

Web-Based Application For Mothers & Midwives

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Abstract: Web-based applications have become the most common platforms for developing information and services via the internet. Because of the evolution of these web-based applications, people have able to communicate with different kinds of applications. So, this project has been decided to help parents, especially for mother and midwives through a web-based application. When parents have to take their children to meet midwives and doctors up to two-three years since their origin, they have to conduct a book to record the details of their children. This is a very critical situation for carrying their children and keeping a record book. The worst thing is they cannot keep their child with another person also to attend the clinic due to the grasping issues. Parents also may not remind all the instructions given by the midwife and has to repeat again and again about previous reports and the baby's condition at the next clinic date. When midwife wants to visit mom's places, they have to face lots of difficulties like forget to bring documents, wouldn't find the location, suitable route to visit the place etc. So, this is the research to optimize the relationship between the parents and midwives through a web-based application with interconnecting mothers and midwives. The analysis part has been done via an interview with using parents and midwives. To enhance the relationship between mother and midwives, this system is tried to set all of the factors into a web-based software solution with surveying all the mixed methods in Sri Lanka.

Keywords: Motherhood, mother - midwife relationship, mother and baby

Introduction

The most precious relationship is the mother and child in the world. All other humans have to help to enhance this amazing relationship since the origin of the child. The birth of a child is wonderful,

it is a life-changing time for a mother and her whole family. There are fresh hopes and new dreams since the time of new beginnings, and it changes all the things. Birth of a child shapes parents lives and families forever.

Today, almost everyone conducts their relationships over the internet and technology. Most of the scenarios are also running as online applications as web-based applications. If the relationship between mother and midwives comes into such kind of web-based application, it will impact to fulfill all the requirements of the mother since the pregnancy period and until to child's growth. When there won't good protection to mother and baby, most of the injuries can happen.

Normally Sri Lanka's antenatal care is consisting of two delivery services as Domiciliary care and Clinic care. Domiciliary care involved by PHM and clinic provided by medical officer including midwives. Antenatal care includes a package of interventions to ensure the health and wellbeing of the mother and newborn baby. This system has focused on the wellbeing of the baby since their origin.

The overall aim is to overcome the difficulties of mothers and midwives by converting manual file records into a web-based software solution. As objectives, this project is used to automate the baby's clinic record book. The midwife can fill the baby's details without using manual records. Parents have accessibility to view the child's growth, record book details, special notices and notifications and receive messages about reminders. The system is generated reports to observe special needs babies and filter nearest addresses to visit baby's places for midwives.

Even though there are apps for babies, those are not fully automated with these records and especially for mother and midwife both parties. Unlike other applications, this system is used to save the time of mother and midwife. Especially it hopes to enhance the relationship between mother and midwife.

It is accepted that a good start at the beginning of life makes a child be an efficient person of the society, hence the first five years is a crucial period of child's growth and development (Fayaz and Goonawardane, 2017). It has associated with the mother's adequate knowledge about the child's development. So, midwives must involve with mothers to help their childcare.

Normally, every woman must develop a personalized care plan with the help of a midwife and other professionals. When there is unbiased information, they can build their own plan it helps to care about their children. When it happens through some kind of own digital tool, it gives the capability to access their own information and keep records about their children. So, without any difficulties, they can be accessed to their own account and having reminders etc.

This project has designed after identifying the difficulties of parents and midwives in Sri Lanka. Because they have faced very conflict situations when caring a child. Sri Lanka

made special efforts to extend health services, including critical elements of maternal health care (Levine, 2007). After studying these kinds of efforts, the system is used to overcome these issues as much as possible.

Normally all Sri Lankans are in a very tight schedule with the globalization even though that they must take care of their babies very well. This effort directly goes to mothers who are involving with the baby every day.

