Web-Based Workload Maintain System for Midwives in Sri Lanka

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Abstract: Public health has always been an information-intensive field. Public Health Midwives (PHM) is the 'front line' health care provider responsible for the provision of maternal and child health and family planning services at the community level in Sri Lanka. Considered several recent researches and studies have revealed these midwives have faces undue burden due to maintain number of routine documents manually and without having proper system. those registers and records and in turn, the quality of their services has been badly affected. Therefore, introducing a web-based system for midwives through a simplified solution for easy documentation, data management in online will opportunity to involve in more field activities. Furthermore, it is useful in midwives to notify daily tasks, monitoring and evaluation of the field activities for themselves. Meantime it leads to notify to mothers about their clinics, vaccinations and activities by messages mothers from eligibility registration to whole pregnancy, prenatal, childbirth and postpartum period. By considered rural families provide this message service to any mobile phone with Sinhala, Tamil and English languages without facing difficulty. Moreover, the facility of storing information and access system with any devices when their visits without referring large documentation make the system more user friendly. In a subsequent of studies, all the midwives gave positive comments indicating that they were happy with the developing system and that they would like to continue using it to enhance their service. The system seems to be a practical solution for the daily activities of midwives in Sri Lanka.

Key Words: Midwife, Information management, E-Health, Health care, Maternal health

Introduction

Public Health Midwives have been an important part of the primary healthcare system in Sri Lanka. A midwife is a health professional trained to support and care for a woman during pregnancy, prenatal, childbirth, postpartum period to family planning. By evolved into professional cadre, playing a role in many aspects other than services immensely valued in whole settings where health resources are scarce. Midwives should provide a comprehensive service to all the eligible families in her area or areas. Midwives will usually check infant's health, growth and assist advise by giving information's and appointments to meet medical and she should be responsible to keep their records and reports as well as special attention during field visits and clinic work. When appointed midwife to a specific area, she should be beginning from start to identify eligible families under that. after considering their details and health status they should be categorized and register as an eligible family. Then midwife needs to inform consulting about the aim of making a child simultaneously.in addition to that if an eligible family woman gets pregnant, start the process of registering a pregnant mother and following her up until delivery.in here arises issues when registering pregnant mothers coming from the external area.

From the beginning of pregnancy, the midwife must inform their clinics, vaccinations, home visiting, programs, and consulting programs everyone and individually. By without receiving scheduled information, formally mothers missed their essential requirements like vaccinations. After that midwives need to process of caring for postpartum mothers and educating the mother on child care.in childcare activities required to maintain child development record and follow it to care for an infant's individual. by the same time need home visits and provide nutritional supplements according to their requirements. and care at least still 5 years under her guidance by user studies and researches confirm that the current workflows of midwives to support pregnant and newborn baby care with lack efficiency by missing their care from daily duty roster. This documentation puts a heavy workload on midwives. These kinds of things realized if they have proper information system to maintain their daily activities properly. By the busy schedule of both midwives and mothers face different problems and midwives also prefer self-help support medium if they are delivered via a familiar medium, such as a web-based system are almost accessible to them using this web-based system, midwives can manage and maintain their maternal health care and workload throughout the day for a long time. Finally, buy using this web-based system computerized all main manual registration and reports can access midwives by selecting their area in online. specially want to mention any no other system currently developed for maintaining daily workload of midwives in Sri Lanka. Consider developed features and specification of this system will be able to add more features as further development.

Background and Motivation

The web-based system is soft tools for connecting users to Internet services that are frequently accessed using personal computers and smart devices. Web technologies have made life easier and it serves the users in different aspects and it is obvious that specifically maintain systems. as an example, for that this web-based midwife workload maintain the system can be taken. As the main role of the health care service of midwives requires modern technology to manage and maintain their workload. Web-based systems can find everywhere and for one purpose uses different way and most of them are useless. Everyone focusses on the business section but not for these hidden social roles to do their service maintaining valuable time.

Most of the web-based services are complex and need simple everything from the user interface to an outcome. Since introducing cloud computing and real-time technology makes a big influence on information technology. Special sections like health care technology are very effective for access information effectively with saving time. In maternal period is dealing with two lives specially during pregnancy or shortly after childbirth. If they missing any care provided by midwives, they become o trouble. By considering all facts midwives need to work without stress to given clear health care to midwives. For their workload management. this kind of web-based system given stress released and it also helps every mother without language complexity extending rural to urban areas for making good communication using current digital technology in Sri Lanka.

