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# INTEGRATED MODERN AND TRADITIONAL MALAY MEDICINE HEALTHCARE SERVICES IN POSTNATAL CARE – AN EVALUATION OF MYPOSTNATALSYS

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**ABSTRACT**

This paper shall propose MyPostnatalSys as a framework to integrate the services of Traditional Malay Medicine (TMM) with modern medicine in the field of postnatal care. An unstructured interview was conducted to assess the current situation and capture the findings that could be used as input for developing the proposed framework.. The findings indicate that traditional Malay medicine and western or modern medicine are being treated in different systems and in isolation. MyPostnatalSys is proposed to integrate the services of these medicine systems via electronic health records using global system mobile and internet technology. Patient can access integrated healthcare services seamlessly and experience a more holistic treatment. In addition, the healthcare providers shall also benefit from the standardization of information exchange with other healthcare providers.

**Keywords:** integrated healthcare, traditional medicine, modern medicine.

## INTRODUCTION

Postnatal care is essential because newborn survivors are directly linked to the mother's health (Sines *et al.* 2007). The postnatal period (the time just after delivery and through the first six weeks of life) is especially critical for newborns and mothers because global statistics show that more than two thirds of new born deaths occur within the first week after delivery (Sines *et al.*, 2007) and two thirds of all maternal deaths occur in the postnatal period (Ronsmans & Graham, 2006). Thus, integrated maternal and newborn postnatal care during the postnatal period should be provided as a concerted strategy to improve survival of both.

Postnatal care in modern medicine derives their observation based on clinical and measurable results (Broome & Broome, 2007). The evaluation of postnatal care or other illnesses via Traditional Malay Medicine (TMM) uses a holistic approach, involving physical, spiritual, mental, emotional and behavioral factors. Often the diagnosis is made based on an examination of physical conditions and a determination of mystical influences (Jamia Aznida, 2006). The physical examination results are not always quantifiable.

For treatment, modern medicine physicians may recommend clinical prescriptions, further medical tests, follow up appointments etc. TMM practitioners may recommend unprocessed herbal medications, proper food consumption, prescribe spiritual treatment that is not clinically proven and traditional malay massage. This traditional treatment knowledge is usually hereditary (Mohd Riji, 2005) and not learnt by formal education (Raja Ikram *et al.* 2015; Raja Ikram *et al.* 2013).

## METHODOLOGY

A semi structured interview was conducted to identify the current healthcare system and requirements for an integrated healthcare service for Traditional Malay Medicine and modern medicine in postnatal care. A total of twelve interviews were conducted. Semi structured interviews involved participants that represent a case study of one hospital with two interviews, three nurses, three medical officers and four Traditional Malay Medicine (TMM) practitioners. A total of twelve interviews were observed in this study. According to Guest (2006), saturation occurred within the first twelve interviews, although basic elements for meta themes were present as early as six interviews. Thus twelve interviews are deemed sufficient for the purpose of this research. The hospital case study selected is one of the nine pilot public hospitals in Malaysia that implement postnatal massage and treatment as part of the services. Nurses involved in this study are experienced in maternity care. Medical officers selected in this study consist of mothers who are experienced in implementing Malay postnatal practices during their self-confinement period. Thus, these doctors can provide a more holistic perspective of TMM treatment as they have been treated and required to provide clinical assessment of patients. Traditional Malay Medicine practitioners involved all have a minimum of ten years of experience in Malay postnatal care services and their services are well sought in their respective residence communities. A MyPostnatalSys prototype was then developed according to the requirements of the data collection. This prototype was then evaluated by two internal testers with technical academic background and the evaluation results are presented.