According to the Table 1-1 more than 90% of mothers had formal health information (n=380, 93.6%) while PHM home visit played a vital role in providing this knowledge (65%, n=261). Antenatal clinic visits and MOH provision of knowledge were 10.2% and 6.9%, respectively. Only 2.7% (n=12) of them obtained information regarding developmental milestones from the CHDR. Nearly 80% of mothers obtained health information (n=326, 81.5%) through informal sources such as parents (72.4%), peers (9.8%) and media (6.1%) (Fayaz and Goonawardane, 2017)

Table 4. Source of information available for mothers on developmental milestones

Background characteristic	Antenatal care provider						Total	Percent of women receiving antenatal care from selected provider	Number of women married
	Obstetrician	Medical officer of health (MOH)	Other health worker	Public health nurse	Other	No ANC			
Mother's age at birth									
<20	57.0	30.3	6.9	4.9	0.3	0.5	100.0	99.2	349
20-34	85.3	25.5	3.9	2.9	0.3	0.0	100.0	99.8	5,735
35-45								1.0	100.0
Birth order									
1	89.2	22.2	4.8	2.7	0.4	0.9	100.0	99.6	2,912
2-5	50.0	22.0	2.5	2.9	0.4	0.3	100.0	99.3	4,125
6+								0.5	100.0
Residence									
Rural	85.5	23.0	4.5	2.0	0.3	0.2	100.0	99.5	5,124
Urban	51.1	21.7	3.4	0.2	2.2	0.0	100.0	99.6	2,098
District									
Colombo	80.8	14.8	4.5	2.2	0.0	0.8	100.0	99.4	931
Campanha	89.1	23.8	4.8	1.8	0.2	1.8	100.0	99.0	690
Puttalam	84.2	28.8	4.0	3.1	0.1	0.0	100.0	99.4	443
Kandy	89.0	32.7	5.9	4.1	0.0	0.0	100.0	99.0	492
Katle	89.2	28.7	2.7	4.5	0.3	1.9	100.0	99.1	332
North Western	81.3	14.1	1.7	1.9	0.3	0.7	100.0	99.1	380
Madaya	83.4	18.7	4.4	2.3	0.0	0.0	100.0	99.7	284
Jaffna	39.4	37.7	12.3	8.3	0.0	0.0	100.0	97.0	170
North Eastern	82.1	18.7	4.4	2.3	0.0	0.0	100.0	99.7	235
Vavuniya	44.0	86.2	10.9	8.0	0.0	0.0	100.0	97.4	42
Middle Western	84.1	43.9	19.2	0.0	0.0	0.0	100.0	97.4	42
Batticaloa	44.4	44.3	6.4	4.0	0.0	0.0	100.0	100.0	217
Amaly	88.0	48.3	11.0	0.0	0.0	0.0	100.0	99.0	168
Kurunegala	73.4	16.0	3.1	3.9	0.0	0.5	100.0	99.0	613
Puttalam	68.6	23.9	0.0	0.8	0.0	0.7	100.0	99.3	282
Arurudhapuram	21.5	79.0	2.6	0.0	0.0	0.0	100.0	99.7	389
Polonnaruwa	89.0	47.6	11.0	0.0	0.0	0.0	100.0	99.0	197
Badulla	42.2	47.6	2.0	0.4	0.0	1.0	100.0	98.0	274
Moragala	46.2	27.0	0.7	24.1	0.0	1.5	100.0	99.0	508
Trincomalee	74.0	47.6	11.0	0.3	0.0	0.0	100.0	99.7	393
Kegalle	80.0	17.7	1.7	0.8	0.0	0.0	100.0	99.0	275
Education									
No education	44.0	36.2	11.0	2.3	0.0	3.7	100.0	99.3	51
Passed Grade 1-5	40.1	27.8	8.0	0.8	0.3	2.0	100.0	97.2	207
Passed Grade 6-10	61.3	27.8	9.9	0.8	0.2	0.8	100.0	99.0	3,124
Passed O.C.E.(G.A.) or equivalent	75.5	18.1	2.8	2.1	0.3	0.7	100.0	99.0	1,708
Diploma and above	83.7	12.9	2.8	0.8	0.7	1.3	100.0	99.0	1,413
Wealth quintile									
Lowest	60.3	36.5	7.5	5.2	0.2	1.1	100.0	99.3	1,413
Second	69.0	30.3	5.8	2.5	0.2	0.6	100.0	99.2	1,437
Third	68.0	25.0	3.0	2.2	0.0	0.7	100.0	99.0	1,497
Fourth	70.2	21.0	4.4	2.7	0.2	0.6	100.0	99.2	1,224
Highest	81.3	0.8	1.0	4.4	0.0	0.0	100.0	99.0	1,284
Total	63.4	23.7	4.7	3.0	0.3	0.9	100.0	98.8	7,138

When researching such kind of aspects can clarify that every woman wants some kind of support from their midwife when caring a child. Especially in Sri Lanka young mothers' knowledge about child care is not good with

the busy lifestyle. They need some technical support for getting their work easily.

