MOM-IN-CARE: A BAHAY-PAANAKAN MONITORING TOOL FOR PREGNANCY AND DELIVERY IN NASUGBU, BATANGAS

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THE PROBLEM AND ITS BACKGROUND

INTRODUCTION

Pregnancy is a huge part of a woman's life, and it comes with a lot of responsibility for handling sensitive pregnancy delivery. In the stage of pregnancy there are three terms of women which are the following; puerpera, primigravida and the parturient. Puerpera is a woman who has recently given birth to a child, and the woman who has already experienced and knew the process of giving birth. Then the primigravida is a woman who conceived pregnancy for the first time. And the last one is the parturient, a woman who is giving birth for the present time. Furthermore, all women must understand what will be the best to do, during pregnancy and the significance of being pregnant. Majority of women only realized the difficulties of pregnancy after they had gone through it. Young women are uninformed about becoming a mother, specifically in what they will do if they find themselves in that situation. According to Romulo, R. R. (n.d.). (2020) Teen pregnancy: A national social emergency. The government declared that teenage pregnancy is a national social emergency as a result of clearly concerning trends. Furthermore, according to a recent report from the Philippine Statistics Authority (2017), an average of 538 babies are born to Filipino teenage mothers every day. In addition, according to Save the Children's Global Childhood Report, the Philippines has the second highest teen

pregnancy rate in Southeast Asia at 5.99 percent (2019). In fact, lack of knowledge in the field of pregnancy is the reason why young women seek advice from female parents. When the time comes for them to give birth, they may seek advice from midwives on the most important aspects of becoming a mother. On the other hand, midwives are the first ones who will get to know you.

Midwives are the person that becomes a mother's guide of a new born baby after the birthing process of a mother. Midwives will also hold and provide basic care. According to Judith Hurley, What Is a Midwife? (2020), a midwife is a licensed healthcare provider who supports healthy women during pregnancy, childbirth, and the postpartum period. In addition, she discussed that there are three stages of training for midwives: Certified nurse-midwives (CNMs) are registered nurses who have graduated from an accredited nurse-midwifery education program and have passed an examination. Certified midwives (CMs) are non-nurse midwives who have a bachelor's degree or higher in a health field, have completed an accredited midwifery education program, and have passed an exam. Certified professional midwives (CPMs) are non-nurse midwives who have training and clinical experience in childbirth, including childbirth outside of the hospital, and have passed an exam. Midwives may give birth at homes or birthing centers, however the majority of pregnant women are more capable of giving birth in a hospital.

Furthermore, according to Mrs. Gina Lotty Doligas, the Head of Saint Light Birthing Home and Medical Clinic facility, they are using a manual process of accepting maternity patients such as pregnant women and other consultations.

Bahay-Paanakan accommodates pregnant women who have an updated checkup and may deliver the baby in a normal way. Midwives sometimes offer the hospital when their equipment is incapable of operating. They accept patients in a manual way or traditional way. BahayPaanakan also has rules and regulations for the proper way of accepting and taking care in every pregnancy that has been admitted and became constant patients to their clinics.

In this kind of situation, the manual process of all transactions between maternity patients and midwives of Bahay-Paanakan clinics can cause gradual process and takes a lot of time, especially in having a face to face conversation of each incoming maternity patient for the accommodations. Accepting incoming maternity patients while having an operation inside the clinics also caused an inconvenient situation for the midwives. To provide the solutions for these problems, the researchers will develop a web system for the midwives and a mobile application for the maternity patients and other women. The proposed system will be called MOM-INCARE, a Bahay-Paanakan Monitoring Tool for Pregnancy and Delivery.

Mom-In-Care is a useful tool that will help Bahay-Paanakan to accept patients via online. In this system, administrators can monitor the pregnant information, scheduled checkups, display availability, announcement, etc. While on the other

hand, the patients can see all the information, schedule checkups, future checkups, accommodation availability, and etc.

BACKGROUND AND SETTINGS OF THE STUDY

Bahay-Paanakan has a manual process of accepting maternity patients. This kind of process is a natural way of every clinic where maternity patients spend a lot of time and experience the inconvenience of going to clinics. Primigravida needs to go to Bahay-Paanakan to accommodate the scheduling process of future check-ups for their pregnancy period.

In addition, Bahay-Paanakan is one of the preferred homes for parturient who are due to give birth during their monthly period. With this situation, midwives experience the unlimited acceptance of patients within 24 hours. Entertaining via face to face of the incoming maternity patients by the midwives. can take a lot of time for the interviews that will be asked to every maternity patient.

Technology is a useful tool for the better use of communication between each person, through using technology lots of online communication has been made and applied in any transactions of communications. In case of transactions between midwives and maternity patients, Mom-InCare system that will be used by midwives to have an easy way of accepting pregnant via online. It will also be a tool for any transaction process of Bahay-Paanakan such as monitoring, scheduling process of check-up and future check-ups of a Primigravida and other services of clinics. Furthermore, Mom-in-Care will also be a useful android

application for the maternity patients to have an easy way searching for the best lying-in, in terms of choosing accommodation for the pregnancy period. By using this system, maternity patients will be also notified and informed in any announcement of clinics.

STATEMENT OF THE PROBLEM

The research aims to develop Mom-In-Care: A Bahay-Paanakan Monitoring Tool for Pregnancy and Delivery in Nasugbu, Batangas. Specifically, the study will attempt to answer the following question:

1. What are the common problems encountered by the respondents in the Lying-in Clinic in Nasugbu, Batangas?

2. What are the needed components of the system to address the problem encountered by the respondents?
3. What is the level of acceptance of maternity patients in the proposed system in terms of:

    3.1 Scheduling of Check-up

    3.2 Monitoring of Activities

4. What is the level of satisfaction of Lying-in personnel in the proposed system in terms of:

    4.1 Pregnancy Monitoring

4.2 Pregnant Scheduling

SIGNIFICANCE OF THE STUDY

This study aimed to establish a Bahay-Paanakan monitoring tool for pregnancy delivery. The conclusion of the study will be tremendously valuable to the following people and organizations:

BATANGAS STATE UNIVERSITY – ARASOF NASUGBU. Through this proposed system, the University will be able to attract and expand student knowledge that adapts to current technological trends.

College of Informatics and Computing Sciences. This study will benefit the students to understand the management system way easier and to deal in more advanced technology.

Bahay-Paanakan. Through this proposed system, the Birthing Home can encourage pregnant women to increase the knowledge and understanding of how technology works.

Midwife. Providing and supervising the schedule of pregnant women for a convenient access to all information and instructions.

Maternity Patients. This research study will help pregnant women with their conditions with the help of midwives in terms of their consultation and monitoring of their conditions.

Researchers. This study may be beneficial to the researchers in the sense of developing values of being patient, knowledgeable, be productive and to know how to conduct and complete the research.

Future Researchers. This study can be used as a foundation for future research. This can also be their guide and references as they conduct related to the topic.

SCOPE AND LIMITATION OF THE STUDY

MOM-IN-CARE: A Bahay-Paanakan Monitoring Tools for Pregnancy and Delivery in Nasugbu, Batangas, the main purpose of this system is to help midwives and maternity patients to have an online transaction for any appointment cases in terms of clinic services.

The researchers will develop a web system for the midwives in bahay-paanakan and an android application for the maternity patients in Nasugbu, Batangas.

In this system, the midwives can monitor the records, display announcements and availability, set schedules for check-ups, and send messages to patients. Then for the maternity patients, they must make an account for the proposed system by using their personal information and create a private transaction where only midwives can see it. Maternity patients can also browse for the locations, details and availability of each lying-in clinics located in Nasugbu, Batangas. The Mom-in-Care has its own weakness. The proposed system has limited

features and it does not include a virtual checkup to support valid information for a pregnant woman's monthly status. The maternity patient is unable to respond to any messages sent by the midwives using the proposed system. Maternity patients are not authorized to view the personal information of another patient. Furthermore, the system is incapable of running an IOS version.

DEFINITION OF TERMS

The following terms are explained in a conceptual and/or operational way so that you can better understand how they are used in the study.

Bahay-Paanakan. A birthing center that helps pregnant women to deliver who carry the baby and need initial care in a traditional way.

Certified Midwives (CMs). They are non-nurse midwives who have a bachelor's degree or higher in a health field, have completed an accredited midwifery education program, and have passed an exam.

Certified Nurse-Midwives (CNMs). They are registered nurses who have graduated from an accredited nurse-midwifery education program and have passed an examination.