## RESULTS

### Current healthcare situation

The findings of the interviews are modern medicine practitioner can only assess a patient's suitability to undergo TMM postnatal treatment, and may not be able to suggest in detail the precise treatment for the patient

unless there are TMM treatment facilities available in the hospital and TMM practitioner. However, the TMM treatment services in public hospitals are still scarce and many still seek TMM postnatal treatment at individual or private centres (Raja Ikram & M.K. Abd Ghani, 2015; Raja Ikram & Mohd Khanapi Abd Ghani, 2015). Thus, the treatment offered by both traditional and modern practitioners are fragmented and isolated. Modern medicine practitioner can only provide emergency related health problems where as TMM practitioners provide TMM postnatal treatment. Both these treatment complements each other and is considered a more holistic treatment for the patient. The patient can only be physically assessed if a certified modern medical officer is present in the premise or patient seek this diagnosis at modern healthcare facilities.

**Proposed requirements**

Table-1 proposes main requirements for integrated healthcare services in postnatal care for traditional malay medicine and modern medicine.

**Table-1.** Main requirements for proposed solution.

| Requirement No. | Details |
|---|---|
| RQ1 | Both TMM and MM practitioners can access patient health record. |
| RQ2 | System is flexible and can be accessed via desktop and mobile devices. |
| RQ3 | System is able to register TMM and MM practitioners. |
| RQ4 | System is able to register patients. |
| Prerequisite | |
| PRQ1 | All practitioners are accredited and registered in the system. |

First, both practitioners are able to access patient information on assessment and treatment via electronic health records. This is important to ensure modern practitioners can access information of previous TMM treatment, and TMM practitioners also can access information on MM treatment. Second, proposed solution has to be flexible enough for TMM practitioners to access and use because its treatment is mostly conducted in private centres or patient home. Also, the prerequisite of this system is all practitioners are accredited and registered in the system. However, the accreditation process is not part of this research and shall only cover registration of practitioners. Other requirements that are basic requirements such as login module, add and update patient data is not included in the requirements above. However, the functionality shall be evaluated by the testers.

**Proposed TMM postnatal treatment workflow**

Due to the isolation and fragmented of TMM postnatal care services, this section shall propose the workflow for patients seeking treatment in TMM postnatal care. The workflow for MyPostnatalSys will be according to Figure-1.

