RENAL PHARMACY SERVICE GUIDELINE

Pharmaceutical Services Division

Ministry of Health Malaysia

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Ministry of Health Malaysia
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MESSAGE

Pharmacy practise which was traditionally product centred has now shifted towards patient care. Pharmaceutical care, which is comprehensive and patient focussed is vital in ensuring that patients receive rational, safe and effective treatment.

Renal Pharmacy practice is one of the specialised clinical pharmacy services that promise exciting challenges in Malaysia. Patients with kidney diseases have many co-morbidities and their drug therapy can be complicated and costly. The responsibility of retarding the progression of chronic kidney disease (CKD) and improving the therapeutic outcomes of renal replacement therapy (RRT) has increasingly become a multi-disciplinary approach which was once considered to be entirely the realm of physicians. This require the pharmacists to work closely with patients and other healthcare providers in promoting health, preventing disease complications, and to assess, monitor, initiate, and modify medication use assuring that drug therapy regimens are safe and effective.

This service guideline is meant for clinical pharmacists involved in the management of kidney disease patients which encompasses outlining the activities and documentations in handling Medication Therapy Adherence Clinic (MTAC) in kidney diseases and provision of renal ward services. The availability of this guideline will enable the standardisation of practice across the country, provide an overview of the required minimum standard of care and help in the expansion of quality renal pharmacy services throughout Ministry of Health (MOH) facilities.

I would like to commend the Clinical Pharmacy Working Committee (Nephrology Subspecialty), Pharmaceutical Services Division, MOH for their contribution and commitment to the publication of this protocol.

Thank you.

DR SALMAH BAHRI

PENGARAH AMALAN DAN PERKEMBANGAN FARMASI

BAHAGIAN PERKHIDMATAN FARMASI

KEMENTERIAN KESIHATAN MALAYSIA

PREFACE

Clinical pharmacy practise in Malaysia has a long history and started as early as 1980's. In the early years, shortage of human resources has limited the expansion of the practise. Developments in pharmacy services have enabled the establishment of Ward Pharmacy services in the Ministry of Health hospitals in 2003, subsequently followed by Medication Therapy Adherence Clinic (MTAC) services in 2004. Starting from the introduction of training modules and proper forms for documentation, the service is now moving towards specialised practise to meet expectations of both patients and other healthcare providers. Renal Pharmacy practise is one of the specialised services that promises exciting challenges and is an area where pharmacists can work closely with other healthcare professionals towards optimising the therapy.

The service and practise must be uniform to ensure its quality across the board is standardised. While formal training has always been encouraged this is not always possible for many. Even though practising the skill never posed any problem, the lack of documents which specify standard methods of carrying various tasks has been a concern. Thus, this guideline basically aspires to achieve the minimum requirements in providing renal pharmacy service.

The aim of this guideline is to provide information on the elements of 'how to start' and 'how to provide' renal pharmacy service mainly at the hospitals and primary care facilities. The compilation of workflow, job description and service modules are simplified in tables and diagram for better understanding and easy reference.

It is with great hope that this guideline will be used to expand renal pharmacy services and will serve as a starting point to provide a seamless transition of care for patients with kidney disease in Malaysia. Any comments or recommendations are welcome and should be directed to Malaysian Renal Pharmacy Group (MRPG) Publication Unit via email at RenalPharmacy_Malaysia@yahoogroups.com.

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THE GUIDELINE

1.0 INTRODUCTION TO THE GUIDELINE

Why have a Service Guideline?

This service guideline is developed to set up standard methods of performing various tasks in renal pharmacy service. The service and practice must be uniform to ensure its quality across the board is standardized. Even though practicing the skill never posed any problem, the lack of documents which specify standard procedure of performing the service has been a concern. While formal training has always been encouraged this is not always possible for many. Thus, this guideline is intended to be used as a reference to achieve the minimum requirements in providing renal pharmacy service.