Literature Review

A.   Problem

By conducting an interview, researches, questionnaires, and case studies from midwives in the sample local area Thalatuoya, Kandy, Sri Lanka and confirm that the current workload od midwives in lack efficiency with faced many problems and issues from the registering eligible families to deliver an infant. When registering an eligible family from a related area, they must provide a unique number to identify records to carry out the whole process until becoming 5 years child.

Basically, register permanent mothers and temporary mothers separately and consider any mother coming from another area.in addition to that eligible family, register number must repeat in the whole process by connecting number taken from pregnant mother's register as well. another hand due to busy schedule of midwives and mothers miss their clinics they must go to once a week or once a month. when considering home visiting, sometimes they don't know the exact day that visit and also pregnant mothers and new mothers don't have proper knowledge about babies behaviours, physical changes, natural cycles, etc. for that it's better to inform that by scheduling some message or notification in brief to mother before a visit.

Additionally, both parties must get the idea of clinical details, vaccinations, consulting programs and other childcare details with schedules. currently send information by verbally and its more chance to forgot.by this web-based system overcome that problem by sending message or notification to mother. In here rural peoples not having smartphone or cannot download applications to deal with this notify system. for those issues, midwives can send messages by selected mothers for the simplest mobile phones as well. Specially rural peoples use simple mobile phones and for better understand use Sinhala, Tamil, and English languages.

The web-based system was designed according to the requirements of the midwives. The interfaces were initially developed in English but will be converted to Sinhalese and Tamil in the future. All this system carried out by Sri Lankan midwives made possible by choosing a "web-based" approach to the smart mobile devices to any computers where only requirement of an Internet browser like Firefox, Chrome, etc. By this system manage all information in a real-time database can access from anywhere with anytime with improved latest security techniques with data and information structures. specially here provide secure message and notification service even can view from normal mobile phones used by mothers in rural areas to easy communicate with midwives.

B.   Existing systems and features

In Sri Lanka, there is one we based system for collecting information for national statistics electronically by The Reproductive Health Management Information System (eRHMIS). This is the main source of data for national health indicators in maternal and child health, family planning, adolescence, and women's health. This system was only done part of the collection by nearly 25 data collection formats. But this system does not provide options involving midwives with their daily workload. In here taken the counts from whole reports and It can visualize data as charts, graphs, reports for connecting with different purposes.

C.   Previous Researches

There was a research "Electronic Patient Records in Sri Lankan Hospitals" by Dr Denham Pole. In here discussed current healthcare system and requirements of computerizing hospital records in the

country. A project sponsored by the Austrian/Swiss Red Cross recently carried out in the Eastern Province has, however, been successful in computerizing the medical records of over 20 government hospitals. As a highlight of that research-based almost entirely on handwritten paper records there is additional work in filing and retrieving information into computerize. And many of the weaknesses of the healthcare system with a lack of information that is stored somewhere and but is not available where it is needed.

There was another research Ubiquitous support for midwives to leverage daily activities present preliminary outcomes concerning the design of a support system for midwives in the Netherlands to carry out daily activities. And emphasis most obvious barrier is the lack of an integrated IT system to provide daily care to pregnant women. Based on the findings we propose some solutions that may help midwives to perform their daily tasks more efficiently. A key aspect of improving maternal health is to make use of the role of skilled health professionals, specifically midwives. in this research build, a mobile application intends to conduct a long-term user test to understand how midwives and pregnant women use the application. Midwives will use the mobile app when they need to visit a patient. The app for midwife is connected to the local software used in the midwifery centre to provide antenatal care.

By considering study about the role of Information Technology on the quality of maternity care in the midwifery centers in the Netherlands published research that Supporting Improved Maternity Care by Midwives Design Opportunities and Lessons Learned this also The objective was to understand the current situation, challenges and design opportunities that could help to provide improved healthcare system to care

mothers. By this system mainly focus on lack of IT training for the midwives, lack of integrity between different software systems used in the midwifery centers and hospitals and attitude of the pregnant mothers based on our findings we provide some recommendations and design implications to support improved care provided by the midwives.

The comprehensive literature review by a book Women and Birth, the popularity of pregnancy-related apps could indicate a shift towards patient empowerment within maternity care provision. The traditional model of 'shared maternity care' needs to accommodate electronic devices into its functioning. Reliance on healthcare professionals and midwives may be the availability of interactive and personalized information delivered via a smartphone and record data in Medical officer of health (MOH) centers to access and provide services.