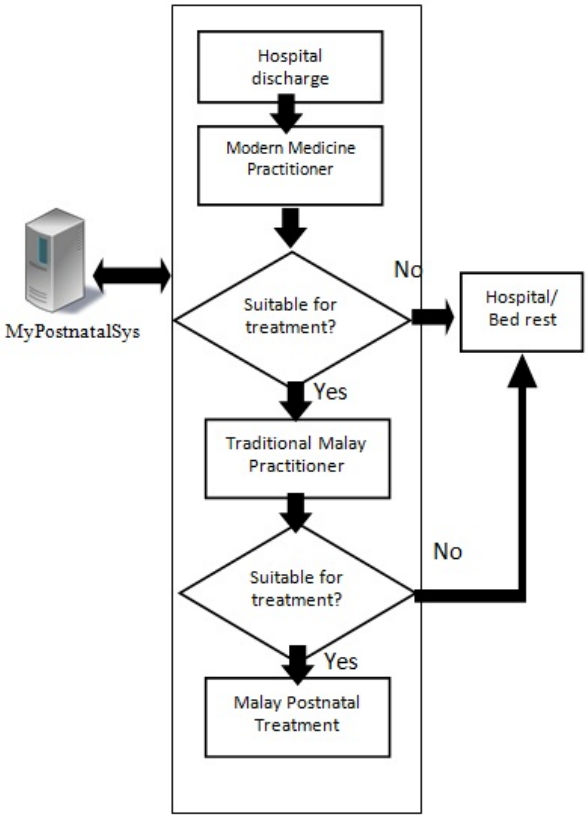


**Figure-1.** Workflow for patient receiving TMM postnatal treatment.

The hospital discharges the patient or new mother who had just undergone labour and delivery. Information of patient's labour and delivery shall be updated in MyPostnatalSys. The mother who intends to undergo TMM postnatal treatment will be required to get their situation assessed by a modern medicine practitioner. The MM practitioner shall retrieve the patients medical record information via MyPostnatalSys. If the mother is suitable for treatment, the MM practitioner shall provide permission for her to seem TMM postnatal treatment. Else, the patient shall be referred to the hospital for emergency cases or discharged with bed rest and possible with some medications. All this information shall also be updated in MyPostnatalSys. When the patient seeks TMM postnatal treatment, the TMM practitioner shall check the previous medical record of the patient via MyPostnatalSys and also assess if the patient is suitable for treatment. If suitable the TMM postnatal treatment shall be executed. Else, the patient shall be referred to the hospital for emergency cases or discharged with bed rest. All this information shall also be updated in MyPostnatalSys.

**MyPostnatalSys module**

This section shall describe the module and use cases of MyPostnatalSys. There are three main modules in MyPostnatalSys which are the Traditional Malay Medicine Module, Modern Medicine Module and the Profile Management Module as per displayed in Figure-2.

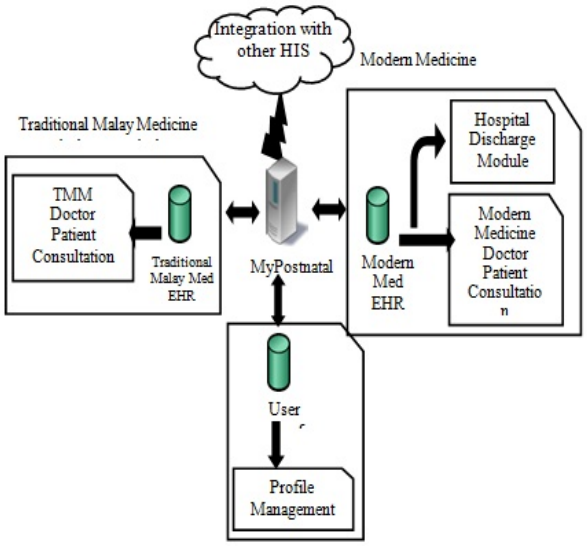


**Figure-2.** MyPostnatalSys module.

The Modern Medicine Module consists of the hospital discharge and MM doctor patient consultation. The modern medicine practitioner will be able to update and maintain data for this module. Data maintained shall be stored in electronic health records. For the Traditional Malay Medicine Module, doctor patient consultation information shall be updated and maintained via electronic health records. As for the profile management module, it shall consists of registration of practitioners and management of user profile. The registration module shall register accredited practitioners and allow them to edit their profile. Currently modern medicine practitioners are accredited by registration towards the respective bodies such as the Malaysian Medical Council (MMC) and Nursing Board Malaysia ((MIDA), 2012). However, for TMM practitioners, there are efforts by individual organizations to register these TMM practitioners such as Gabungan Pertubuhan Pengamal Perubatan Tradisional Melayu Malaysia (GAPERA) (Association for Practitioners of Traditional Malay Medicine). GAPERA is acknowledged as an accredited body under Ministry of Health Malaysia (TCM Division, 2015). Training is also provided by Lembaga Penduduk dan Pembangunan Keluarga Negara (LPPKN) (National Association for Residents and Family Development) which is also an initiative by the Ministry of Women, Family and Community Development in Malaysia. However this training is also not regulated by the Ministry of Health and focus on providing training to empower women to provide TMM postnatal care services to increase their family socio economy situation. Thus, the administrator of the system is required to ensure modern and Traditional Malay Medicine practitioners are registered by the respective relevant bodies before registering them in MyPostnatalSys. However, the accreditation or registration process is not part of the scope of this study but a prerequisite before the practitioners register in MyPostnatalSys.

MyPostnatalSys also should be flexible enough to be integrated with other Hospital Information Systems. Currrently there are no hospital information systems used in the Traditional and Complementary Medicine unit in the nine pilot hospitals in Malaysia during doctor patient consultation.