Aim

To provide a seamless transition of care for patients with kidney disease within the Ministry of Health Malaysia hospitals and health clinics with renal pharmacy service(s).

Using the Guideline

This guideline is based on the current policy of the Pharmaceutical Services Division (Pharmacy Practice & Development), Ministry of Health Malaysia which may be amended with time. Therefore, new policies and protocols from the Pharmaceutical Services Division should be given priority to the current recommendations.

Any comments or recommendations are welcome and should be directed to MRPG Publication Unit via email to RenalPharmacy_Malaysia@yahoogroups.com.

2.0 STANDARD CRITERION FOR RENAL PHARMACY SERVICES

2.1 Job Description of A Renal Pharmacist

Under direct patient care setting, renal pharmacists have a growing responsibility and accountability for managing medication therapy. The following job scope is devised to ensure consistently high quality of care and service. However, this list is not exhaustive as the pharmacist's role in patient care is dynamic. Thus keeping oneself updated on recent development in clinical practice is crucial.

Table 2.1: Job Description of Renal Ward Pharmacy

Job Scope	Description
Admission clerking	• Medication history clerking, which includes non-prescription drugs e.g. herbal remedies and chronic use of non-steroidal anti-inflammatory drugs (NSAIDS) • Compliance assessment *(CP1 form)* • Medication reconciliation
Pharmacotherapy Rounds	• Active participation in ward rounds with doctors • Collaborate with other healthcare providers in developing pharmaceutical care plans for the patients • Provide medication therapy evaluations and recommendations to healthcare providers supported by evidence-based medicines
Monitor and review patients' medication	• Case clerking and review (*CP2 form)* • Checking patient's medication chart • Ensure medications are served • Ensure prescription is completely filled • Ensure rational drug use to maximize the benefits of drug therapy • Therapeutic Drug Monitoring (TDM) / Total Parenteral Nutrition (TPN)services
Identify Pharmaceutical Care Issues	• Dosing adjustment based on patient's creatinine clearance, dialysability of the drugs. • Drug interaction especially with immunosuppressants • Polypharmacy • Medication errors e.g. drug, dose, frequency, duration, administration, etc • Drug incompatibility and contraindications
Adverse Drug Reaction Report	• Investigate and report any suspected adverse drug reaction (ADR) or drug allergy • Provision of allergy card
Provision of Drug Information	• Renal dosing adjustment • Dilution of injectables to the nurses • Serve as a source of scientifically valid information and advice regarding the safe, appropriate, and cost-effective use of medications.
Education	• Patient group counselling/education • Continuous Nursing Education • Junior pharmacists

Patient counselling	• Bedside/Discharge counselling • Post-transplant medications • Non-prescription medication • Specialised drug delivery devices e.g. Humapen, inhalers • Group counselling
Research and Development	• Participate in research work/project pertaining to renal pharmacy practice

2.2 Standard of Care in Renal Pharmacy Services

Standard:
The pharmacist continuously and systematically reviews the patient's medication regimen, evaluates the appropriateness of the regimen to optimize therapeutic outcomes, and ensure regular patient reviews are conducted.

Criterion 1 The renal pharmacist is trained or experienced in conducting medication reviews.

Indicators:

1. Completes specialized training organized or arranged by Pharmacy Division, Ministry of Health, Malaysia in conducting medication reviews in patients with kidney disease.
2. Maintains access to appropriate support services (e.g. drug information services, clinical support group etc)

Criterion 2 The renal pharmacist establishes and maintains patient's medication profile.

Indicators:

1. Requests routine notification when a patient is admitted or maintains a system to be continuously notified when there is a new admission.
2. Establish and maintains a current medication profile unique to the interviewed patient.
3. Reconciles the medication profile when a patient is admitted, upon transfer and on discharge.

Criterion 3 The renal pharmacist uses formal documentation to record medication reviews.