Certified Professional Midwives (CPMs). They are non-nurse midwives who have training and clinical experience in childbirth, including childbirth outside of the hospital, and have passed an exam.

Midwives. A person who assists, monitors and helps the pregnant women to deliver the baby successfully and the main user who will handle the proposed system.

Mom-in-Care. An application tool for monitoring the delivery process of pregnant women.

Parturient. A woman who is giving birth.

Primigravida. A woman who conceived pregnancy for the first time.

Puerpera. A woman who has recently given birth to a child, and the woman who has already experienced and knows the process of giving birth.

Saint Light Birthing Home. One of the facilities in Nasugbu, Batangas which accommodates pregnant women and other patients.

Scheduling Process. A process of organizing the schedule of the following appointment such as pregnancy checkups, operation of giving birth, and etc.

CHAPTER II

RELATED LITERATURES

Related literature focuses on the different studies conducted by the past researchers that are connected to the idea and development of the Mom-in-Care: A Bahay-Paanakan Monitoring Tool for Pregnancy Delivery. These studies will serve as a basis for the researchers to finish the research and they will provide different information on developing the system.

CONCEPTUAL LITERATURE

To gain concepts and insights related to this study, investigations conducted by past researchers were reviewed. The review covered key findings, conclusions and recommendations which were found to have similarity to some extent with the present study.

Based on the study of Özkan Şat, S., and Yaman Sözbir, Ş. entitled “Use of Mobile Applications by Pregnant Women and Levels of Pregnancy Distress during the COVID-19 (Coronavirus) Pandemic” (2021). It cited that continuous care and counseling are necessary during pregnancy and the postpartum period. Telemedicine and telenursing applications have been employed during the pandemic process to satisfy the need for healthcare globally, and expertise in this field has been built. This study sought to determine how pregnant women used

mobile applications to access healthcare, counseling, and health information during the COVID19 epidemic, as well as how distressed they were at that time. And as a result of their study a total of 77.9% of participants claimed to have used mobile applications relevant to pregnancy throughout the epidemic. The mean overall Tilburg Pregnancy Distress Scale score was 24.09, and the cut-off point revealed that 37.2% of the participants were at high risk for distress. The Tilburg Prenatal Distress Scale total score and the change in receiving medical services, as well as the fear of coronavirus transmission, differed significantly.

According to the studies of Lazarevic, N.; Lecoq, M.; Bœhm, C.; Caillaud, C. entitled “Pregnancy Apps for Self-Monitoring: Scoping Review of the Most Popular Global Apps Available in Australia.” Int. J. Environ. Res. Public Health 2023. Cited that apps and other digital health technologies have the ability to encourage healthy behaviors, particularly self-monitoring, which can help with pregnancy management and lower the risk of related pregnancy-related illnesses. Despite the fact that pregnant women frequently use pregnancy apps, little is known regarding the general caliber of the tools for self-monitoring or the quantity of behavior change strategies (BCTs) they contain. So, the purpose of this study was to evaluate the effectiveness of pregnancy apps for self-monitoring and their BCT usage. By web scraping the most well-liked international self-monitoring applications in Australia's Apple App Store and Google Play Store, we were able to find pregnant apps. Apps and other digital health technologies have the ability to encourage healthy behaviors, particularly

self-monitoring, which can help with pregnancy management and lower the risk of related pregnancy-related illnesses. Despite the fact that pregnant women frequently use pregnancy apps, little is known regarding the general caliber of the tools for self-monitoring or the quantity of behavior change strategies (BCTs) they contain. So, the purpose of this study was to evaluate the effectiveness of pregnancy apps for self-monitoring and their BCT usage. By web scraping the most well-liked international self-monitoring applications in Australia's Apple App Store and Google Play Store, we were able to find pregnant apps.

RESEARCH LITERATURE

The study of Rothman, B.K. entitled “Pregnancy, Birth and Risk: An Introduction.” year 2014. State that the intrinsic risks that midwives have had to deal with throughout time and geography, there are also specific risks that have been added by medicalization. On the one hand, medicalization makes us blind to these risks, and on the other, it makes us blind to the knowledge and skills that midwives and laboring women themselves possess. The women and midwives studied for these articles demonstrate that, contrary to what risk theorists (all too frequently) claim, there is more to pregnancy and birth than simply a question of "actual danger" vs "perceived risk." There is more of an intellectual assessment, balancing, and contextualizing of hazards. This issue gives us a look at how people balance risks in an informed, original, and determined manner. They

discuss the most important issues that pregnant women and the general public should be aware of when it comes to pregnancy, birth, and risk.

The study of Barnes, D. L., Adair, L. S., Popkin, B. M., “Women's Physical Activity and Pregnancy Outcome: A Longitudinal Analysis from the Philippines” International Journal of Epidemiology, vol 20, Issue 1, 1991, was tackled that physical activity and pregnancy outcome in 2741 Filipino women identified during pregnancy as part of a two-year longitudinal research. Posture, energy expenditure, and physical stress were specific characteristics of physical activity predicted to be significant to pregnancy outcome. Variables for nine households and 48 formal and informal economic activities were created. The analyses were divided into three categories based on whether the woman did a formal waged job outside the home, incomerelated activity at home, or was economically inactive. As a result the traditional definitions of physical activity and employment based on involvement in the formal labor force disregard a significant percentage of home economic production as well as the physical demands of housework, according to the findings. They discovered no difference in the probability of low birthweight or premature delivery between economically active and economically inactive mothers.

However, they discovered that greater standing exercise had an effect on pregnancy outcome in select groups of women. To accurately analyze the impacts of physical activity during pregnancy, particular components of the

activity must be examined rather than relying on formal work as a substitute for exposure.

The “Prenatal Care and Pregnancy Outcome in Cebu, Philippines.”, 1989 study of Guilkey, David K., et al.. There are 3,080 women from rural and urban areas were chosen at random to assess the direct and indirect impacts of prenatal care consumption patterns on birth weight and gestational age. We examine the indirect effects of prenatal care on intermediate maternal factors (nutrition, stress, smoking, and alcohol use), and then the effects of these factors together with prenatal care on the course of the pregnancy. The endogeneity of prenatal care and the intermediate maternal factors are corrected using a statistical method called simultaneous equations. There are significant policy ramifications to the findings of simulations of the impact of variations in the frequency of prenatal visits on intermediate and health outcome indicators.

According to Bachiri, Mariam, Idri, Ali, Fernández-Alemán, José Luis, Ambrosio Toval, “Mobile Personal Health Records for Pregnancy Monitoring Functionalities: Analysis and Potential.” Mobile Personal Health Records for Pregnancy Monitoring Functionalities: Analysis and Potential - ScienceDirect, vol. 134, 2016. Personal Health Records are a fast expanding sector of health information technology. PHR users can maintain their own health data and connect with clinicians to improve the quality and efficiency of healthcare. The devices allow users to gain access to applications that used to be available only for personal computers. The system has features that tackle the study concerning

pregnancy and applications available on the market. As a result, a total of 33 mPHRs for pregnancy monitoring were chosen from the Apple App store and the Google Play store, respectively. The findings demonstrate that none of the mPHRs chosen met all of the capabilities examined in this article. The greatest possible score was 77%, while the lowest possible score was 17%. Another study concerned the monitoring of vital signs according to Alim, Anika. Imtiaz, M.H. “Wearable Sensors for the Monitoring of Maternal Health—A Systematic Review”, Sensors, 23, 5, (2411), (2023). Discussed that an essential part of preserving the health and safety of women and newborns during pregnancy, labor, and childbirth. This surveillance is frequently the initial step in the early discovery of pregnancy problems, allowing for timely, effective intervention to reduce maternal and newborn morbidity and mortality. It stated the comprehensive vital signs in monitoring pregnant women and fetuses.

Based on the study of A. Kazantsev, J. Ponomareva, P. Kazantsev, R. Digilov and P. Huang, "Development of e-health network for in-home pregnancy surveillance based on artificial intelligence," proceedings of 2012 IEEE-EMBS International Conference on Biomedical and Health Informatics, Hong Kong, China, 2012, pp. 82-84,. The project's purpose is to create a telemedicine network of smart in-home monitoring equipment for outpatient pregnancy surveillance in order to assure early diagnosis of pregnancy problems and fetal diseases, as well as ubiquitous information support for prenatal and intrapartum pregnancy care.