According to research Workload of primary-care midwives conducted by T.A.Wiegers Netherlands institute for health services research, objectives that to assess the actual workload of primary-care midwives in the Netherlands and calculate active hours can service provides by midwives and make scheduling program for them to conducts their activities. Here proposed a system midwife can make their schedules and generate reports to do works etc.

Researchers have highlighted the importance of healthcare professionals' involvement in the conceptualization of smartphone-based interventions "Midwife in low resource environments challenges and opportunities in maternal and reproductive health service provision" presents that how Midview's services distribute via smart devices and mobile phone self-monitoring program to prompt mothers to report their

emotional state several times throughout the day request care by midwives.

The requirement of Guidelines Nursing Midwifery Workforce Management is discussed by World Health Organization Regional Office for South-East Asia New Delhi emphasis the managing duties of midwives in rural area guidance with contacting through application and support health care in a regional context. And manage them according to successful health system defeat difficulties. Specially present conceptual flamework for the foundation of management.

In the research "Web-Based Appointment System using Short Message Service Technology" conducted by Muhammad Helmy Abd Wahab the hardware and software requirement, and integrate to provides manual operation platform, which can manage the information resource and short messages to satisfy the rural areas education purpose users requirements. Advanced ADO.NET technology is used for database management. here focus on send message to a group of peoples through the web-based system and using SMS gateway.

By research presented by Ibukun Ogunbekun is discussed the experiences of nurse/midwives with a simple management information system in the private sector are reported facilities in Nigeria. special attention should be given to strengthening the ability of health workers to record and collate data satisfactorily. Here present web-based system to manage their data for national their statistics reports.

In case of midwives management system in New Zealand, Dallas Knight of the University of Otago presented important practically applicable system by research paper "Midwives and Technology: The Case from New Zealand" mainly by this research focused on how New Zealand midwives currently use technology in their practice,

and its implications – both for midwives as well as health consumers and health organizations. It also discusses where midwives need to develop in their use of technology to meet the needs of the women and families they work with and provide evidence-based midwifery care.

General Circular No:01-26/2006 Office of Director-general of Health Services, Ministry of Health present Duty list of the Field Public Health Midwife, mentions requirements of Administrative, General Activities, Antenatal care, Intra natal care and Care of the Infant and Children and related needs.

Maternal Care Package a guide To Field Healthcare Workers book from Family Health Bureau 2011published by Family Health Bureau, Ministry of Health Sri Lanka. This book emphasizes that requirement of development of maternal care services in Sri Lanka by considering past raised problems and issues.in addition to that discuss the inventions and maternal care models in Sri Lanka. And proposed Maternal care Model for domiciliary and clinic care shows the requirement of an administrative system for midwife care.

Methodology

A.   Requirement analysis

Beginning of this system the researcher met his project supervisors and had a face to face interview with them about this system and how to gather requirements for this project. In the interview able to present my project idea and ask questions and get guidelines and opinions about how to develop this project. As a beginning choose central province and met local area Public Health Midwife of Medical Officer of Health (MOH) center in Thalatuoya, Kandy, Sri Lanka with mainly focus sample village Pinnagolla. Then interviewed separately midwives by explaining the project and ask for basic requirements and problems faced using their

current manual system. During the interviews and observations, the researcher could be able to ask questions from responsible persons and referred to available sources and the related process can develop as a web-based system.

The questionnaires, questions regarding their attitudes towards how the current process going on and problems difficulties facing as a written medium.
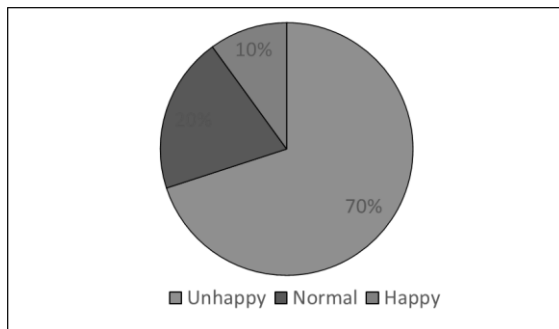

Figure 1: Questionnaire results pie chart

The needs analysis was done using a questionnaire which obtained opinions from 10 midwives in the selected MOH area who were directly involved This chart shows they are in unhappy in the current manual system. Several informal interviews conducted with midwives were useful in formulating the questionnaire. The needs analysis clearly showed that midwives spent most of their time on managing health records which might negatively affect their delivery of mother care. As it is based almost entirely on handwritten paper records there is additional work in filing and retrieving information, in copying and summarizing it and in transmitting it from one office to another. Furthermore, they need some system work online can use from anywhere they visit without carrying their whole documents. By considering their feedbacks and requests come up with a solution using available information technology.