Nowadays the most common and flexible method is designing a web-based application to overcome their issues. There are several types of applications for supporting mothers.

Cumberlege had been proposed as a digital tool for improving choice and care about children. But the thing is these suggestions have not involved totally with midwives especially when they are going to visit their client's places.

South Warwickshire set an electronic notes system for maternity care. It is like a tablet computer which can be used by midwives to enter information. Normally, it has interconnected with the hospital.

Another one is M4ID project and this system has concerned about the pregnancy period only and only for mother, it has not concerned about the child.

Table 1-5. Antenatal Care

Sources of information	No.	%
Formal health information¹ (N=381)		
PHM Home visit	261	65.0
Antenatal clinic visit	42	10.2
Postnatal clinic visit	11	2.7
Antenatal classes	22	5.4
Medical officer of health	28	6.9
General practitioner	5	1.2
Child health development record	12	2.7
Informal health information¹ (N=332)		
Parents	236	72.4
In-laws	19	5.8
Peers	32	9.8
Neighbours	7	1.5
Media	22	6.1
Others	16	4.3

¹Multiple responses

According to the Table 1-2 ninety-nine percent of ever-married women received antenatal care from a skilled healthcare provider via doctors, nurses and midwives for their most recent birth. Only one percent of ever-married women did not receive antenatal care for birth in the preceding five years. Of those who received antenatal care from a health provider, 65 percent received it from an obstetrician, 26 percent from a

medical officer of health (MOH), 5 percent from another doctor and 3 percent from a public health midwife(Health, 2005).

Even though midwife is concerning for babies, there are issues such as they cannot contact them when they needed due to the difficulty of finding contact details, the mother has to rewind all the details about the baby and midwife has to read the reports, see the record book, the midwife has to spend the whole day to visit baby's place it may be useless due to the unavailability.

As the first section, this paper is identified about the relationship between mothers and midwives and their importance. The literature review is used to identify previous projects in the second section. The third section is Methodology and describes the architecture of the project and Implementation has used to identify system interfaces as the fourth section. Discussion and Conclusion is the fifth section and has identified further improvements of the project

Literature Review

A. Relationship Between Mothers and Midwives

Childbearing is a period of psychological challenges that must be viewed in a social context. This study reports the maternal transition from the perspective of Iranian first-time mothers in the first year after childbirth. (Javadifar et al., 2016)

This is the research to optimize the relationship between the parents and midwives. According to the above-said statement after giving birth to a child, the mother's psychological situation is totally difficult to manage. At that moment everyone who is engaging with her like her husband, friends and not even her family, midwives also should help her. This project helps to enroll these midwives to interconnect with mothers and babies.

B. Mothers

Today, mothers who are involving with their first maternity period, they haven't any experiences about this, most of the cases they are in busy lifestyle even their husband, and other family members. So, they may not get any exposures from their mothers about child caring.

"When a mother doesn't know anything about raising children and taking care of a newborn, how to change the baby's diaper, how to treat the baby when he is sick and how to give him medications, and when there are no experienced older parents around to tell her how to take care of these things and how to take care of her own stitches too, then the information provided by the midwife will be useful" (W1, 26 years old, first delivery) (Attarha et al., 2016a)

According to the Attarha, when mothers not knowing about childbirth and caring, both parties have to face huge conflict situations.

Based on the qualitative content analysis of Attarha there are four results can cause due to mental health promotion. They are Relieve stress and relaxation, mother-infant bonding, improved relationship with spouse and prevention of depression (Attarha et al., 2016a)

Mother's depression cause for caring for their children, it may either positive or negative due to the mentality of the mother. This project is helped to build the relationship from an automated system with the convenience of their duties.

