SAGIP NANAY: MATERNAL HEALTH AND MORTALITY DISASTER RISK REDUCTION MANAGEMENT SYSTEM

Katalbas, Vida Ross G.[#1], Musni, John Mark V.[#2], Parungao, Liam Karlo B.[#3], Roque, Kevin Christian F.[#4], Tangkeko, Marivic S. [#5]
Information Technology Department, College of Computer Studies
De La Salle University, 2401Taft Avenue, 1004 Manila, Philippines

Abstract: Maternal deaths are the greatest health inequity of the 21st century. Ninety percent of maternal deaths occur in developing country such as the Philippines. One of the indicators of the health status of citizens of a country is the maternal mortality ratio (MMR). In the State of the World's Children Report of the United Nations Children's Fund (UNICEF) in 2004, 200 women die for every 100,000 live births. This has increased to 230, as stated in a study conducted by the UN Population Fund (UNFPA). Despite being listed as one of the Millennium Development Goals for UN's members, the reduction of MMR has yet to be achieved and continuous efforts and more aggressive actions need to be implemented. We look at one aspect of the health care system for pregnant mothers which are the devolution and administration of services. The group researched on how services and programs as well as corresponding processes are being observed and implemented in the most accessible health units for both urban and rural areas which are the health centers. Through different fact-finding techniques such as observations, numerous interviews with midwives and health service workers, document review and surveys with health administrators, the group was able to arrive at the main problem which the inability to adequately dispense or provide maternal health service. The study revolves around creating a solution to the problem and incorporating ICT. Information communication technology (ICT) plays a big role in the society nowadays, most especially with the transfer of data and its transformation towards vital and useable information. Thus, the developed solution is Sagip Nanay: Maternal Health and Mortality Disaster Risk Reduction Management System. Sagip Nanay focuses on serving as a solution to the problems encountered by both health centers that cover both urban and rural test beds. The system focuses on expectant mother monitoring and record management, diagnostics assistance and risk assessment and decision support.

Key Words: Information Communication Technology (ICT); Maternal Health and Mortality; Risk Factor; Maternal Deaths; and Risk Reduction

1. INTRODUCTION

The health status of Filipinos has been improving since the year 2005, with significant increase in respective life expectancy for both male and female. Though data varies across the seventeen (17) regions of the country; several factors such as maternal health and child mortality are also used as basis for claims for the improvement of the health system. Though, maternal health and child health are not improving as fast as those found in different Asian countries.

The Philippine health system is composed of a dual sector, namely, the private and the public sector. The public sector is financed through tax-based budgeting of the government and

WCF-001

offers free services to its citizens (with the exception of some services having standard fees) while private sectors on the other hand are profit-oriented.

As stated in the 1987 Philippine constitution, the state recognized that health is a basic human right. This implies that proper medical services be administered to its citizens and medical institutions present to be able to provide a convenient avenue to be able to shell out the said medical services.

In the Philippines, approximately 4,100 to 4,900 women and girls die each year due to pregnancy-related complications. Each year, an additional 82,000 to 147, 000 Filipino women and girls suffer from disabilities caused by complications during pregnancy and childbirth. Despite the increase in health-related spending and the devolution of health services, the Philippines mortality rate (MMR) continues to be at an unacceptably level. Based on data collected, the most common causes of maternal deaths are due to the following: a) Hemorrhage (33.6%), b) Hypertension (24.7%), and c) Infections (9.9%).

Among the most common direct causes of maternal deaths are hemorrhage, infection, obstructed labor, hypertensive disorders in pregnancy, and complications of unsafe abortion. There are birth-related disabilities that affect many more women and go untreated like injuries to the pelvic muscles, organs or the spinal cord. (Improve Maternal Health, n.d.).

2. METHODOLOGY

Among the different system development methodologies available, the group has decided to follow the Rapid Application Development method. The method follows four (4) stages, namely the Analysis and Quick Design, Prototyping, Testing and System Implementation. As seen in Figure 3-1, RAD offers a faster way of system completion compared to Traditional System Development Methods which would take a longer time.

Rapid Application Development (RAD) is the methodology developed to respond to the need to deliver systems fast. Furthermore, RAD is the software development methodology that uses minimal planning in favor of rapid prototyping.

3. RESULTS AND DISCUSSIONS

Upon the registration of the mother at the health center, it would be midwife who would be placing her details or personal information in the system. A registration form is available in the system. The information needed to be entered in the system includes the basic information (name, address, signature, contact number, etc). Once registered, the patient would now be included in the master list of patients of the midwife, where she can now easily check the trimestral schedule of the mother as well the entire profile of the patient. After doing the entire registration process, the midwife would not automatically register the patient to check-up schedule thus assuring her next visit where the added pregnancy details will be gathered. The midwife, as part of the protocol, would also suggest different laboratory tests that the mother can

WCF-001

undergo and would be recorded during the next visit.