Indicators:

1. Records patient's medication history including alternative medicine use and other drugs used.
2. Maintains documentation of identified issues during the review and actions taken arising from the review.

Criterion 4 The renal pharmacist identifies potential therapeutic problems and accurately documents action plans and recommendations.

Indicators:

1. Identifies pharmaceutical care issues (PCIs) on a daily basis and documents them.
2. Documents the action plan and recommendations made in the relevant forms.

Criterion 5 The renal pharmacist discusses the recommendations with the medical practitioner or other health professional

Indicators:

1. Maintains a system to discuss the recommendations effectively with the prescriber or other health professional.
2. Utilizes evidence-based medicine to support recommendations when necessary.

Criterion 6 The renal pharmacist accurately and appropriately documents outcomes of the recommendations made and maintains follow-up.

Indicators:

1. Records the date and actions taken by the prescriber and/or other health professional as a result of the intervention and/or recommendations.
2. Records the outcomes of discussion with the prescriber regarding therapeutic problems and treatment options.

Criterion 7 The renal pharmacist reports issues relating to medication administration to the nursing staff.

Indicators:

1. Documents the date and time of the contact and the name(s) of the nursing staff with whom issues about medication administration were discussed.
2. Records the issues discussed with nursing staff in the relevant forms.

Criterion 8 The renal pharmacist identifies, monitors and documents Adverse Drug Events (ADEs) and Adverse Drug Reactions (ADRs)

Indicators:

1. Takes reasonable steps to identify suspected ADEs and ADRs when reviewing medications and notifies prescriber when these are clinically significant.
2. Facilitates a system for reporting ADEs and ADRs. (https://www.bpfk.gov.my/quest2/madrac reporting online.htm)
3. Facilitates and utilizes a system to prevent ADR medicine from being re-administered

Criterion 9 The renal pharmacist identifies, monitors and documents need for special services such as Therapeutic Drug Monitoring (TDM) and Parenteral Nutrition (PN)

Indicators:

1. Identifies patients whose medication profile indicates a need for TDM.
2. Interprets drug assay results and provides recommendations for changes to drug therapy as required.
3. Maintains all records of TDM interventions in the patient notes.
4. Identifies patients at risk for malnutrition and those that have a need for PN.
5. Suggests appropriate PN regimen that complements the dietary intake and monitor the outcome.
6. Maintains all records of PN interventions in the patient notes.

Criterion 10 The renal pharmacist continuously updates his/herself in the development of renal drug therapy and provides information and education on medicines that adequately meets the needs of the facility.

Indicators:

1. Continuously update knowledge on recent developments in the field of renal drug therapy via attending Continuous Professional Development (CPD) activities.
2. Maintains adequate and current resources to support the provision of drug information.
3. Responds to drug queries promptly and effectively.
4. Documents the drug information provided in the relevant forms.
5. Conducts / delivers continuous education program required in the facility.

3.0 SERVICE OUTCOME MEASUREMENT

Pharmacists' involvement in patient care has proven to benefit the patients and also the healthcare system in many ways. The impact of renal pharmacy service can be determined by several indicators as listed in Table 3.1. These should be followed by evidence from research in order to gain better quality service and higher achievements. Thus service outcome is best measured when research is incorporated into daily practice because the gathered data holds valuable information to improve the provision of pharmaceutical care.

Table 4.1: Indicators for the measurement renal pharmacy service outcomes

a.	**Improvement of patient's adherence towards medications and treatment plan**
b.	**Enhancement of patient's drug knowledge and understand in regards to their medications and treatment plan**
c.	**Retardation of disease progression**
d.	**Optimal management of disease complications**
e.	**Reduced drug related problems**
f.	**Optimal therapeutic drug monitoring**

3.1 Improvement of Drug Adherence

Patient's adherence towards their medication adherence must be assessed from time to time because non-adherence among kidney disease patients can lead to increased morbidity and mortality risks.3 This is essential as patients with kidney disease have a high pill burden, taking an average of 12-19 pills per day. [1,2,3] Among all medications, phosphate binder is one of the drugs patients tend not to adhere with non-adherence rate range from 22-74% as reported in a recent study [4].