According to the Dahlberg said that "Midwifery care is the best method of creating a positive experience of childbirth for mothers, and midwife's communication skills, knowledge, understanding and their presence are vital to this experience"(Dahlberg, Midwife and Aune, 2013)So, getting help from a midwife is essential for them. Based on the several

researchers, justify that women with a good midwife feel better about themselves, pregnancy and their baby.

It is the problem which has concerned with this project. So that the researcher has proposed an automated system due to, when building confidence in the midwife may benefit from continuous communication during the childbirth process. (Dahlberg, Midwife and Aune, 2013)

The midwife and mother relationship engaged with improving the quality of life not also to adopt health-promoting behaviours. Through that improve the knowledge of mothers about maternal and neonatal health care. (Whitehead, 2009) Whitehead state that the birth of an infant to a teenager represents a sudden role transition which has consequences not only for the teenager and her infant but the entire family system. This research shows the importance of a mother's health care. Due to different conditions, most of the mothers are suffered from anxiety and depression.

Teenage childbearing has serious consequences for teenage mothers, their children and the entire society but despite the negative consequences of teenage pregnancy and childbirth worldwide the rate is still high.(Vaishali Jadhav and Natasha Jadhav, 2016)

In the other hand, the possibility of relational continuity enables midwives to provide high-quality holistic care for mothers and helps to improve positive labour outcomes. Women should be encouraged to ask questions, to provide clear verbal information and to be as emotionally supported as possible.

C. Maternity services

(Cumberlege) Cumberlege has found that most mothers want their midwife to be with them from the beginning, through pregnancy, birth and after the birth of the child. Time and again, mothers state that they

had hardly ever seen their professionals after their first meeting and had to repeat the same story because their notes had not been read and had been lost. Typically, this cannot be unacceptable, inefficient and needs to change. According to that report, this is too much variance in the quality of maternity services. Health professionals work under stress and too often do not work well together, particularly across the professional divide. That medical professionals and midwives spend far too much time for collect data and filling out paperwork, but the data which they have is often of poor quality and paper-based when it should be online, and in some areas of treatment, there is no evidence at all. When it comes to a system, it will be easy to keep evidence about child's and mother's information.

Antenatal care (ANC) has been recommended as a service that can reduce both maternal and newborn mortalities. (Katowa-Mukwato et al., 2019) This paper shows it more clearly by providing problems with antenatal care.

In Sri Lanka, health systems provide technical guidance to their respective provinces. The Public Health Midwife (PHMM) is the main grass-root level health care worker in Sri Lanka who promotes the health of communities. (Perera, Guruge and Gunawardena, 2015) According to the Renfrew (Renfrew et al., 2014) the degree and type of risk related to pregnancy, birth, postpartum, and the early weeks of life differ between countries and settings, the need to implement effective, sustainable, and affordable improvements in the quality of care is common to all.

D. Digital Tools

(Cumberlege) Cumberlege have proposed a digital tool for improving choice and care about children. Because NHS wants to make it easier for health professionals to gather and share data with others and with those for

whom they care. But the thing is these suggestions not have involved totally with midwives especially when they are going to visit their client's places.

South Warwickshire has set an electronic notes system for maternity care. It is like a tablet computer which can be used by midwives to enter information. Normally, it has interconnected with the hospital.

Baby Buddy App from the charity best beginning which guides women through pregnancy and for the first six months of their children live. In the other hand my birthplace, the pocket midwife is some kind of maternity apps.

According to the project of iDeliver, has executed a tool for improving maternal healthcare. Based on the M4ID support midwives with decision making, from the moment a pregnant woman arrives at the facility to give birth until the time she is discharged. Especially this system has concerned about the pregnancy period only and only for mother, it has not concerned about the child. Regional Office for Europe (WHO Regional Office for Europe, 2009) state that assessment tool is used for MoH, key stakeholders and partners, to carry out assessments of perinatal health care provided at facility level in a homogeneous and valid way, and ultimately to contribute to the identification of key areas of pregnancy, childbirth and newborn care that need to be improved.