The study of Gaffield, Mary Ann., Colley Gilbert, B.J., et al, “Oral health during pregnancy: An analysis of information collected by the Pregnancy Risk Assessment

Monitoring System”, The Journal of the American Dental Association, vol. 132, Issue 7, 2001, there is little information available about the usage of dental care during pregnancy. Nonetheless, evidence suggests that a pregnant woman's dental health and pregnancy outcome may be linked. Pregnancy Risk Assessment Monitoring System, or PRAMS, in 1998. PRAMS is an ongoing, population-based survey designed to obtain information from mothers who recently delivered live born infants about their experiences and behaviors before, during and immediately after pregnancy. As a result, dental care uses during pregnancy ranged from 22.7 to 34.7 percent. In three states, 12.2 percent to 25.4 percent of respondents reported having a dental problem and of these, 44.7 percent to 54.9 percent went for care. Among mothers reporting a dental problem, prenatal care, or PNC, insurance through public funding and late PNC entry were significantly associated with their not getting dental care.

A study from Frid G, Bogaert K, Chen KT, “Mobile Health Apps for Pregnant Women: Systematic Search, Evaluation, and Analysis of Features", J Med Internet Res., 2021 Oct 18. A lot of expectant mothers use the internet to research pregnancy and childbirth. In order to find the thousands of pregnancy- or women's health related applications they need, more than

50% of pregnant women use pregnancy apps from the app stores.

In addition, because of COVID-19 many pregnant women struggle to go to the centers for consultations. The study's objective is to identify the mobile apps for pregnant women and to evaluate the apps using modified applications. The methods that they do was to evaluate the apps to exclude the inaccurate, malfunction apps and all the unique apps were downloaded. As a result, a list of 57 original pregnant apps. 28 apps were eliminated before the remaining 29 were examined, with a mean rating of 9.4 out of a possible 16. The app with the highest rating received 15 points. More than 60% (18/29) of the apps lacked all four of the essential elements for pregnant apps: communication, health tracking, notifications, and reminders, or did not provide comprehensive information for every stage of pregnancy. Only 28% (8/29) of apps cited literature, and only 24% (7/29) of apps had a text search field.

According to the study of Souza FMLC, Santos WN, Santos RSC, Silva VLM, Abrantes RM, Soares VFR, et al. “Effectiveness of mobile applications in pregnant women’s adherence to prenatal consultations: randomized clinical trial.” Rev Bras Enferm, 2021. The study tackled evaluating the effectiveness of a mobile application for cell phones in the adherence of pregnant women to prenatal consultations. The method that the researchers used was a controlled, random clinical trial that was carried out from January to December 2018. At the conclusion of the third day, a structured interview was used to collect data of gestational period. Chi-Square and Mann-Whitney tests were employed for analysis. The 88 expectant women from 2 Family Health Strategies in Northeast

Brazil made up the sample. Two groups of participants were randomly assigned: intervention (IG), which made use of the program, and control (CG), who went to prenatal appointments. As a result of their study, the pregnant women who used the application (IG) had greater numbers than the participants in the CG.

Based on the study of Setyanto, Arief., Raharjo, Suwanto., et al. "Pregnancy Monitoring and Mapping Using Integrated Mobile Application and Geographic Information System.", 2019. Care for expectant mothers is a crucial aspect of public health. Pregnant women are given much attention since the sustainability of a country is ensured by the health and rate of births. Regular medical checkups are a frequent strategy to keep track of pregnancy risk. Women who are pregnant must visit the medical facilities within a particular time frame. As a result, the intervals between medical checkups become unmonitored. Nowadays, the majority of low cost devices have a variety of sensors. GPS, an accelerometer, a camera, and a video recorder are now features found in most electronic devices. The researchers study is to propose a simple technique for keeping an eye on pregnancy risk utilizing a smartphone app. They offer an integrated mapping service that allows to locate each member of the pregnant woman under surveillance on a map along with their current location and risk status.

According to the study of Balikuddembe MS, Tumwesigye NM, Wakholi PK, Tylleskär T. entitled "Computerized Childbirth Monitoring Tools for Health Care Providers. Managing Labor: A Scoping Review." JMIR Med Inform. 2017. Many pregnancy-related issues can be avoided with proper labor and delivery

monitoring. Nonetheless, monitoring is still subpar in many places, in part because of issues with support tools like the partograph's usability. The World Health Organization (WHO) urged the creation and assessment of context-adaptable electronic health systems in 2011.

Although computerized tools have permeated many aspects of healthcare, their impact on helping medical professionals during childbirth appears to be limited. The study's objective was to determine the trends that can be used on computerized labor monitoring. As a result, 14 of the approximately 380,000 publications started with eligible for the final analysis. The majority of tools were in the development stages of design and execution. Post-implementation evaluations of two tools were the subject of three papers. The search turned up no information on clinical outcome studies. The criteria that the gadgets were designed to measure varied, but they frequently focused on the fetal heart rate, labor progress, and mother condition (7 of 11). The majority of tools were created to be used in low-resource environments with personal computers and may be altered to meet the demands of various users.

TECHNICAL BACKGROUND

The researchers obtained relevant information from the Bahay-Paanakan in Nasugbu, Batangas. In order to consider the technologies that will be used in the web system and mobile application the researchers initiated a collaboration of ideas for monitoring pregnancy delivery. The technology, tools, and software

that can be used in a system were identified by the researchers. These are some of the tools and technical terms used by the researchers in the project: HTML, CSS, JavaScript, XAMPP, Lucidchart, PHP, MySQL, and PhpMyAdmin. Some of the terminologies stated above are also the technology utilized by the researchers in the project.

HTML stands for "Hypertext Markup Language ". It was the programming language used to create a monitoring web system for midwives and mobile application for maternity patients. A HTML page consists of hyperlinks that are connected to different files such as images, and web pages to retrieve its content and place it on the page (developer.mozilla.org). Some tags are used to create the overall page layout and elements of a webpage wherein it serves as a guide in constructing the design of the webpage by arranging text, images, and colors in a particular way. Tags can contain attributes to create a distinct style that can be connected to an external file or in the main HTML file. These attributes have values to manipulate the design inside a webpage (developer.mozilla.org).

Cascading Style Sheet or CSS is a language written on plain text using a text editor that will be applied with the HTML content of the project. It is capable of creating the layout of a webpage by altering the elements of attributes such as adding colors, using different font styles, sizing of objects on the page, adding animations effects, adding responsive features, and further decorative styles used in designing. For the researchers, the main purpose of the CSS is to create a style sheet to make an efficient method of designing the developed web-based system,

creating a more decorative user-friendly interface for the users. (developer.mozilla.org).

JavaScript is another language that the researchers used to form interactive and dynamic web pages by constructing scripts for the system, meanwhile the main function of HTML is creating static web pages. To connect to the web server, researchers utilized PHP which was the focus of server-side scripting by executing queries providing the CRUD paradigm which stands for create, read, update, and delete. (developer.mozilla.org)

XAMPP for the web server allows the researchers to test their system even without internet access (undsgn.com). For creating a relational database system researchers used MySQL and PhpMyAdmin for handling the management of MySQL which was a popular database while for web server software, the Apache HTTP web server was employed.

Sublime text editor was the software used in coding scripts in the developed system. Furthermore, a Lucidchart was used for constructing charts and diagrams forming a work breakdown structure (WBS) of the project (hostinger.ph).

Android Studio is the official integrated development environment (IDE) for Android application development. It is based on the IntelliJ IDEA, a Java integrated development environment for software, and incorporates its code editing and developer tools.

Visual Studio Code, a source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded.