**MyPostnatalSys use case**

Figure-3 represents the use case model for MyPostnatalSys framework. The two main actors in this framework is the modern medicine practitioner, TMM practitioner and administrator. Registration of patient can be done by medical practitioners or assistant dedicated to provide registration services. Both practitioners can manage and edit health records related to their respective domains. Health record of previous patient visits to other practitioners can also be retrieved. The practitioners will be able to manage their patient profile. Registration of practitioners shall be dedicated to a medical assistant or staff who will require to ensure modern and Traditional Malay Medicine practitioners are registered by the respective relevant bodies before registering them in MyPostnatalSys.

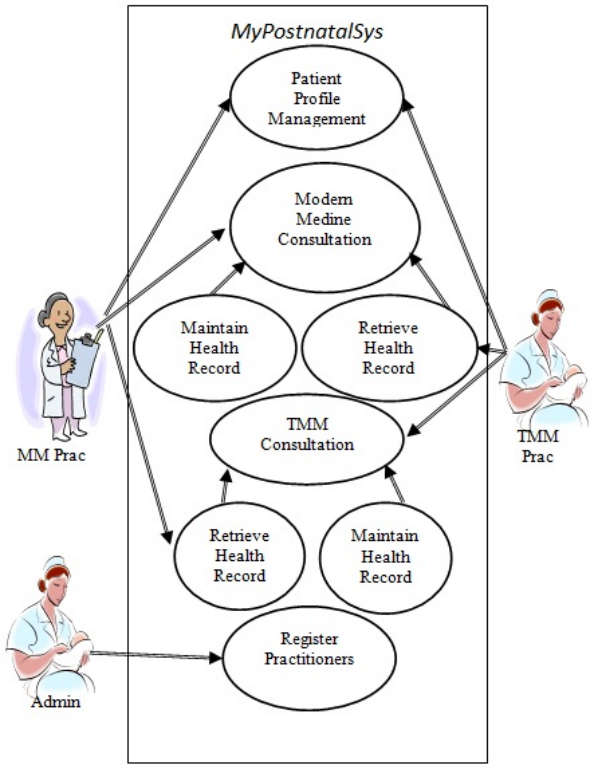


**Figure-3.** MyPostnatalSys use case model.

**Architectural view of MyPostnatalSys**

Figure-4 shows the architecture layer of MyPostnatalSys. MyPostnatalSys is built in cordova in an android development environment. There are four layers in MyPostnatalSys – the interface layer, client side script, server side script and database. The HTML 5 is cross-compatible with all of the major web browsers and optimized for mobile website and applications. JQuery is client side script where information from the interface is passed to the server side script for processing. All forms or data entry in the interface are sent to the server side script my jquery before any modifications of data in the database is executed. Php is the server side script that communicates with the mysql database.

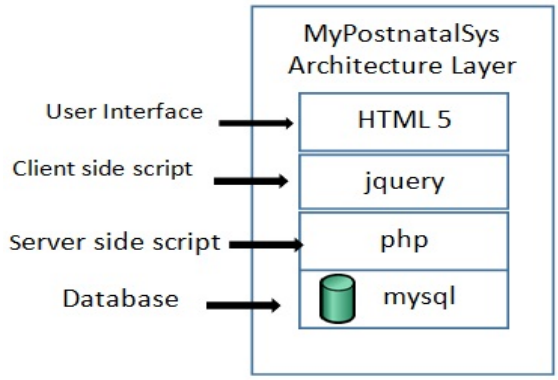


**Figure-4.** Architectural view of MyPostnatalSys.

**Deployment view**

This section shall propose a deployment method for MyPostnatalSys.