Design and Implementation

The system was designed according to the requirements of the users. As the main part

of the system usually, design and develop some interface that user will use. The main conception design was drawn using UML diagrams and Sketchup using Adobe XD. Specially instead develop mobile application development system as responsive web design. After that, it was shown to the midwives and the project supervisors, who provide comments, which are used to reanalyse, and redesign with affording with some features. This will process continues in a cycle until the expected results will come.
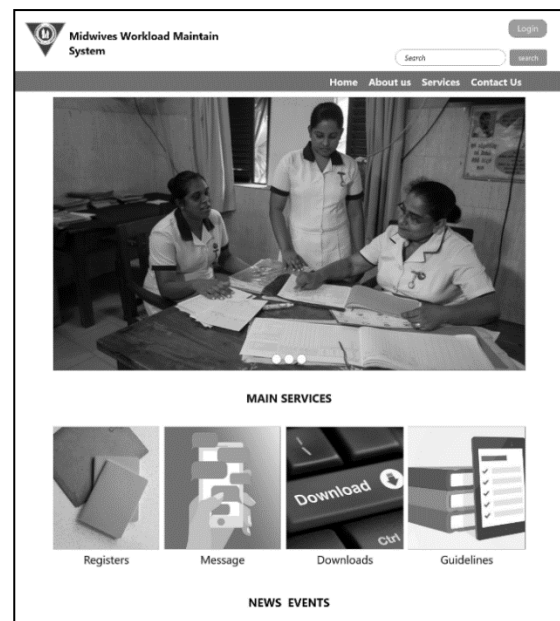

Figure 2: The main interface of the system

The goal is to provide a system with overall functionality. In the development process mainly use HTML, JavaScript, CSS, Bootstrap, Visual Studio Code and Php for interface designing and arrange connections among them. MySQL use as the main database of the system. Also, use cloud hosting service for hosting and SMS gateway API for establishing communication.

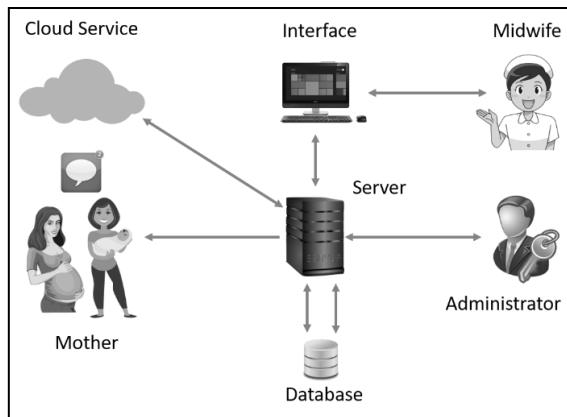A.   Fundamental modules and usage

Figure 3: Basic System Design

Midwives can use this system from their MOH center computers and their smartphones. Those two types of roles in system login as an administrator or midwife the administrator (there is an officer under area) must sign into the system. By the username and password system detect user role enter as an administrator or a midwife. the administrator can create accounts for midwives, assign areas and send midwife's username and password through an email. An administrator can view whole families and areas under the main MOD area. also, besides, update and delete areas of midwives and manage when shifting midwives' different areas. Mainly administrator can upgrade system downloadable forms, kinds of stuff and maintain system correctly.

The midwife can log in into the system by already provided usernames and password. Then midwife can view dashboard consist of areas under her. And display their daily schedule like visits, vaccinations, report updating notifications etc. furthermore meetings and other activities also display on their interface. In this overview shows all the records and related details under area/areas of midwife such as Eligible families register, Pregnant mothers record, Birth and immunization record Child Development Record and family planning record. Then midwife can check or do any required changes or updates and maintain their

workload easily. After that midwives can search any records and send messages about clinics, vaccinations consulting programs and other activities as per requirements.

B.   The Overall System Architecture

The Architectural design defines the overall structure of the system and forms a solution before moving on to the detail design or the low-level design which includes the design of specific components details. The overall system architectural design for the proposed system is as follows.