THEORETICAL FRAMEWORK

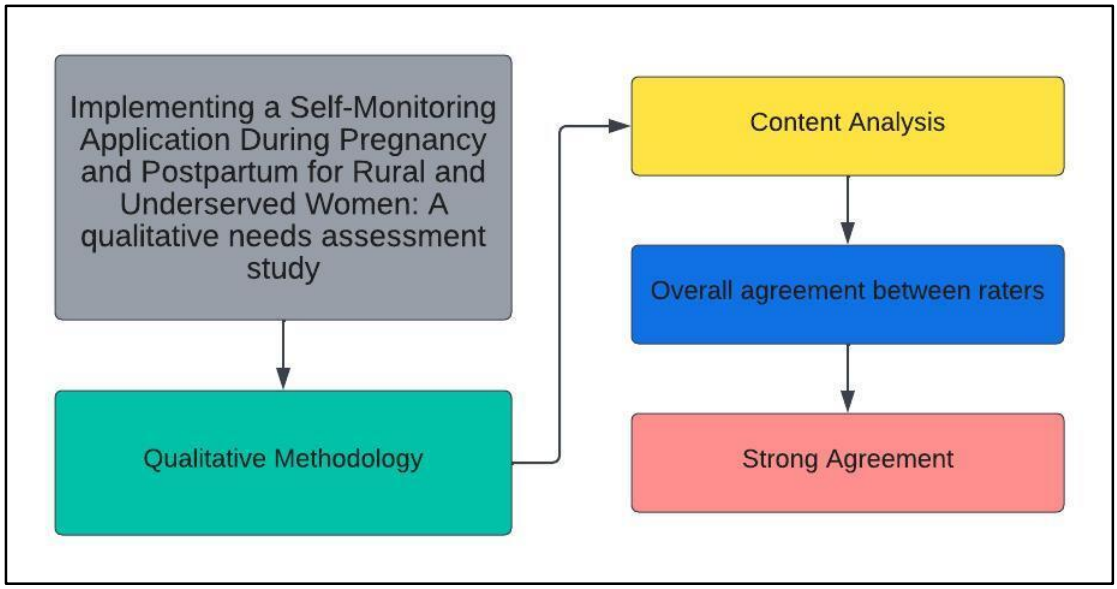

Figure 2.1 Theoretical Framework

According to Marlo M. Vernon and Frances M. Yang, July 19, 2022, Georgia has one of the highest maternal mortality rates within the US. This study describes the qualitative needs assessment undertaken to understand the needs of rural and underserved women and their perspectives on implementing a self-monitoring application during pregnancy and postpartum.

Qualitative methodology was used to conduct the needs assessment of 12 health care providers (nurses, nurse-midwives, patient care coordinators, and physicians) and 25 women from rural and underserved populations in Georgia

was conducted to ascertain common themes on three topics: pregnancy care experiences, comfort with technology, and initial perspectives on the proposed VidaRPM application. Transcription, coding, and consensus were conducted using content analysis and a Cohen's Kappa coefficient was calculated to identify level of overall agreement between raters for the representative quotes identified for each theme.

The overall agreement for the representative quotes that were chosen for each theme was in strong agreement ($\kappa = 0.832$). The major provider feedback included the following regarding the VidaRPM app: inclusion of questions to monitor physical well-being, embedded valid and reliable educational resources, and multiple modalities. The overall feedback from the mothers regarding the VidaRPM application was the virtual aspect helped overcome the barriers to accessing care, comfort with both WiFi and technology, and sustainable utility.

Marlo M. Vernon and Frances M. Yang's article serves as one of materials to provide a monitoring data that a system will produce for other future maternity patients of the Bahay-Paanakan (Lying-in) because it relates many aspects when it comes in pregnancy health monitoring as wells as providing the basis information for choosing their pregnancy delivery location and location.

This article, theoretical framework and methods will be the guide for gathering the data requirements for building the system. Conducting interviews

and surveys will be focus on what are the feedbacks of maternity patients after the transactions including the pregnancy monitoring and delivery stages.

CONCEPTUAL FRAMEWORK

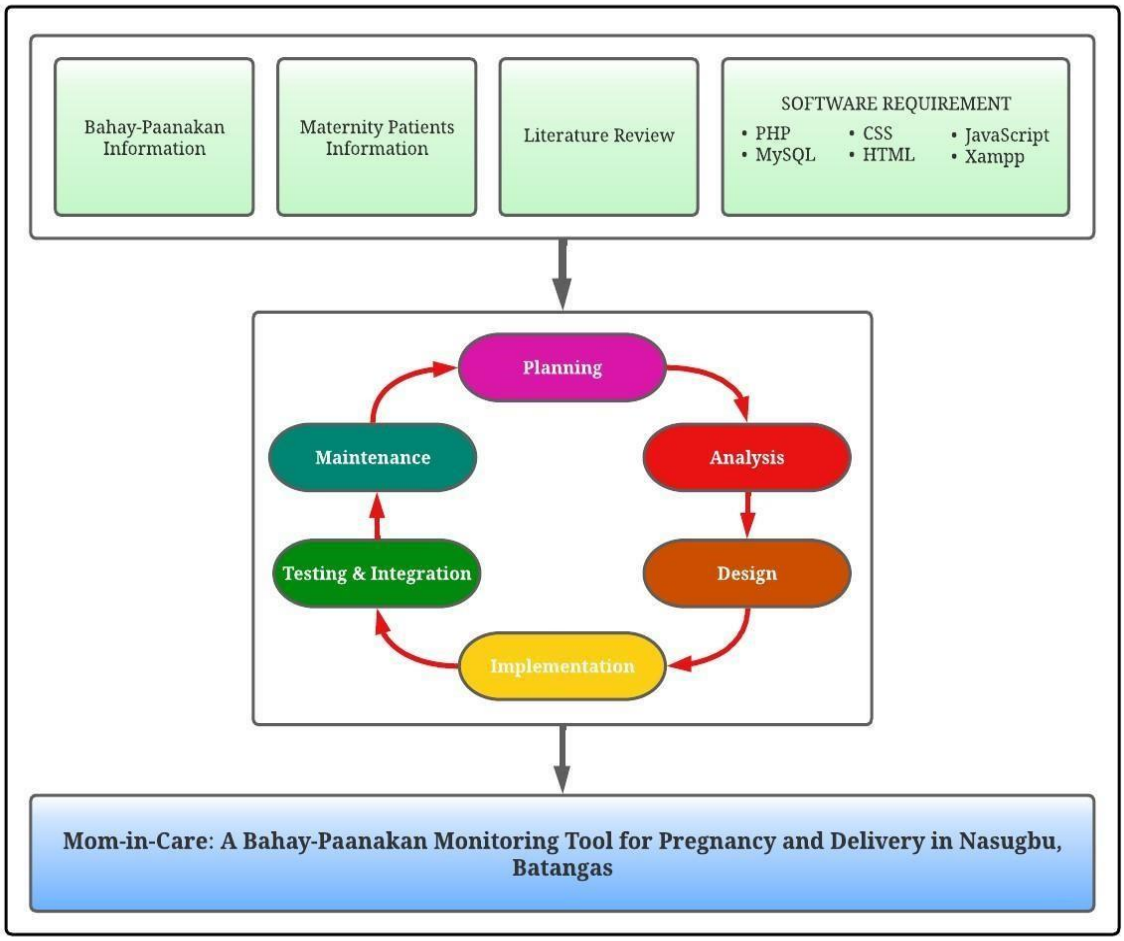

Figure 2.2 Conceptual Framework

This research describes the conceptual framework of the Mom-in-Care: A Bahay-Paanakan Monitoring Tool for Pregnancy and Delivery in Nasugbu, Batangas. Figure 2.2 shows the process on how the system will work. The goal of this study is to develop a desired monitoring tool for maternity patients for

their delivery. It is intended to develop and improve the manual monitoring process of midwives and maternity patients in Nasugbu, Batangas.

The input, process, and output are the three processes that help to compose the conceptual framework. The Bahay-Paanakan Information, Maternity Patients Information, Literature Review, and Software Requirements are included in the input. The proposed system's development process also includes planning, designing, developing, testing, deployment, review, and launch. Therefore, the proposed system's output is what it generates. The process through which all relevant data, research, and study are integrated to create the system known as Mom-in-Care:

A Bahay-Paanakan Monitoring Tool for Prenatal Delivery in Nasugbu, Batangas.

SYNTHESIS

“Pregnancy, Birth and Risk: An Introduction.” (2014). The study states the important issues about pregnancy, birth and risk. In addition, it also talks about the experience of maternity patients and also the midwives. Furthermore, this study is related to the proposed system which tackles pregnant women who are becoming a mother.

“Women's Physical Activity and Pregnancy Outcome: A Longitudinal Analysis from the Philippines” (1991). Based on the study were they analyze and divide the categories of the women’s physical activity and pregnancy outcome

based on whether the woman did a formal waged job outside the home, income-related activity at home, or was economically inactive. The study is somehow related to the proposed system because in order to find a solution the researchers must analyze the problem.

"Prenatal Care and Pregnancy Outcome in Cebu, Philippines." (1989). The study talks about what is the outcome of the prenatal care and pregnancy outcome in Cebu by choosing a randomized control to assess the direct and indirect impacts of prenatal care using statistical methods called simultaneous equations. Based on what the study's main point is, it is similarly related to the proposed system because the researchers will use an equation to calculate the respondents etc.