3.2 Enhancement of Patient's Drug knowledge

A patient who is knowledgeable about their disease, treatment and medication will have a better understanding on the rational of drug therapy which will enable better appreciation of medication counselling and promote adherence to therapy. [5,6]

3.3 Retard Disease Progression

Optimization of the following parameters is essential in retarding renal disease progression and reduce adverse outcome such as increased risk of cardiovascular events, stroke and death.

- BP control [7,8,9]
- Plasma glucose control [10]
- Proteinuria reduction
- Plasma lipid control
- Smoking cessation

3.4 Optimal management of disease complications

- Mineral Bone Disease (MBD)

  Maintaining serum calcium and phosphate levels as near normal as possible can prevent or suppress the development of parathyroid hyperplasia, prevent and reverse development of extra skeletal calcification, prevent or reverse the accumulation of aluminium in bone calcification and reduce cardiovascular risk.[11]

- Infection

  Infection is the common cause of death in kidney disease patients as they are relatively immunosupressed and most are present with concomitant co-morbidities. Renal replacement patients undergo dialysis are especially prone to catheter related infection due to presence of vascular access. Prevention of infection in pre, peri and post transplant patient is especially important due to its immunosuppressed status and risk of multiple potential source of infection.

- Malnutrition

  Nutrition support is important in kidney diseases patient as they are at risk of protein-energy malnutrition. Various factors contribute to malnutrition in kidney disease patient, mainly decreased intake, diet restrictions, loss of nutrients in dialysate, concurrent illness, chronic blood loss, acidosis, catabolic state and endocrine disorder.[12,13,14]

- Anaemia

  Effective treatment of anaemia in CKD is found to improve survival, decrease morbidity and increase quality of life. Haemoglobin (Hb) status of patients should be kept within the recommended Hb level.

3.5 Reduce drug related problems

Patients with kidney diseases have high pill burden as an average of 12-19 medications need to be taken daily.[15] This poses a high risk for drug related problems which necessitate pharmacist to be proactive in identifying and minimizing these problems. Some of the drug related problems are adverse drug reactions, medication safety issues, suboptimal outcomes and non-adherence to name a few.

3.6 Maintenance of drug levels within therapeutic range

Kidney disease patients have altered drug pharmacokinetics due to renal failure and complex drug regimen.[16] Drugs that have narrow therapeutic index need to be monitored periodically in order to prevent subtherapeutic or toxic drug levels. Examples of drugs which require monitoring are aminoglycosides, vancomycin and immunosuppressants.

4.0 IN-PATIENT CARE FOR PATIENTS WITH KIDNEY DISEASE

Patients with kidney disease require lifelong treatment for their condition and other co-morbidities. They receive a wide range of pharmacotherapeutic agents and are therefore at higher risk to experience drug related problems that may lead to increased morbidity, which can affect patient's quality of life or cause increase in mortality. Thus, provision of in-patient care by pharmacists starts at the point of admission. Throughout hospitalization, pharmacists are responsible to ensure patients receive the right drug with the right regimen at the right time. This can be achieved by following a set of processes starting from taking accurate medication and medical history, reconciling medications during medication review, enhancing drug knowledge to improve adherence and instituting a proper medication discharge plan.

4.1 Workflow for Renal Ward Pharmacy Activities

Figure 4.1 describes the common and recommended workflow for the renal ward pharmacy activities such as the following:

i) Medication History Taking / Reconciliation
- Form used: Medication History Assessment Form (CP1).
- Pharmacist must acquire the skills to interview patient to obtain an accurate and informative medication history of the patient. Two main sources of information can be extracted, that is from the case notes and through patient interview. (Refer to Job Description for effective medication history taking)
- The form should be filed together with the patient's case notes, serving as a reference to other healthcare providers.

ii) Case Clerking and Medication Review
- Form used : Pharmacotherapy Review Form (CP2)
- Case clerking is the term used when a case is being studied and documented for the first

time. The subsequent revision of the case is known as case reviewing.