The midwife's main page is composed of different options that would allow her to monitor the status of the pregnancy of all patients that are registered under her care. Furthermore, upon logging into her account, the midwife can automatically view all Expectant Mothers registered under her in a trimestral tabular view (patients are categorized to what pregnancy trimester they are currently included), view the map of the vicinity and the address of the patients. The midwife main page also contains the unread notifications received which includes messages, upcoming patient appointments and rejected hospital referral requests. The page also includes a search function for patients that can also redirect the midwife to their respective profiles. There are also options that allow the midwife to view if the expectant mother is also categorized according to priority cases (usually those that are high risk).
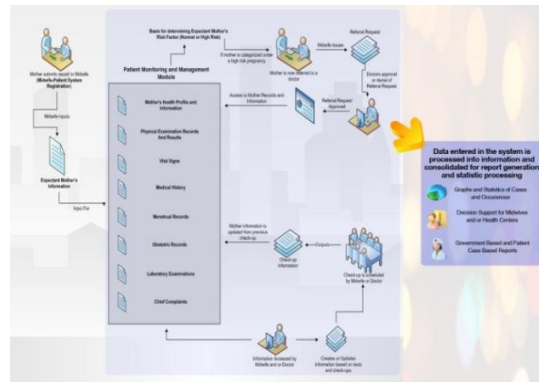

Figure 1: Sagip Nanay Process Flow

The Expectant Mother's Health Complications, records and Medical Orders are stored and used as reference for every scheduled monthly check-up. Mothers would then be sorted to either a normal-risk or high risk pregnancy depending on the results of the different examinations and their medical history (the system uses several risk parameters in determining the risk status; *see Table 5-1: Risk Code for Pregnancy*).

Risk Code for Pregnancy	
A	An age less than eighteen (18) or greater than thirty-five (35)
B	Being less than 145 centimeters (4'9') tall
C	Having a fourth (or more) baby (or so called grandmulti)
D	Having one or more of the following : a. A previous caesarian section b. 3 consecutive miscarriages or still born baby c. Post-partum hemorrhage
E	Having one or more of the following medical conditions: 1. Tuberculosis 2. Heart Disease 3. Diabetes 4. Bronchial Asthma 5. Goiter

Table 1: Risk Code for Pregnancy

WCF-001

Health records that can be created through the system includes the Labor and Delivery Records (which would be collated from the hospital where the mother has had her delivery), Post-Partum Information which contains the basic information regarding the new born and the Final Diagnosis which is based from previous complaints, records and findings for the mother. These records can be both viewed by both the Mother and the Midwife in their specific system-based accounts.

The system caters to a Decision Support System that suggests possible interventions through the form of health center sponsored seminars or events (separate those that are being implemented and or suggested by DOH and their respective health departments). Given certain number of cases or the occurrence of cases, with a special focus on the top 3 leading causes of maternal death (hypertension, hemorrhage and infections), the system will prompt the health district officer of the alarming number and suggest that a certain event would be created in response to such case. The system though only suggests and the health district officer would then be responsible for the actualization of an event or not.

4. CONCLUSIONS

To be able to point out how the developed system provided the solution to not just the main problem identified but also to its respective sub-problems.

Expectant mothers lack self-monitoring initiatives and delay in seeking health care: Using personal user account of the expectant mother in Sagip Nanay, they will be able to keep track of their personal health records and condition as well be able to easily connect with the midwife assigned to her case, virtually in any possible location (given that there is internet connection). Also, during the checkup and after the check-up, the mother can always recount her status and her condition through the availability of midwife notes and diagnosis present in her account, which makes it a big distinguishing factor from the HBMR which only contains details of tests and results.

Moreover, it is more convenient for expectant to be able to know her schedule as well be able to schedule a new one through the availability of the calendar scheduler. Furthermore, the mother can also learn more about her pregnancy and condition through the availability of different videos and readings.

Limited adoption of ICT across health service delivery chain: By convention, the administration of health service in the Philippines is reliant on skills of health personnel attending. Details are recorded via manual means and stored in manual repositories. The only time that ICT would be employed is thru creation and printing of reports and in cases, transfer of data from one source to another.

Sagip Nanay allows ICT to bridge the gap between the administration of service and the expectant mother. Through the use of different aggregated reports generated by the system, be able to heighten maternal health literacy, allowing real time communication between the patient and the midwife and virtual maintenance and storage and records, Sagip Nanay allows all user-types a more efficient system that improves and augments the administration maternal health
WCF-001

service.

Sagip Nanay: Maternal Health and Mortality focuses more on the intangible benefits rather than the quantifiable benefits. Its technical functionality and devolution of processes allow the administration of maternal health services; this capability is higher than the price of the actual system because it is able to: assist expectant mothers during their 15-month pregnancy, help Midwives and General Health Practitioners/Doctors monitor and manage mothers and their respective cases even if physical interaction would not be possible, and be able to support Health District/Municipal Officers in terms of decision-making initiatives for augmented health programs and services.

5. ACKNOWLEDGEMENTS

6. REFERENCES

Agustin, S.C., Bernardez, C.E. and Panopio, M.R. *Maternal health information system for the municipality of Bauan, Batangas (2011).* Undergraduate degree capstone project from De La Salle University – Information Technology Department

Arie, B. (n.d.). RAD Life Cycle Model. *eHow-Tech*. Retrieved July 5, 2012, from http://www.ehow.com/how-does_5272396_rad-life-cycle-model.html

Grundy, J., Healy, V., Gorgolon, L., & Sandig, E. (2003). Overview of devolution of health services in the Philippines. *Rural and Remote Health*, *1*(2), 1-10.

Reed, H. E., Koblinsky, M. A., & Mosley, H. W. (2000). *The Consequences of Maternal Morbidity and Maternal Mortality: Report of a Workshop*. Washington: The National Academies Press .

Robinson, R. (2003). Economic evaluation and health care. Retrieved August 11, 2011 from http://www.bmj.com/content/307/6909/924.full.pdf

Shelly, G. B., Cashman, T.J., and Rosenblatt, H.J.(2007). Systems Analysis and Design, 7th Edition. Singapore: Thomson Learning Asia.

WCF-001