"Use of Mobile Applications by Pregnant Women and Levels of Pregnancy Distress during the COVID-19 (Coronavirus) Pandemic" (2021). Based on this study, using mobile applications for health counseling by the maternity patients are a useful tool to seek health information globally and to gain health information during the pandemic. This study also stated that mobile applications are useful especially in the field of pregnancy by checking their health status. The features and concept of this study are related to the researcher's proposed study, which are highly focused in pregnancy health monitoring of the maternity patients.

"Pregnancy Apps for Self-Monitoring: Scoping Review of the Most Popular

Global Apps Available in Australia.” In 2023, this study's objective was to assess the efficacy of pregnancy apps for self-monitoring and their BCT usage. It also cited that applications and other digital health technologies have the potential to promote healthy behaviors, particularly self-monitoring, which can aid in the management of pregnancies and reduce the risk of associated disorders. Furthermore, in the proposed system it is an application that will used to monitor the pregnancy period of a women and will used by the women

“Mobile Personal Health Records for Pregnancy Monitoring Functionalities: Analysis and Potential.” 2016 In this study, it discussed the features and possible paths for future development of similar applications, which may lead to a more efficient use of smartphone capabilities. This platform similarly works on monitoring the health of pregnant women concerning what are the best applications available on the market. While the proposed study is about making a web system and mobile application for maternity patients to monitor the pregnancy delivery which is similar because developing the proposed system needs a great analysis for a better outcome.

“Wearable Sensors for the Monitoring of Maternal Health—A Systematic Review” 2023. A study which discussed the essential part of maintaining the health and safety of the maternity patient by the use of wearable sensors for the monitoring of maternal health. In addition, the proposed study connects how important information must be monitored when it comes to the health of the maternity patients to support the credibility of the patient’s information.

"Development of an e-health network for in-home pregnancy surveillance based on artificial intelligence," 2012. An e-health network for in-home pregnancy surveillance concerned about monitoring the out patients to assure an early diagnosis of pregnancy problems and fetal diseases, as well as ubiquitous information support for prenatal and intrapartum pregnancy care. The study concluded that in order to assure the patients it needs to be monitored by the use of smart inhome monitoring equipment that is related to the study to monitor the health of the maternity patients even though they are away from the BahayPaanakan.

“Oral health during pregnancy: An analysis of information collected by the Pregnancy Risk Assessment Monitoring System” 2001. This study is regarding the pregnant oral health during pregnancy because having problems or feeling unwell may cause stress to the patients. That’s why the pregnancy risk assessment the monitoring system is about collecting the important data of the maternity patients. The study is related to the proposed system to tackle the health maintenance of pregnant women.

“Mobile Health Apps for Pregnant Women: Systematic Search, Evaluation, and Analysis of Features" 2021. This study is about the methods to evaluate, search and the analysis of features of a mobile health application for pregnant women. The study is important in developing a mobile application because in order to have an outcome a process of making a system is the only way. The study is somehow related to our proposed system. Because we the researchers

also evaluate, analyze and search all the useful information to enhance the features of the proposed system.

“Effectiveness of mobile applications in pregnant women’s adherence to prenatal consultations: randomized clinical trial.” 2021. The study tackled evaluating the effectiveness of a mobile application for cell phones in the adherence of pregnant women to prenatal consultations. In order for this study to be useful a randomized clinical trial was carried out. The study is aligned because an interview was held for the researchers to have knowledge when it comes to the consultations of pregnant women. The researchers desire an effective application that a pregnant woman can use in consultations.

“Pregnancy Monitoring and Mapping Using Integrated Mobile Application and Geographic Information System.” 2019. Mobile application and geographic information system for monitoring the pregnant and mapping was integrated in the study. It is a simple technique for keeping an eye on pregnancy risk using smartphones. The study is linked to the proposed system because it also has a mapping service to locate the different Bahay-Paanakan and to be knowledgeable in what the centers may offer.

CHAPTER III

DESIGN AND METHODOLOGY

The design and the process of the proposed system Mom-in-Care: A Monitoring Tool for Pregnancy and Delivery in Nasugbu, Batangas was stated in this chapter. Collection of information and data are performed by analyzing the research problems and issues. After the researchers find any related ideas on how to manage the records more securely and organized, the insecure technique of recording data will be changed. A new project will be completed based on some previous research project concepts that are very informative.

The researchers also presented the System Development Life Cycle (SDLC) to show the process of project development. Every phase of SDLC was discussed including its descriptions and its purpose.

The Agile Methodology presents different phases. These phases are also explained related to the project development process. It is divided into six phases. Planning, Analysis, Design,

Implementation, Testing and Integration, and Maintenance.

Research Design and Methods Used

Figure 3.1. Agile Methodology

The figure above is showing the Software Development Cycle of the project, Mom-in-Care: A Monitoring Tool for Pregnancy Delivery in Nasugbu, Batangas. Every phase is studied by the researchers. Every phase has its purpose in developing the project.

Requirements

To systematically build the proposed system, researchers will provide the following requirements. Data collections, devices needed, hardware and software that will be the tools for developing the system itself.

There are many ways that can be used to provide the data requirements. The researchers decided to have these methods of data collection. Conducting interview materials, survey forms and direct inquiry for maternity patient reports for respondents to get the needed information in terms of their experiences for being maternity patients and midwives. The second method is to research on the

internet and look for related topics that can also maximize the researcher's knowledge about the proposed system. Collecting all these data and use these as the primary materials on developing the system as well as designing the User Interface (UI) depends on it, with the use of hardware and software needed that will successfully develop the system.

Design

The process of specifying the components, modules, interfaces, and data of a system in order to meet predetermined requirements. Following data collection, the researcher moved on to the planning phase, which included consideration of system architecture as well as the software tool required to construct the program.

Development

The system development consists of environmental development which are the android application and web-based platform. The android application of the system will be used by the maternity patients to do the inquiry for the accommodations, and consultation. The web system will be used by the midwives to manage the delivery monitoring and scheduling appointments. The system have two users, the midwives (System Administrator) and the maternity patients.

Testing

After the researcher finishes the system development, the researcher will test now so that it can determine if there's any flaws in the functionality of the system. The researcher will monitor the feature functionality that will be tested like the function of the monitoring of the pregnancy delivery and scheduling the appointment of the patients, checking the stored information of the patients in the system. Then if the researcher sees a bug or an error, they need to re-program or redevelop it before the researcher releases it or deploy the system to the public.

Deployment

Researchers conducted an in-person transaction in every Bahay-Paanakan clinic in Nasugbu, Batangas. Researchers also had a conversation together with the head nurse of every lying-in clinics and distributed the request letter for the approval of implementing the observations and interview to gather information in their facilities. The request letters have been signed and acknowledged by the head nurses. This is a proof as well as assurance that the project will be developed with a focus target and an implementation phase.

Review

At this phase, researchers review the gathered information and data. It aims to give the main purpose and reasons for developing the project that discuss how the project will help the midwives by monitoring and managing the appointment

transactions of every maternity patient. With this review, the researchers look for strong references for the gathered information in every Bahay-Paanakan in Nasugbu, Batangas. Researchers used the acquired answers and ideas to construct the project after consulting with the head nurse and clinic owner of the Bahay-Paanakan in Nasugbu, Batangas. Recommendations and suggestions are taken into account.

DEVELOPMENT PROCESS

To successfully complete the development, the system will go through several processes. To keep the projects moving forward, proper analysis of the step-by-step process is required. This phase will go over the three major components of the system's development that have been studied. Testing, Debugging and Validation. The system's development will be more stable as a result of this.

Testing

This aims to investigate and observe potential problems, as well as to test the system's flexibility and stability. At this point, the developer will have an idea to handle and manage the system, changes to make, and the idea will be applied to the upcoming adjustment processes. In short, after this stage, the record will be improved because it will provide a hint on improving and make the system better than before.

Debugging

The system's tested functionality will now proceed to the next phase. This phase is in the process of progressing, and the developer will now fix the system's errors and deficiencies after identifying them. All errors, from minor to major, must be corrected. After making those changes, the system's functionalities will be better prepared to deal with any conflicts that the target user may encounter.

Validation

The validation stage is an important part of the development process. This section describes how the testing and debugging processes work.

The target user will now provide recommendations and suggestions, particularly end-user feedback, to the project system's main function. These will be obtained by asking the target users via questionnaires or surveys how the project will benefit them. Another advantage for the development process will be obtained by the developer.