- Pharmacist should be able to extract relevant information from medication chart, case notes, laboratory data and other relevant details through patient interview.
- Monitor patient's progress, update the pharmaceutical event details from patient care issues and intervene accordingly when necessary. If the patient is transferred to another ward, share and pass the CP2 form to your other colleagues who are in charge of that particular ward for further follow up as needed (repeat the flow: from 4.1)

iii) Ward Rounds

- Ward rounds including routine rounds, pharmacist rounds, and grand ward rounds
- Active participation in ward rounds requires good clinical knowledge and adequate information on drug availability and dosage form.
- Participate effectively during discussion by presenting relevant PCI and respond to questions and enquiries promptly.
- Intervene when necessary and monitor outcome
- Record all the interventions and activities in the relevant forms or specifically the Clinical Pharmacy Report Form (CP3)

iv) Bedside Medication Counseling

- Select and identify patient who needs counselling by reviewing the CP1 and CP2 form.
- Prioritize potential patient based on :
    - Complexity of therapeutic plan
    - Compliance status
    - Patient with special device needs
    - Patient dependant on caregiver

- Pharmacists must have thorough understanding of the patient's condition and disease in order to get the patient involved in their drug therapy plan during medication counselling. Identify relevant issues to be emphasized during counselling.

v) Discharge Plan

- The pharmacy discharge plan will include past medication history taking, medication reconciliation, and discharge counselling.

vi) Referral to Medication Therapy Adherence Clinic (MTAC)

- Prioritize patient that need MTAC follow up:
    - Transplant patient
    - Complex medication regime
    - Uncontrolled DM/HPT
    - Poor compliance

- If a patient needs referral to MTAC programme, the patient should be registered under a particular MTAC programme and given a follow up date. (refer to Renal MTAC protocol)

