

Cleanroom-based Software Development for early Detection of Puerperal Psychosis in Nursing Mother

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ABSTRACT

Postpartum depression applied to only the nursing mother at the early stage of post natal visit to the clinic. It is dangerous to both the mother and the child if not detected as early as possible. Since it is preventable and there are means of detecting the depression early in order to prevent its occurrence, development of a cleanroom-based software for its early detection will be a great advantage for early treatment before it reaches uncontrollable stage. For reliability of the software, this article presents different techniques to gather necessary parameters for the development and application of the software. Questionnaire, document examinations and modelling were used. Team based, usage profile and functionality metric tests as preached by this process model will assist in standardising the software. Conclusively, it will be an added advantage to the stakeholders to adopt the use of this system in all hospitals and clinics throughout the world for safety of the mother and the new born baby.

Keywords: *Cleanroom, Engineering, Prevention, Psychosis, Puerperal, Reliability, Software.*

1. INTRODUCTION

Children as widely believed, are future leaders of tomorrow. Many better future leaders, developers, genius, scientists, and so on are sometimes disabled, injured or killed by their mothers due to depression after delivery. Since it is preventable, researchers need to use different means of preventing its occurrence. Computer as an instrument applicable to so many fields can contribute to its prevention and eradication if possible. Puerperal is relating to childbirth or the time immediately following childbirth, while psychosis mean loss of contact with reality: a psychiatric disorder such as schizophrenia or mania that is marked by delusions, hallucinations, incoherence, and distorted perceptions of reality. Another important word is depression which means, sadness: a state of unhappiness and hopelessness or a psychiatric disorder showing

symptoms such as persistent feelings of hopelessness, dejection, poor concentration, lack of energy, inability to sleep, and, sometimes, suicidal tendencies. All these show that it is dangerous to the future of a nation. (Microsoft⁷ Encarta⁷ 2008. 8 1993 2007 Microsoft Corporation).

This software developed is an added advantage to automate psychosis detection and have records of patients with the symptoms as may be needed at any time in future for any expectant mother during pre-natal clinic visits.

2. PUERPERAL PSYCHOSIS OVERVIEW

Postpartum psychosis (puerperal psychosis) is a term that covers a group of mental illnesses with the sudden onset of psychotic symptoms following childbirth. A typical example is for a woman to become irritable, have extreme mood swings and hallucinations, and possibly need psychiatric hospitalization. (Catherine Stone, 2013) Weisner et al (2002) opined that, Postpartum depression is the most common complication of childbearing. It is very rare but very dangerous to mothers and the children even their relatives.

Experienced mother stated A I may have experienced a few of these symptoms, but not the whole list. I was never treated for suicide ideation because my husband refused to believe I was as bad as I was. It was not until years later that I was finally hospitalized. I often wondered if I had been treated for post partum depression or psychosis would I have ended up like this? I have been hospitalized twice for depression (17 years later), and am finally getting a grip on my depression@. (Kelly Hiltz, 2014). Another mother Nathalie, 2015 said AMy experience was more disconnected than this. It involved uncontrollable racing thoughts and worst of all, dissociation. The moment my eyes opened in the morning I was confused about my surroundings,



petrified and confused who people were and why we were all living? I really wasn't sure what life was during that time. I was hysteria, I was the definition of someone who broke from their reality. I also lost a lot of executive function skills. I knew it was only a matter of time where I would die. But with treatment I miraculously crawled out@.

These are people that experienced ppd in real life which shows that ppd can damage, destroy or kill the depressed mother or extended to other care givers. The crucial questions are; Is it hereditary? If so how can it be prevented from reaching baby through breast feeding? If not how is it developed? How can this be prevented too?

3. OBJECTIVES

This research is meant to show the importance of computerizing the method of detecting nursing mothers that may likely develop psychosis after delivery and how it could be done successfully using one software engineering technique. It is also to develop software that can be used and be practically implemented in any hospital or any environment. Life-saving is a responsibility of every human being, this is also for saving life of newborn and their mothers.

4. METHODOLOGY

Based on the system in Nigeria, immunization schedule was used in order to make it possible and easier to make mothers be able to have access to the system. Books, journals, internet and interview were used to collect data. The team involved are paediatrician, community health consultant, psychiatric physician, health record officers and computer scientist. Each contributed immensely to the successful completion of this research.