PROGRAMMING PROCEDURE

The proponent's software is made up of PHP code, which is commonly used to build interactive websites with features like data storage, which requires the user to set up a MySQL database. Furthermore, the built system made use of notification capabilities; additionally, the system will integrate GIS so that maternity patients can locate the location of Bahay-Paanakan. HTML, CSS, and

Bootstrap were utilized to create a visually appealing design that was also responsive to the device from which the system was accessed.

System Architecture

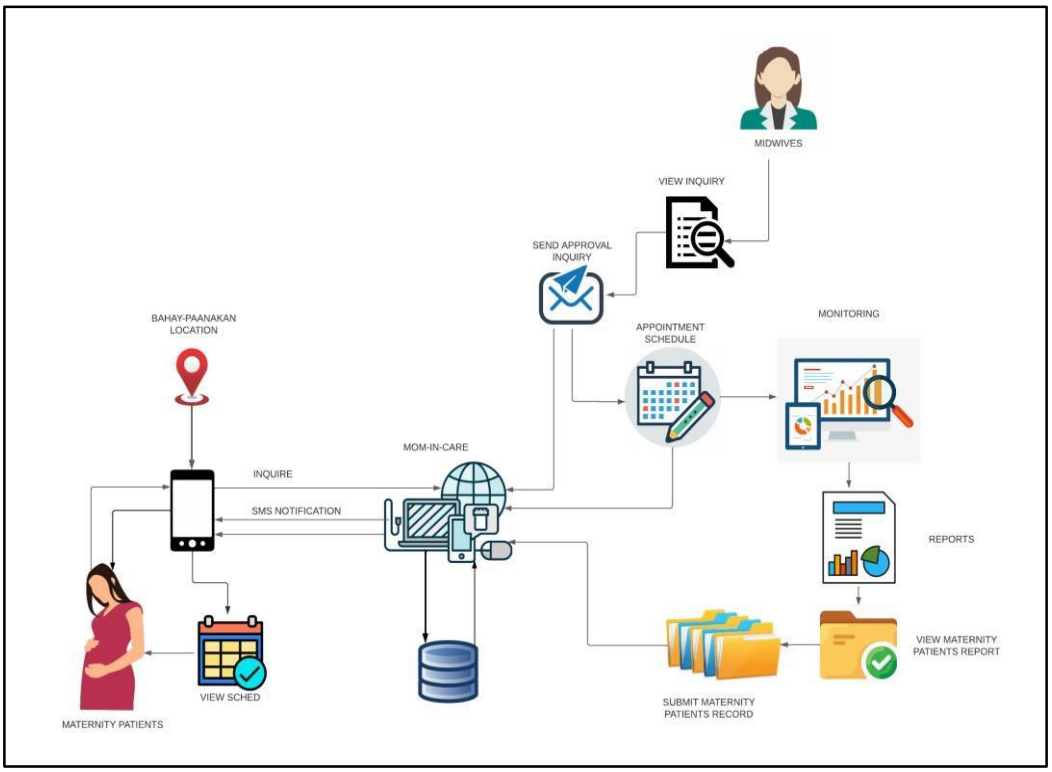

Figure 3.2 System Architecture of the System

The figure 3.2 shows the architectural design of the system, with the use of this diagram, researchers will determine the structural design functionality same with the numerous views of the system development.

Based on the diagram the system has a web based and mobile application that are connected to the data based. In the system, the maternity patient must need to make an account to enter the system which is highly secured and will be stored

in the database. After the account creation, the maternity patient can see the locations of Bahay-Paanakan to check and inquire. It takes minutes to receive a sms notification for inquiry approval. Once the maternity patient receives an inquiry approval she can view the schedule of her checkups. The midwife can view and review the inquiry of the maternity patient's data. After the previous process, midwives will make an appointment schedule to monitor the maternity patients. Lastly, all the data will be stored in the database of the Mom-in-Care.

Requirements Analysis

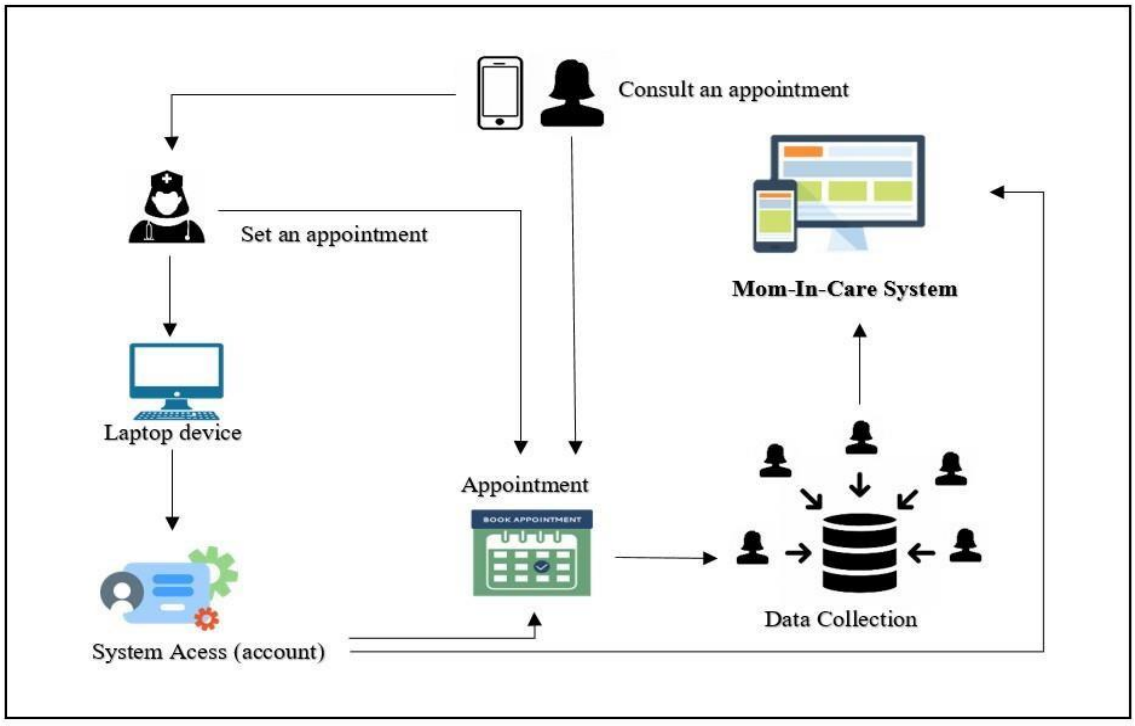

Figure 3.3 Requirements Analysis of the System

The figure shows the system requirements needed in the proposal system. Requirement analysis describes how the system will become a useful tool for the midwives and the maternity patients. It shows the requirements must be used into

the system including the maternity data collections, appointments, and consultations. In data collections it comes from the end users or the maternity patients who are using the system. Midwives are the one who can set up the appointments and the consultations.

