortality rate are among the most important health indicators in showing the level of community welfare. This statement then became one of the issues prioritized by the Ministry of Health in the 2020-2024 health service development program policy (4). According to Yunarti et al. (2019), the maternal mortality rate in Indonesia ranked highest in the five years before the MDG period ended. In 2021,

Mothers and children are family members who need special attention and priority in terms of health services. This is related to the statement of the Indonesian Ministry of Health which states that the maternal mortality rate and infant mortality rates are one of the most important one of the most important health indicators in showing the level of community welfare. In the industrial era 4.0, almost all activities have been digitized. (3) The definition of digitization according to Marilyn Deegan is a technique of changing from all forms of printed files or others to digital presentation. (1). Vice versa, in recording data at the Puskesmas, it should also have started to be digitalized to make it more efficient. Puskesmas is a Community Health Center which is a health service facility that aims to organize public health efforts and first-level individual care according to the Ministry of Health is a Community-Based Health Effort (UKBM) which implemented by the community, from the community, for the community, and with the

community. The goal is to empower the community and make it easier for people to get basic health services. In this service, the Posyandu has a book, namely the Maternal and Child Health Book (KIA). The MCH handbook is a tool for early detection of maternal and child health disorders or problems, a communication and counseling tool with important information for mothers, families and communities regarding services, maternal and child health including referrals and packages (standards) of MCH services, nutrition, immunization and child development (2).

The problems found in the Paciran health center are the process of recording and processing data Toddlers, mothers, pregnant women, and data for cadres or officers at Posyandu are still done manually using handwriting so that it becomes inefficient in processing, searching, and preparing activity reports.

In addition, mothers often do not bring Maternal and Child Health (MCH) books when they come to P osyandu, so cadres have to record repeatedly on different paper which results in data redundancy. The purpose of building the Posyandu application is expected to accelerate the performance of Posyandu cadres so that it doesn't take up a lot of time and effort. And make it easier for the public so that they don't need to carry the MCH handbook and can see the examination results without opening the MCH handbook. It is a website-based MCH book digitization platform.(5)

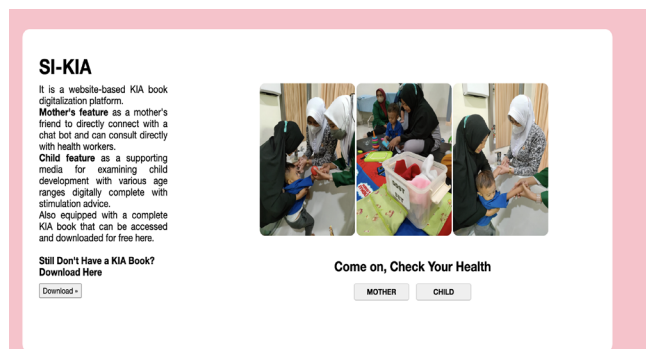


Figure 1: KiaWeb

Ways that can be done to monitor post-saline mothers is through a information system that can be information system that can be used by postpartum mothers to become a mother's best friend In addition, there are also communication with health workers. Methods that will be used in design of this monitoring information system is Human Centered Design (HCD). Method HCD method sets the user as the center of system design. The HCD concept that the user is at the center of the system development process development process and that its properties and objectives are based on user experience The key to success of this method is to build a close relationship between the system designer or Programmers who depend on the wishes of of the

user. The HCD method has been proven to produced software that is very useful. According to Sari, et al. According to Sari, et al. accessibility, and usefulness to produce a system system that meets the wants and needs of all stages of HCD have been proven to make users feel more comfortable with the designed user interface and the information displayed is also easier to understood. This method was chosen for several reasons. First, it is considered appropriate to the needs of the research topic. Second, it is in accordance with the concept of digitalization, namely the transition of using manual system to a computer. Lastly, there has not been research that uses the UCD method in modeling HCD method in modeling the mother companion website (API) according to the KIA book. according to the MCH book. Therefore, the study objectives of this research is to create modeling a mother's best friend website that in accordance with the MCH book using the Human Centered Design (UCD) method for monitoring pregnant women. monitoring of postpartum mothers. (13) This application can help users (postpartum mothers) to see the results of recording monitoring records from the Posyandu, as well as helping users when facing an emergency concept The feature of mothers as mothers' friends is to directly connect with chat bots and be able to consult directly with health workers. The children's feature as a media to support the examination of the development of children with various age ranges is complete digitally along with stimulation advice.

Novelty/significance of this study is The method to be used in the design of this information monitoring system is User Centered Design (UCD). The UCD method places the user at the center of system design. The concept of UCD is that users are the focal point of the system development process, and its nature and purpose are based on user experience. The key to the success of this method is to build a close relationship between system designers or programmers and the desires of the users. The UCD method has proven to produce highly beneficial software. According to Sari et al., accessibility and usefulness are critical for creating a system that aligns with users' desires and needs. All stages of UCD have been proven to make users feel more comfortable with the designed user interface, and the displayed information is easier to understand.

## MATERIALS AND METHODS

### Data Collection

Collecting Data/Information Information collection was conducted direct interviews with 14 respondents namely the post-saline mother group in paciran village. Respondents age 23-40 years old, and gestational age 4-8 months. 4-8 months of pregnancy. Interviews were conducted to get an overview of the application needed to broaden their horizons. knowledge and used as reference in determining the design research design that will be made. Review of literature including

journals and MCH books are used to obtain information on information on the management of postpartum maternal assistance.