This project is used to represent the way to increase the relationship between mother and midwives with an automated system.

E. Comparison with prior studies

Table 6. Comparison of the proposed system and existing applications.

Features	New Proposed System	MCH App	Maatritva	Savika	Happy baby, Healthy mom	ZMD
Mother & Midwife both can access	✓	✗	✓	✓	✓	✓
Send message and advice	✓	✗	✗	✗	✗	✗
Reminders	✓	✗	✓	✗	✗	✗
Calculating statistical data	✓	✗	✗	✗	✗	✓
Find the shortest route	✓	✗	✗	✗	✗	✗
Chatbot	✓	✓	✗	✓	✗	✗
Tracking a child's growth	✓	✓	✗	✗	✗	✗
Help to avoid overweight during pregnancy	✗	✗	✗	✗	✓	✗
Document Management	✗	✗	✓	✓	✗	✓

Lots of researches and systems have been developed to secure and bring well-fare for parents and their new birth children and strengthen the relationship between midwives and parents since their pregnancy period. Especially for enhancing the relationship between parents and midwives.

Effective communication and emotional support of parturient women improve the outcome of childbirth. Reduction in Duration of labour, caesarean rate, use of anesthesia, and 5 minute Apgar Score less than 7 can achieve. (Attarha et al., 2016b)

When comparing this proposed system to those older studies, it must be pointed out that, those systems consist of only some instructions and few functionalities even there aren't any routing instructions.

Methodology

During the requirement gathering and analysis phase data were collected from parents and midwives while the interview and they were not allowed to communicate to prevent cross-contamination. It included as face to face, unstructured interviews with participants by the researcher. Participant mothers were selected with the help of midwives. During interviews, questions were asked from mothers about their experiences with midwives and it has turned into the most specializing concept in this project, by asking their preferences about using an automated system with describing privileges. The researcher was asked about inconveniences when keeping records of babies and other conflict situations from participant midwives. For mothers as well as midwives is tended to persuade about the value of using an automated system.

At the beginning participants are informed of the purpose of the research and how it can affect their lives. This was the study instrument in this research. The questions were asked in a friendly manner and it helped to earn more details from them.

A. Results

According to the mother's perspective, they expected from midwives to be with them since the pregnancy, birth and the after birth. Also, it happens without any restrictions because it is the duty of midwives. But at the next meeting with mother-baby and midwives and other professionals, they had been to repeat again and again about previous reports and baby's and mother's condition by finding previous reports and documents. Based on the midwife's perspective identified that inconveniences for

visiting places with carrying records and clarifying particular child. Totally it was time wasting and it should not be acceptable and not an efficient way as government workers. Also, it caused for disappointment by both parties.

After requirement gathering and analysis, system is used HTML for front-end and PHP as back-end development. It is designed interfaces based on the mother's and midwives' preferences. Especially concerning with HCI rules and standards hope to design user interfaces. The database is designed with few tables which can be untreatable to everyone at the design phase. The database management is done by the admin and design to manage midwives and parents accounts separately.

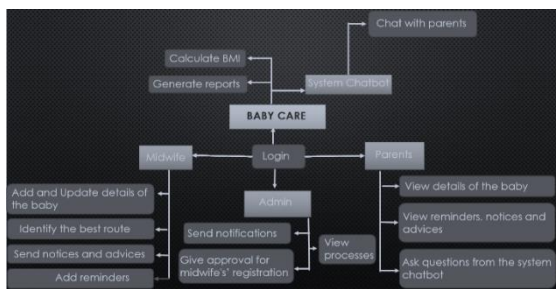


Figure 29. Baby Care Web Application

Through this project, the researcher implements the system mainly login access to both parties and adding details about them. The midwife can fill the relevant details of the baby in their account. Then, they don't want to keep manual records. If the mother is not aware of childcare scenario, they may not get worried furthermore, when adding every detail by the midwife. If there any conflict situation about the child such as underweight, overweight, it can be identified due to the records of their accounts and automatically generate reports base on the particular area of the midwife.

Mainly, the midwife can notice all the details and can assume the child's situation.