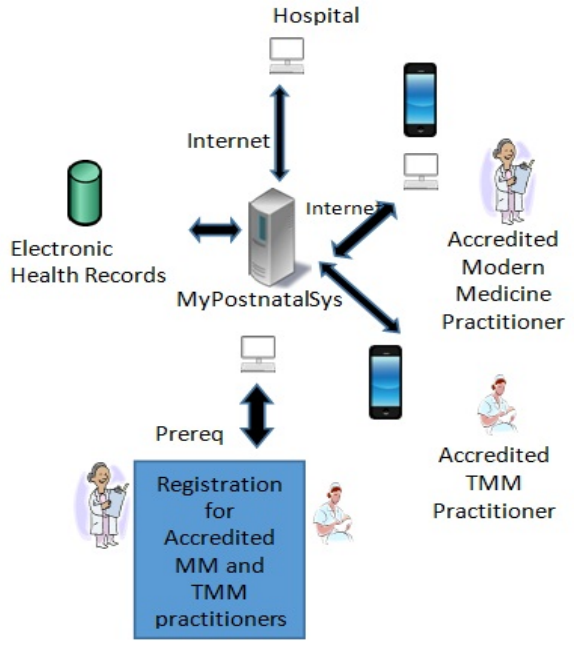


**Figure-5.** Deployment diagram of MyPostnatalSys.

MyPostnatalSys server shall be located in a secured location. The system shall be able to be accessed online via desktop and mobile devices. All data shall be saved in the electronic health records database. Hospital and registration of accredited practitioners shall be done using desktops or can even be accessed from mobile device. However, access through desktops are considered more suitable for a hospital setting. Accredited MM and TMM practitioners shall be able to access and maintain patient data via mobile and desktop devices as well. However, the TMM practitioner can specifically access via mobile because of the nature of their work which is usually executed in private centres or patient home. Private centres and patient homes may not necessarily have a desktop or internet access and thus MyPostnatalSys is flexible enough to cater for this requirement.

**Security factors**

Major security issues in the healthcare sector include specifying transmission of information standards, access controls and physical security (Ontario, 2010). Layered controls must be established to ensure that the communication and transmission of information as appropriate. MyPostnatalSys implements multiple layers of architecture to ensure security including server and client side script to ensure information on server side script is not visible to users. Appropriate logical and physical controls also must be established to balance access to information and technology-based systems against potential risks throughout the information lifecycle, from acquisition of data to destruction or deletion of data. This includes the establishment of appropriate controls to authenticate and authorize users while providing access to information and technology-based systems, so that they may fulfil their roles and responsibilities. MyPostnatalSys controls the user access by providing relevant modules to relevant users only. i.e. MM module can only be accessed my modern medicine practitioners and TMM module can only be accessed by TMM practitioners. Data entered by clinicians cannot be deleted during different visits to ensure patient history is logged and to disallow illegal modification on patient medical record. As for physical security, appropriate measures must be taken to ensure that physical access to information and technology-based systems is controlled. MyPostnatalSys server location is required to be in a controlled environment with only authorized physical access by authorized personnel.

**EVALUATION OF MYPOSTNATALSYS**

A prototype was developed for MyPostnatalSys based on the design and requirements of the previous sections. Figure-6, 7 and 8 displays the prototype of MyPostnatalSys. This module was developed in Malay Language due to the barriers of most TMM practitioners in proficiency in the English language.

Figure-6 displays the print screens of MyPostnatalSys that consist of the login screen, main module page and form entries during doctor-patient

consultation and traditional practitioner- patient consultation.