#### Understanding and Determining User Context

At this stage, an understanding and determination of the user context from Puskesmas Paciran Lamongan will be carried out.

#### Determining User Needs

To determine user needs, interviews were conducted. Interviews were conducted to identify problems at Puskesmas Paciran Lamongan.

#### Creating Design Solutions

After understanding the user needs to be designed, the next step is to create design solutions from User Requirements. This includes designing an information architecture that can help users and developers understand the information structure in the application. Once the information architecture is designed, the design is realized in the form of mockups and prototypes. Users are used as the main source of knowledge, considering problem-solving must be based on user perspectives and needs.

#### Design Evaluation

After mockups and prototypes are created, evaluations are conducted involving users who will use the application. This stage is carried out to evaluate the suitability of the prototype design with user needs and to gather information. The results of the evaluation are in the form of statements that have been mutually agreed upon and used as a reference for subsequent design improvements.

#### Design Improvement

From the evaluation results, a list of design solution improvements is obtained. The statements are user inputs that are used as references to ensure the maternity assistance application (API) designed meets user needs.

#### Data Analysis

This research academically uses a qualitative research approach. The qualitative method is a research method based on postpositivism philosophy, which is generally used for research with natural object conditions and experiments. Researchers in this approach act as key instruments in the research framework and data analysis.

#### Ethical clearance

This study was approved by Research ethics committee universitas Nahdlatul Ulama Surabaya No. 0307/EC/KEPK/UNUSA/2023 reference so that the website design made has in accordance with user needs. The research method carried out by researchers is as follows:

#### a. Research Design

Problem analysis – Research data collection - application design- trial use of digital applications- application revision-final Result

#### b. Data Collection Method

##### 1) Observation

Observations were made by researchers to collect data and information by directly observing the activities carried out at the Paciran Health Center

##### 2) Interview

Interviews are very necessary for this research process, in order to obtain accurate information. Researchers conducted questions and answers directly to informants including coordinating midwives and P osyandu cadres.

3) Library Studies Researchers also conduct library studies using journals that are on the internet, to support the information needed in this research.

Location in Paciran Primary Health Care, July until August 2023, total population 50 mother and child, sampel size 47 and sampling method random sampling. Variable in this research is digitalization and mother and child handbook, data collection and data analysis.

## RESULTS

Development of service information system monitoring website for postpartum mothers using the Human Centered Design (HCD) method is done in several stages. several stages. An explanation of each stages can be seen below. Collecting Information At the information gathering stage, Researchers analyze the system requirements needed. Analysis is done by means of interview. The results obtained include who wants to use the system later and how the system works. In addition to interviews, similar literature studies were also conducted as a reference both in terms of appearance and functionality available.

Objective of this research is to create website modeling based on the KIA book with using the human Centered Design method for postpartum maternal monitoring. The results presented are: website service information system prototype, where this system can help postpartum mothers to ask about the condition of complaints that occur, and can consult directly with health workers. from the design of this information system it is hoped that makes it easier during the post-copy process. Therefore, it can be concluded that modeling the mother's best friend's website using the HCD method was effective in helping when carrying out the prototype design process due to the user directly plays an active role in providing

advice so that the needs for the desired system can be met.

## DISCUSSION

Puskesmas (Primary Health Care) as the main health service center must provide quality basic health services including maternal and child health services (Sanah, 2017). The quality of service is closely related to the fulfillment of needs according to patient expectations, affordable and standardized (Fahrani & Ningsih, 2022). Health workers must try to provide quality and standardized services in the delivery of services including the quality of MCH (Maternal and Child Health) services (Lestari, 2020). Hospitals or primary health care must also adapt to technological advances in carrying out their services (Anggraeny, 2013). The urgency of conducting this research is that maternal and child health services (MCH) are an important part of health services in hospitals or health centers that are comprehensive, starting from pre-conception, pregnancy, childbirth and BBL (birth weight), postpartum, pre-school, toddlers to the elderly who need routine checks and regularly with the ultimate goal of reducing maternal and child mortality. This study was to developing of Digitization of KIA book, as an Innovation on Maternal and Child Health Services Based on website for Quality Improvement of Health Services in Indonesia and this digitization has simple features and can be easily used by users. In modern times like today, information technology is developing rapidly and everything is becoming digital, for example, the world is in our hands, that means the information system on Android can be used anywhere for postpartum mother and their families to get early education to reduce the risk of risks of postpartum.

## CONCLUSION

Based on the results of research using this website can provide effectiveness in work. Broadly speaking, based on the results of the design and creation of the website for the Digitization of Maternal and Child Health Books (KIA) at the Paciran Health Center, using this system makes the data collection process faster and more organized. Then the process of making reports can also be faster and neater. And also the patients are helped because they can know their progress, even though they don't carry or don't have the MCH book.

This research proposes a model based on Human Centered Design (HCD)-based model to design the a post-surgery maternal monitoring service system. The development has been done through several stages, namely user analysis, user needs analysis needs analysis, prototype design, and evaluation/testing. Website service modeling based on the MCH book for post slaughter maternal monitoring has been developed to the prototype stage. has been developed up to the prototype stage and the second (final) iteration. The results of the

second iteration respondents already feel enough of the results of the prototype that has been made. Based on the results of identification and evaluation, it can be seen that the use of HCD model is effective in helping when prototype design process because users directly play an active role in suggestions so that the needs for the desired system can be system can be met. After making improvements at the the second iteration, it is expected that the website service can be used to monitor post-saline mothers, in the form of health of the mother and fetus, so as to reduce mortality rate of pregnant women and babies.

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