The midwife has to visit mother's places to collect information and give pieces of advice. Through this application, they can be aware of the best route to their places by identifying the shortest route to them. This project has implemented that functionality to get easier for midwives.

Also, mothers can get notices which are sent by a midwife about vaccinations, other medicines and reminders about the next clinic date to their mobile phone. Basically, a midwife can send notices individually or as a group according to their area.

Implementation

This project involves identifying the requirements of midwives and mothers when communicating with children's welfare.

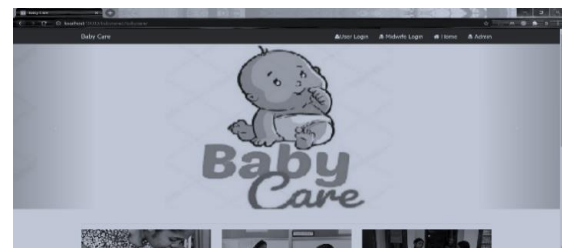


Figure 30. Home Page

Here is the home page which has accessibility to login to MOH, midwife and parents.

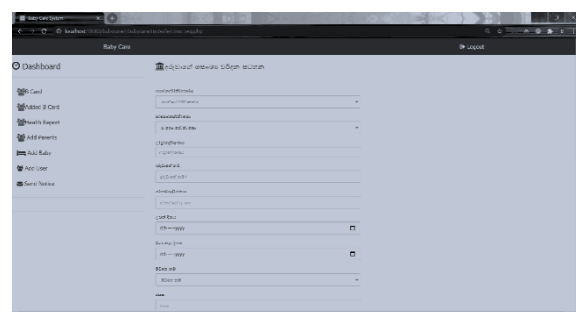


Figure 31. Detail Form

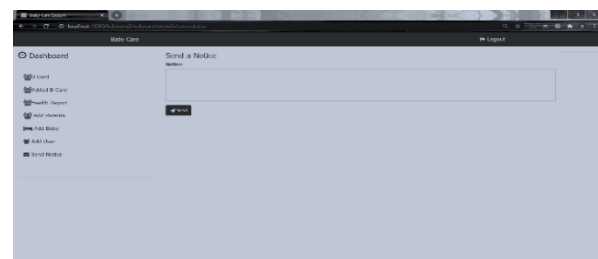


Figure 32. Sending notices by midwives to parents

A midwife can send notices to mothers who are in a particular area as a group or individually.

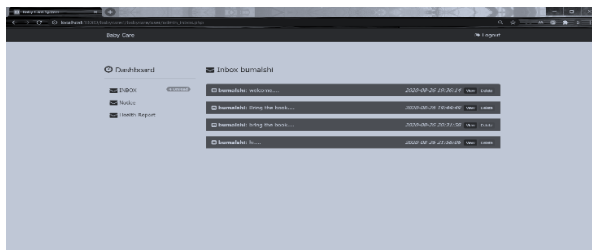


Figure 33. Parents can view messages

As like messages they can view all other notices and the baby's report.

Discussion and Conclusion

The web-based applications can be developed into various forms according to day-to-day requisites. Among those requirements, providing system for mothers and midwives are one of the major functionalities that have to be executed. Through that can enhance the easiness of both parties and enhance the relationship between mother and midwife. This research helps to increase the efficiency and save the time of both parties. Also, it provides a solution for insufficiency.

As summarized in this paper represents system methods which can use to enhance the growth of the relationship between parents and midwife especially with considering children's well-being, because if the relationship of parents and midwife is high, the growth of children wouldn't stop furthermore. Especially this paper has concerned for mothers who can involve new technologies and provide a solution for their busy lifestyle. So, this paper hopes to implement the system to enhance the children's health assurance since their birth. This project is hoped to increase the lifestyle of midwives and mothers most steadily.

As limitations, this has not concerned about hospitals and other professionals and midwives have to keep their other manual records, because this has concerned only for

baby's records. This work can be further improved by studying, identifying and providing more functionalities to the system. It can be executed in hospitals over the country by combining them. Then every midwife can access their patients' information easily. If occur any sudden incidents to midwives, another person can handle that particular patient based on the web application.

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Author Biographies



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