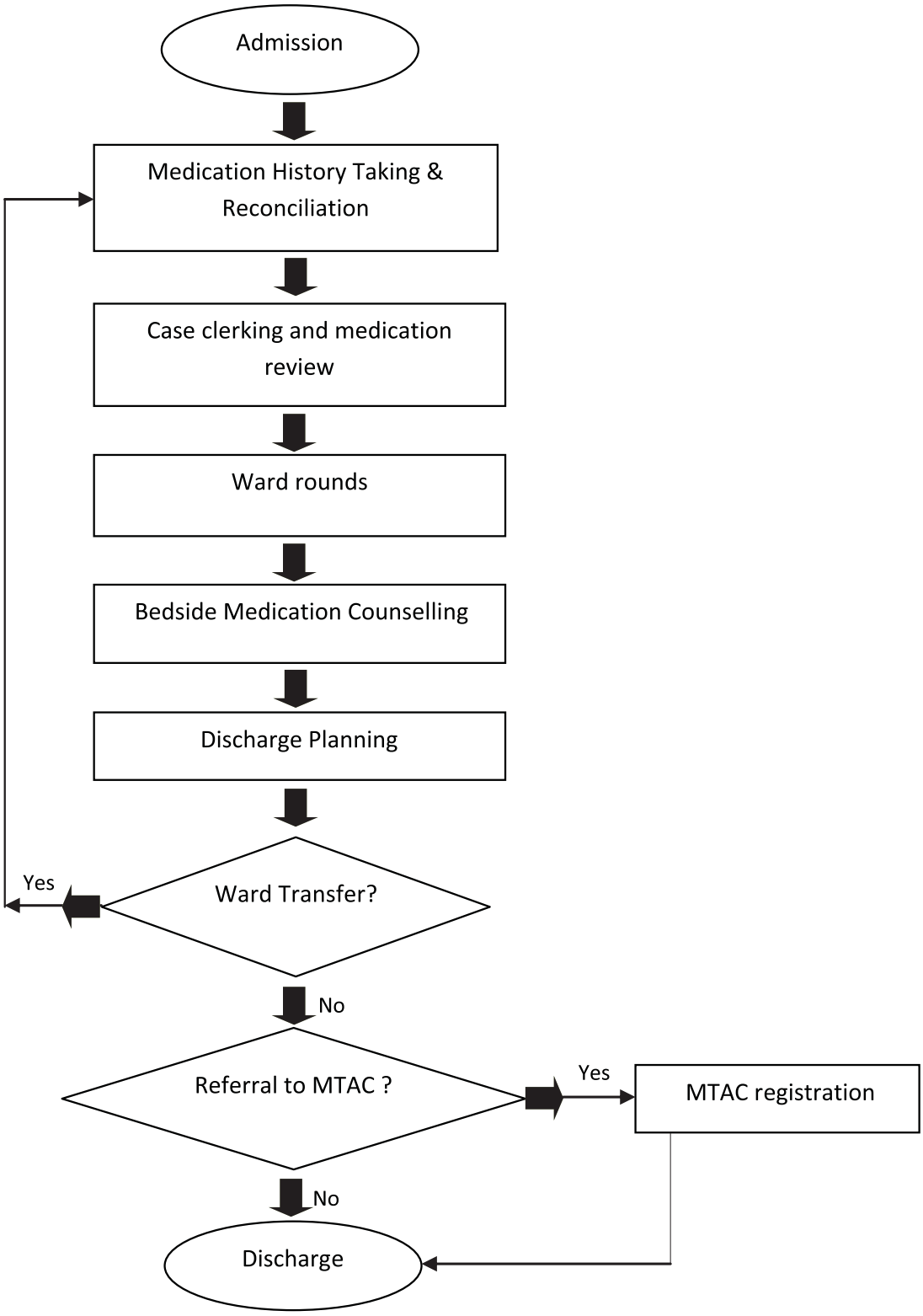


Figure 4.1 : Workflow for renal ward pharmacy activities

4.2 Identification of Specific Pharmaceutical Care Issues in Kidney Disease

Figure 4.2 shows the method on how to identify specific pharmaceutical care issues (PCIs) encountered in kidney disease patients. Like any other patients when they get admitted into a hospital and subsequently into a ward, they will undergo several phases from ward admission up to when they get discharged or transferred to other facilities. As shown in the flowchart, several core phases have been identified to which specific PCIs can be determined:

i) Upon admission

Basic PCIs are identified through medication history taking and medication reconciliation. Examples of common PCIs include compliance to multiple medication, allergy or adverse drug reaction (ADR) status and incomplete or inappropriate prescription.

ii) First diagnosis/impression established within 24-72 hours

At this point of time, several drugs would probably be prescribed by the attending physician based on the first diagnosis or impression made. As such, some of the core PCIs expected here would be suitability of antibiotic regime, any possible drug interactions, inadequate drug regime and any dosage adjustment required.

iii) On treatment

During on-going treatment, daily review of patients' medication profile may enable the pharmacists to detect some other continuous PCIs, for example the duration of antibiotic therapy, drug dosage adjustment and errors occurred during drug administration.

iv) New or a change in diagnosis

When there are any new or changes in diagnosis, we can anticipate simultaneous changes in patients' pharmacotherapy. As such, some new PCIs can be identified here. Examples are change in antibiotic regime, incomplete or inappropriate prescription.

v) Discharge planning

When patients are ready to be discharged, the pharmacist will do a discharge plan for the patient that entails reconciliation of ward and discharge prescription drugs and medication counselling. Some of the common PCIs pre-discharge are duration of drug therapy, ncomplete prescription and referral to MTAC if necessary.