Use Case Diagram

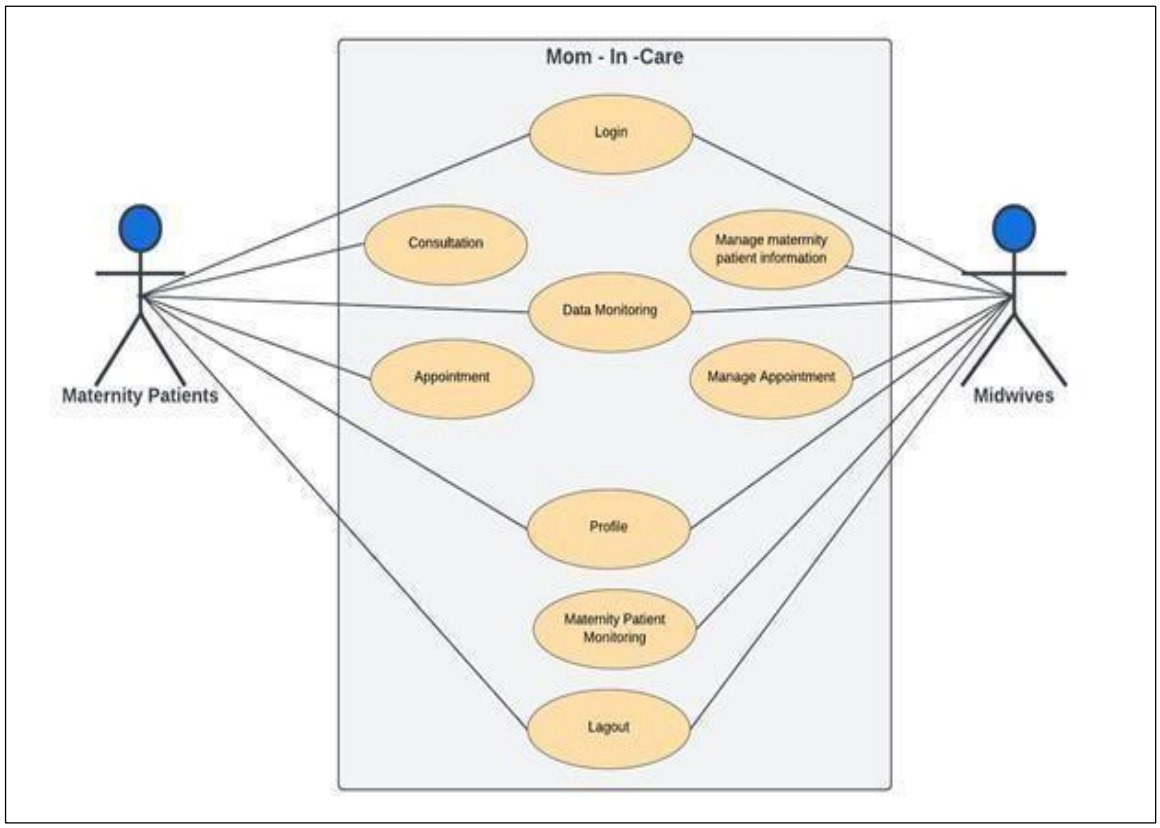

Figure 3.4 Use Case Diagram of the System

The figure shows the user interaction to the system by using the use case diagram that represents the use case on which the user is involved. The system has a main user which is the midwives. Midwives are the one who can manage the system including the maternity patient information, appointment, data

monitoring and the profiles. They can also monitor maternity patients by using the system. Then the system also has an end user which is the maternity patient. Maternity patients can log in into the system and can do the consultation process, view the appointments, and manage their own profile.

Context Diagram

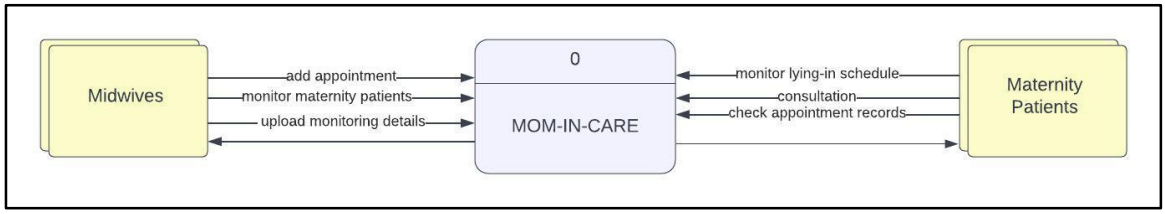

Figure 3.5 Context Diagram of the System

The figure shows the context diagram of the system. It involves the three (3) important entities which are Midwives, Maternity patients and the Lying-in. This will explain the basic idea of how the system will work, based on the user's configuration. The design will be considered as one of the requirements to successfully execute the function of the system.

Data Flow Diagram

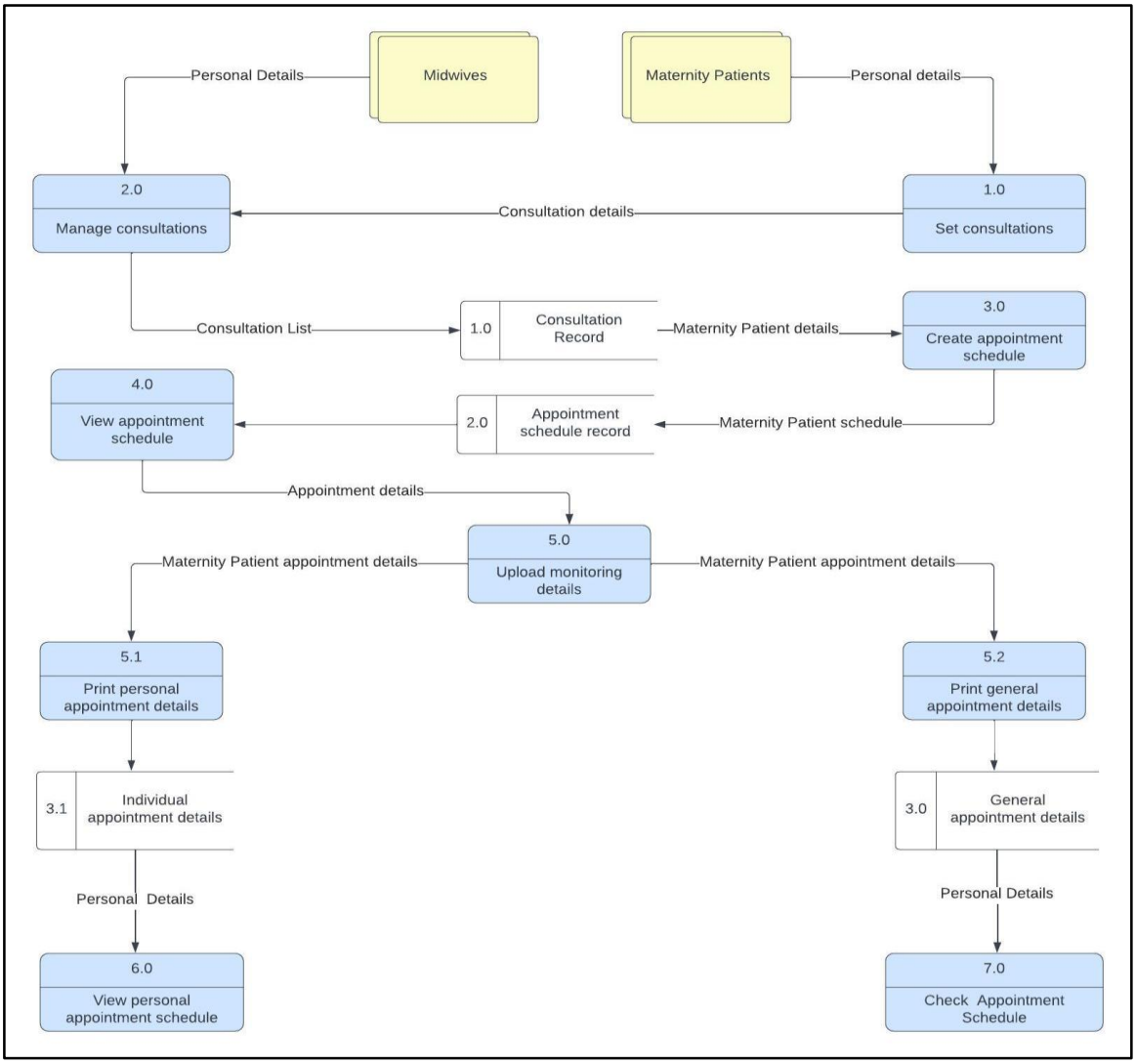

Figure 3.6 Data Flow Diagram of the System

The figure shows the data flow diagram that describes the information inside the system. The entities that are present in the figure are the maternity patients, lying-in and midwives. The process was divided into many categories to explain more how the data are processed into useful information. All the processes should be completed by the system to produce the output of what the user needs.