Figure 4: Overall System Architecture
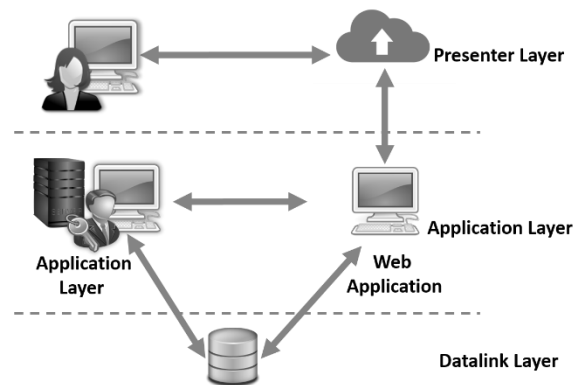
Evaluation

This research aims to design and develop web-based workload maintain a system for midwives in Sri Lanka. During the short period since testing the web-based system has given satisfactory results, and this has encouraged all the participants. And it is possible to generate several routine reports and returns sent to the regional and central levels from the periphery. Public health data that obtained by this system can be utilized at different levels of public healthcare administration as it is possible to transfer data readily into the main existing system electronic Reproductive Health Management Information System (eRHMIS), regional and central levels.

A major feature in the system was the cost of implementation. When we took cloud service and SMS gateway API need some payment for providing services. When discussed with

family health bureau this can be easy with attached with their system. However, when long term benefits are considered, it would be a good investment to improve preventive healthcare.

The web-based workload maintain system for midwives in Sri Lanka still under developing by testing, monitoring and evaluating progress. Because of that cannot coming through a conclusion about this system. Proper monitoring and evaluation are essential for the improvement and continuity of system. Therefore, when the system was in operation the behaviour of the system and the users were monitored closely. At the same time regular discussions were conducted with users and they were provided with questionnaires to obtain their feedback and suggestions. Changes were applied to the system, depending on the responses. In other words, this study was conducted as action design research and the iteration method was used to develop the system as the project proceeded. This system was testing among selected group of midwives in a remote area of Medical Officer of Health (MOH) in Thalatuoya, Kandy district in Sri Lanka. Currently necessary training given use of laptops and progress of the project will be evaluated on regular basis. The preliminary responses obtained so far are very satisfactory.

Discussion

While developing countries have problems, computerization can transform many of these problems into opportunities. By this system careful to avoid cost and complexity. The system used a local area network using a separate server in a safe place but connected to site via the Internet. specially this project is mainly focusing on the midwives and pregnant and post-pregnant mothers who have busy schedules and who need technological solutions to keep in touch with health care. There is no necessity to spend any cost to use this web-based system. And having such a web-based system will provide an easy environment to the user and it will also self-direct the user to figure out all the flow of solving maternal care and self-workload of midwives. However, public health information is still managed using a manual system which was introduced a long time ago. This is not very efficient, and the manual system is time-consuming. Therefore, introducing a web-based online workload maintenance system to manage public health information has become a necessity.

The purpose of this study is to develop a web application which provides midwives through a simplified solution for easy daily workload maintenance and documentation while providing the opportunity to involve in more field activities. Besides, it facilitates instant access to health information of the community served by them. Furthermore, it is useful in monitoring and evaluation of the field activities of midwives by the supervisors and themselves. They thought that their daily work had become easier. This is presumably one of the main reasons for the high level of acceptance. Besides, midwives believed that the system was user-friendly and easy to understand. Thus, the system is a practical solution to enhance the field activities of midwives in Sri Lanka. However, further work needs to be done to study the long-term benefits. The knowledge gained from this study would be useful for future e-Health implementations in the public health sector of Sri Lanka.

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Authors Biography

I am Officer cadet DWGML Dissanayake, Intake 34, undergraduate Faculty of Computing, Department of Information Technology at General Sir John Kotelawala Defence University. This research based on my final year project focused on health service in Sri Lanka. I am introducing a solution for the main problems involved in midwives, utilizing my knowledge that learned based on information technology to enhance the public health field services will improve the health service of Sri Lanka.

DU Vidanagama is a Senior Lecturer in Faculty of Computing, KDU. She graduated from University of Kelaniya in the field of Statistics and Computer Science. She completed her Masters degree in Management and Information Technology in University of Kelaniya. Her research interests include Multi-agent technology, data analytics and ontologies.

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