5. COMPUTER AND SOFTWARE ENGINEERING

Application software developed for this will go a long way to make the use of the questionnaire developed by Edingburg more easier and faster to detect peuperial psycho mothers.

6. CLEANROOM AND ITS APPLICABILITY

Using cleanroom software engineering, there should be three teams (requirements, development and verification teams) for better software design, development, verification and management.

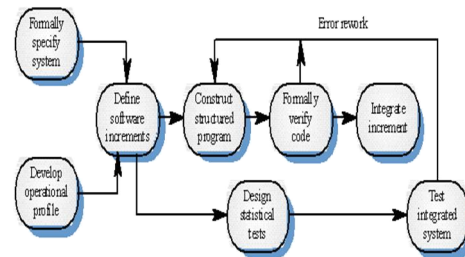


Fig. 1. Cleanroom Process Model
Source: Maxim (2008)

Robert (1998), Pressman (2005) and Maxim (2008) process models are samples that give room for incremental, error rework, and team oriented for better software development. The processes will be able to assist in guiding against costly errors by having stakeholders to have a say at every stage of its development and use. Doctors, Health record Officers, Obstetrician and gynaecologists, Computer Scientists, and Community Health workers should be co-opt into the teams. Reliability metrics may be introduced to calculate the reliability of the system either using functionality profile with parallel and serial modules or used usage profile means of software verification for its reliability.

7. SOFTWARE DEVELOPED AND ITS FORMS

Software was developed using Visual Basic and it has all it takes to give information on mothers that may likely be psychosis. It used to categorically state after its calculations whether the mother should be referred to psychiatric doctors or wards or not. A sample of the forms is as follows:

Fig. 2. Sample form for Puerperal Psychosis Questions and its Result

The figure shows that the software has the necessary and friendly icons and menus that does not need any special training for the users and decision making. It is user friendly and gives accurate results and verdict on whether the mother is likely to have psychosis or not.

8. REAL - LIFE APPLICABILITY AND PRACTICABILITY

Its applicability should be as if it is meant for patient information system whereby patient data can be stored right from ANC period before delivery and as they commence immunization for the children, the mothers can be asked to see the officer in charge of the software in the unit first and collect pass before immunization. This will make it effective and non of the mothers will be left out as it is compulsory to collect the card from the officer in charge of computer that will ask them those questions or ask them to answer it themselves by given those that are computer literate the opportunity. It is practicable since there is no emergency in child immunization. The mother will willingly, consciously or unconsciously be able to pass through computer unit before proceeding to getting their child to be immunized. Figure 2 is an example of what can be used for applicability and practicability of the software developed for nursing mothers

9. RESULTS

Based on immunization schedule used in Nigeria, the software modules have five sections for the mothers; 0-2weeks, 6weeks, 10weeks, 14weeks and 6months modules. Each section will ask the 10 questions based on what transpired in the past 7 days. The software was developed and was tested using unit testing and system testing. Immediately the questions were answered, the result will be displayed to know the mother=s status and will state categorically when it is positive (i.e. total >than 9) and referral needed. Implementation of this software will bring solution to the problem of late detection and safe life of babies and mothers.

10. BENEFITS

- Early detection is an immense benefit of this software since the first immunization comes immediately after birth.
- Mothers will be able to be attended to by psychiatric doctors as early as possible
- Children and their mothers are saved as early as possible
- Reduced medical bills as prevention is better than cure.

11. DISCUSSION

Becky Schroeder (2015) said, someone who is experiencing psychosis has to take medication. It=s very, very important. The best thing you can do for her right now is just be there for her showing your love and support. Let her doctors decide what she needs and support her in how she decides to treat this. This is only possible after it must have been detected and referred to the doctor earlier in order not to injure herself, the child or any other person.

Caroline Cassels(2009) said using cues embedded in the electronic medical records of infants 0 to 6 months assisted physicians which is by adding indicators to the medical records but not on its own. This is a good idea but it could have been better if it is on its own due to its importance and after six months, there is no need for such mother to use the stored information except next time which may likely become an historical record compared to a system that will be used immediately after delivery to detect the mothers condition in time.

12. CONCLUSION

Life is precious, newborn is expected to be leaders tomorrow, mother is expected to guide the child to become somebody in future, how will it be possible if such life has been destroyed due to ppd. The best thing is to prevent it as early as possible. This system is momentous, weighty and consequential which needs critically decisive response from every angle to curb destroyer of human race future.

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