Entity-Relationship Diagram

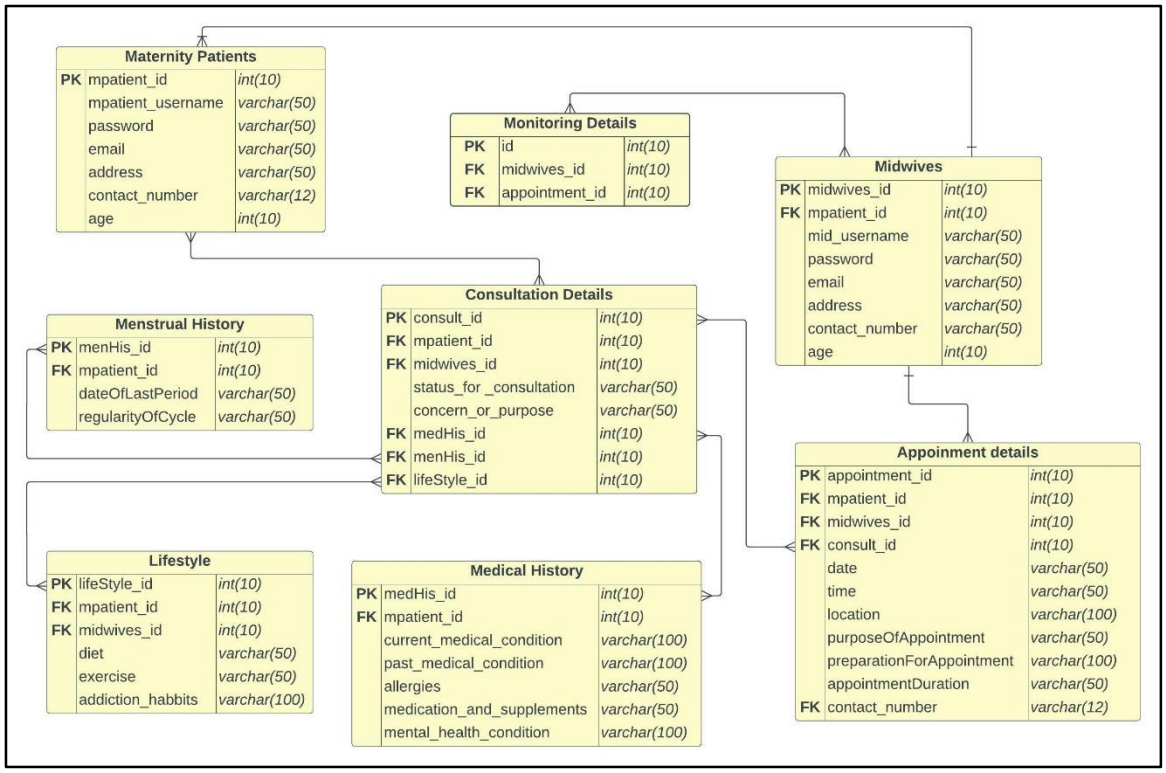

Figure 3.7 Entity-Relationship Diagram of the System

The figure above is the ERD of the system which shows the table, fields, relationships, and attributes in the database. The user has the most information in the database. It is the overview of the development proposed system of the researcher which is the

Mom-in-Care: A Bahay-Paanakan Monitoring Tool for Pregnancy and Delivery in Nasugbu, Batangas.

HARDWARE AND SOFTWARE NEEDED IN THE DEVELOPMENT

Hardware Needed

The hardware requirements for the web system and application contributed to the development system's successful design and programming.

Table 3.1

Hardware Needed of the Laptop for the Development

Hardware	Specification	Function
Laptop with Windows 10 Pro	Version 21H2	Used for developing the system as well as documentations and other requirements.
Mouse	Wireless USB Mouse	A mouse is a hand-held pointing device that detects two-dimensional motion relative to a surface.
Monitor	14.00-inch display that has a resolution of 1366x768 pixels.	A monitor is a piece of computer hardware that displays the video and graphics information generated by a connected computer through the computer's video card.

Random Access Memory (RAM)	8GB	RAM is a temporary memory bank where your computer stores data it needs to retrieve quickly.
Processor	Core i5	A processor is an integrated electronic circuit that performs the calculations that run a computer.

Table 3.1 shows the suggested hardware needed of the laptop for developing the system. Keyboard, Mouse, Monitor, Random Access Memory (RAM) and

Processor are the hardware requirements needed to accomplish the proposal system.

Table 3.2 Hardware Needed of the Mobile Device for the Development

Hardware	Specification	Function
RAM (Random Access Memory	4GB	It is used to store, read and write any type of data.
Processor	Intel Quad core 2.0Ghz or higher	A processor is an integrated electronic circuit that performs the calculations that run a computer.

Table 3.2 shows the suggested hardware needed of the mobile device for developing the system. Memory Card, Random Access Memory (RAM) and Processor are the hardware requirements needed to accomplish the proposal system.

Software Needed

The software requirements for the web system and application contributed to designing and programming the developed system.

Table 3.3 Software Needed in the Development

Software	Specification	Function
Programming Language	PHP, HTML and CSS	A scripting language for writing a program in creating web applications included the back and front-end of the system.

Integrated Development Environment	Visual Studio Code	It is a free-editor that helps the programmer or developer in writing code, debugging and correcting the code in an easy manner.
Web Server	XAMPP	A cross-platform web server that allows programmers to write and test the code.
Database	MySQL	An open-source relational database management system that can define, manipulate, control and query the data.
API	SMS	Is used for sending SMS notification.

Table 3.3 above shows the needed software in developing the proposal system. The table has 3 columns which are Software, Specification and Function that has its own specific functionality.

The researchers will use PHP as a programming language to write and debug a code in the VSCode (Visual Studio Code). VSCode is a free-editor that helps the programmer in writing code, debugging and correcting the code in an easy manner. This programming language and IDE will be the tool that the researchers will be using in developing the proposal system named Mom-in-Care.

Mom-in-Care system will use an online database platform called MySQL database and a XAMPP for web server which is phpMyAdmin that is intended to handle or administer MySQL.

INSTRUMENTATION

To assess the information provided by the respondents, the researchers used an evaluation/questionnaire tool. This data links the system's recommendation to the user's approval rating and other data. The research's issue statement, as well as sample size calculation procedures, were used to determine an appropriate number of respondents to be collected from the general population. The specified location and target respondents were used to create three groups. Maternity patients were the initial group and followed by midwives. After using the

technology, the researchers completed the validated evaluation/questionnaire. They then added up and calculated the data they had gathered.

PREPARATION AND EVALUATION

The researchers will gather important data for the study by conducting a survey of those taking part in the research. The requirements to build the system were also prepared and ready to use. Respondents will also be questioned to fill out a questionnaire. Finally, the survey will be tabulated by the researchers. The answers to each question will aid in the analysis of the problem. The mean range is used to establish guidelines for questionnaire intervals. It is critical to obtain the interval. The Likert Scale (5-point) formula was used by the researchers:

Guide Interval for Questionnaire

The intervals between evaluation ranks were verified a Likert Scale:

Likert Scale : i = h-1t

wherein:

i = interval

h = highest value in the questionnaires l = lowest value in the questionnaire

t = total number of the preset options in the questionnaire Weighted Mean formula:

Whereas:

WM = Weighted mean

fx = sum of the products of f and x where f is the frequency of each score and x are the weight of each score.

N = total number of the respondents.

Table 3.4 Guideline Interval for Degree of Acceptance

SCALE	MEAN RANGE	DESCRIPTIVE EQUIVALENT
5	4.21-5.00	Highly Acceptable
4	3.41-4.20	Acceptable
3	2.61-3.40	Moderately Acceptable
2	1.81-2.60	Fairly Acceptable
1	1.00-1.80	Not Acceptable

Table 3.4 shows the intensities of the responses of the respondents. Each scale number has a descriptive equivalent and mean range.

Table 3.5 Guideline Interval for Degree of Satisfaction

SCALE	MEAN RANGE	DESCRIPTIVE EQUIVALENT
5	4.21-5.00	Highly Satisfaction
4	3.41-4.20	Satisfied
3	2.61-3.40	Moderately Satisfied
2	1.81-2.60	Fairly Satisfied
1	1.00-1.80	Not Satisfied

The table shows the answers of the respondent in the level of their satisfaction with the proposed system. In analyzing the Likert Scale Data, researchers used descriptive statistics to write a brief numerical or visual summary of the gathered information.

Sample Size Determination

To get the sample size, researchers needed a total of fifty-four (54) respondents in Nasugbu, Batangas consisting of four (4) midwives and fifty (50) maternity patients living in and working in every lying-in clinic in the target area.

Sampling Procedure

A non-probability sampling technique called convenience sampling, sometimes referred to as sampling availability, gathers data from individuals of the population who are easily accessible to take part in the sample. In this study, convenience sampling was used by the researcher to collect responses from midwives and maternity patients who were readily available to discuss their opinions of the proposed system, Mom-in-Care: A Bahay-Paanakan Monitoring Tool for Pregnancy and Delivery in Nasugbu, Batangas. The researcher will distribute a questionnaire to each respondent either personally or through any other means that may be available.

Participants of the Study

Table 3.6 Participants of the Study

Respondents	Number
Midwives	4

Maternity Patients	50
Total:	54

This table shows the participants in the study, which are the maternity patients and the midwives. These are the respondents who can answer the questionnaire given by the researcher. The table shows the possible number of target respondent which are four (4) midwives and fifty (50) maternity patients total of fifty-four (54) respondents.