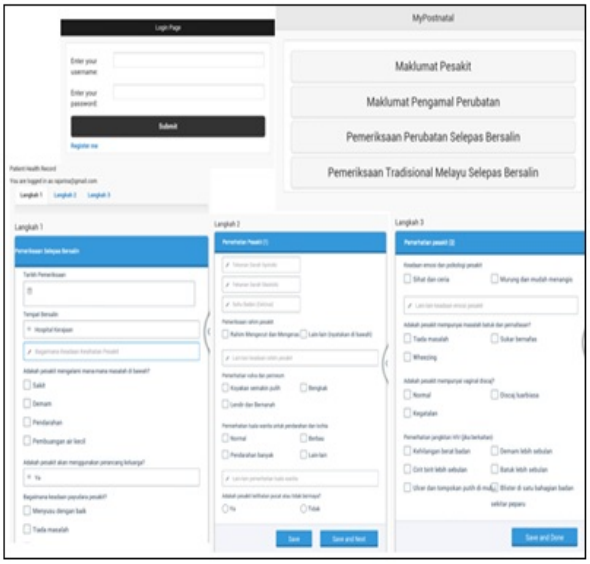


**Figure-6.** Printscreens of prototype of MyPostnatalSys.

Figure-7 shows the main screen for modern medicine module. The modern medicine practitioner can check the patient medical history (Maklumat Pesakit), enter hospital discharge information (Borang Discaj Pesakit), conduct postnatal check for standard modern medicine practice (pemeriksaan perubatan selepas bersalin) and conduct postnatal check before undergoing Traditional Malay Medicine treatment for postnatal care. Modern medicine practitioners also can register their patients in the Patient Registration module (Pendaftaran Pesakit).


**Figure-7.** Modern medicine module.

Figure-8 displays the main page for traditional malay medicine module. TMM practitioners can check the patient health record in Patient Profile (Maklumat Pesakit), enter treatment information in the TMM practitioner-patient consultation form (Rawatan Tradisional Melayu) and Register Patients (Pendaftaran Pesakit).


**Figure-8.** Traditional Malay medicine module.

Initial testing was conducted via 2 internal testers to evaluate if the system meets the system requirement. The internal testers are technical testers from academic background. This testing is considered to be pre-production testing, before the system is deployed to the user. The prototype shall be presented for validation to the MM and TMM practitioners once the initial testing is completed. Thus, MyPostnatalSys shall be evaluated twice. However, this paper shall only present the initial evaluation of the prototype. The initial evaluation result is displayed in Table-2. Test cases were derived from the requirements and executed by two internal testers. A total of eleven expected outputs were verified by the testers and all expected outputs were displayed according to specification. According to Table-2, accredited practitioners can register, access patient health record, and register patients successfully. MyPostnatalSys is also flexible enough to be accessed via mobile and desktop devices. All initial evaluation results show that the MyPostnatalSys meets the stated requirements to facilitate integrated healthcare service for traditional malay medicine and modern medicine.

**Table-2.** Initial evaluation results.

| RQ No. | Detail | Expected output | T1 Test | T2 Test |
|---|---|---|---|---|
| RQ 1 | Both TMM and MM practitioners can access patient health record. | 1.TMM practitioner can view patient visit record to MM practitioner. | Pass | Pass |
| | | 2. MM practitioner can view patient visit record to TMM practitioners. | Pass | Pass |
| | | 3.TMM practitioner can update patient record in TMM module. | Pass | Pass |
| | | 4.MM practitioner can update patient record in MM module. | Pass | Pass |
| RQ 2 | System is flexible and can be accessed via desktop and mobile devices. | 1.TMM practitioner can access MyPostnatalSys via mobile device. | Pass | Pass |
| | | 2.TMM practitioner can access MyPostnatalSys via desktop. | Pass | Pass |
| | | 3.MM practitioner can access MyPostnatalSys via mobile device. | Pass | Pass |
| | | 4.MM practitioner can access MyPostnatalSys via desktop. | Pass | Pass |
| RQ 3 | System is able to register TMM and MM practitioners. | 1.MM practitioners can successfully register in MyPostnatalSys. | Pass | Pass |
| | | 2.TMM practitioners can successfully register in MyPostnatalSys. | Pass | Pass |
| RQ 4 | System is able to register patients. | Patients can successfully register in MyPostnatalSys. | Pass | Pass |

## CONCLUSIONS

This paper has presented the design and initial evaluation of MyPostnatalSys prototype, which represents an integrated healthcare service system in postnatal care treatment. Based on the initial evaluation results, MyPostnatalSys prototype meets the data collection requirements for integrated healthcare service. However, this prototype shall be required to be validated by subject matter experts or modern and traditional practitioners before it is deemed suitable to be deployed in healthcare centres.

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