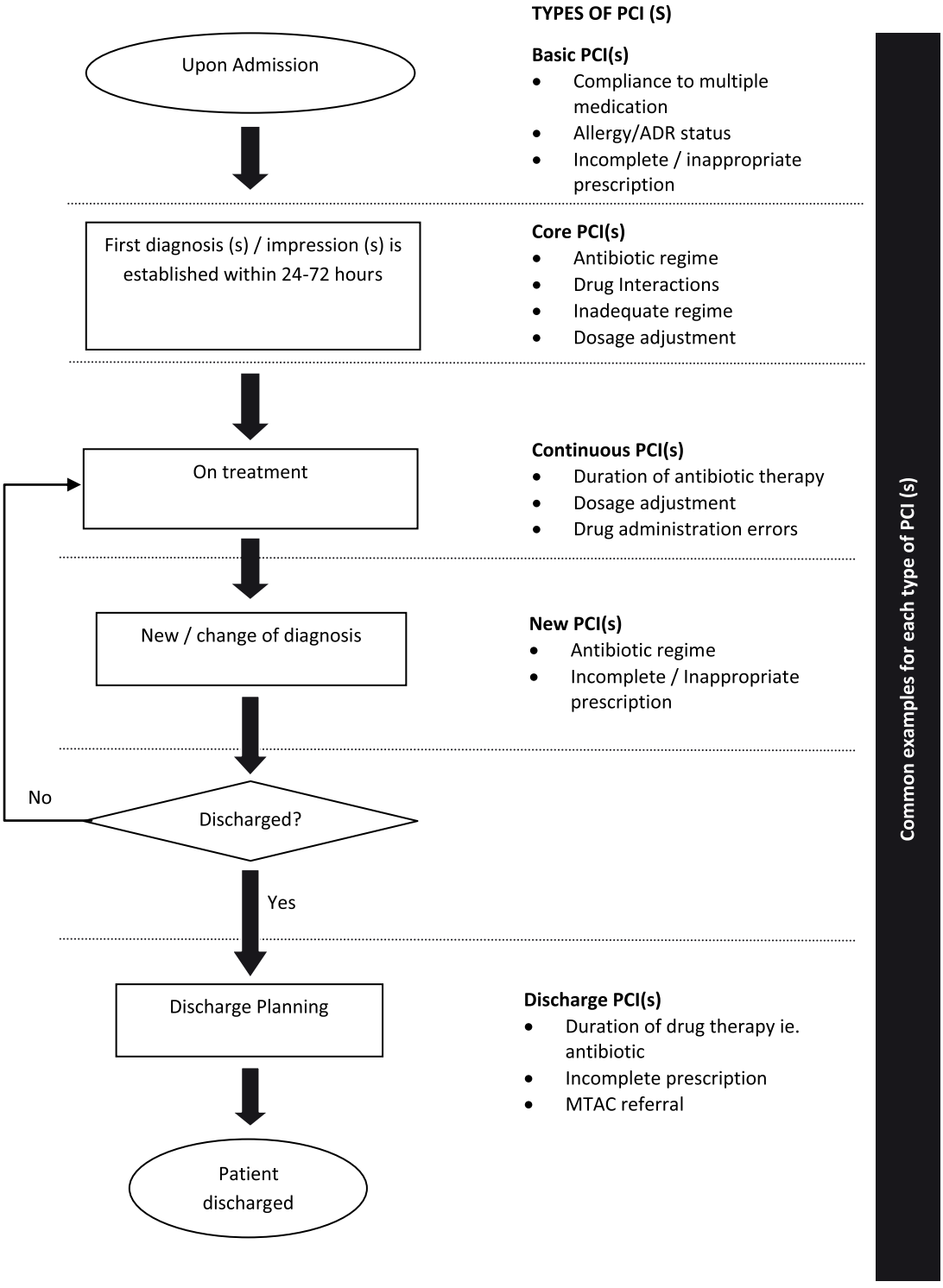


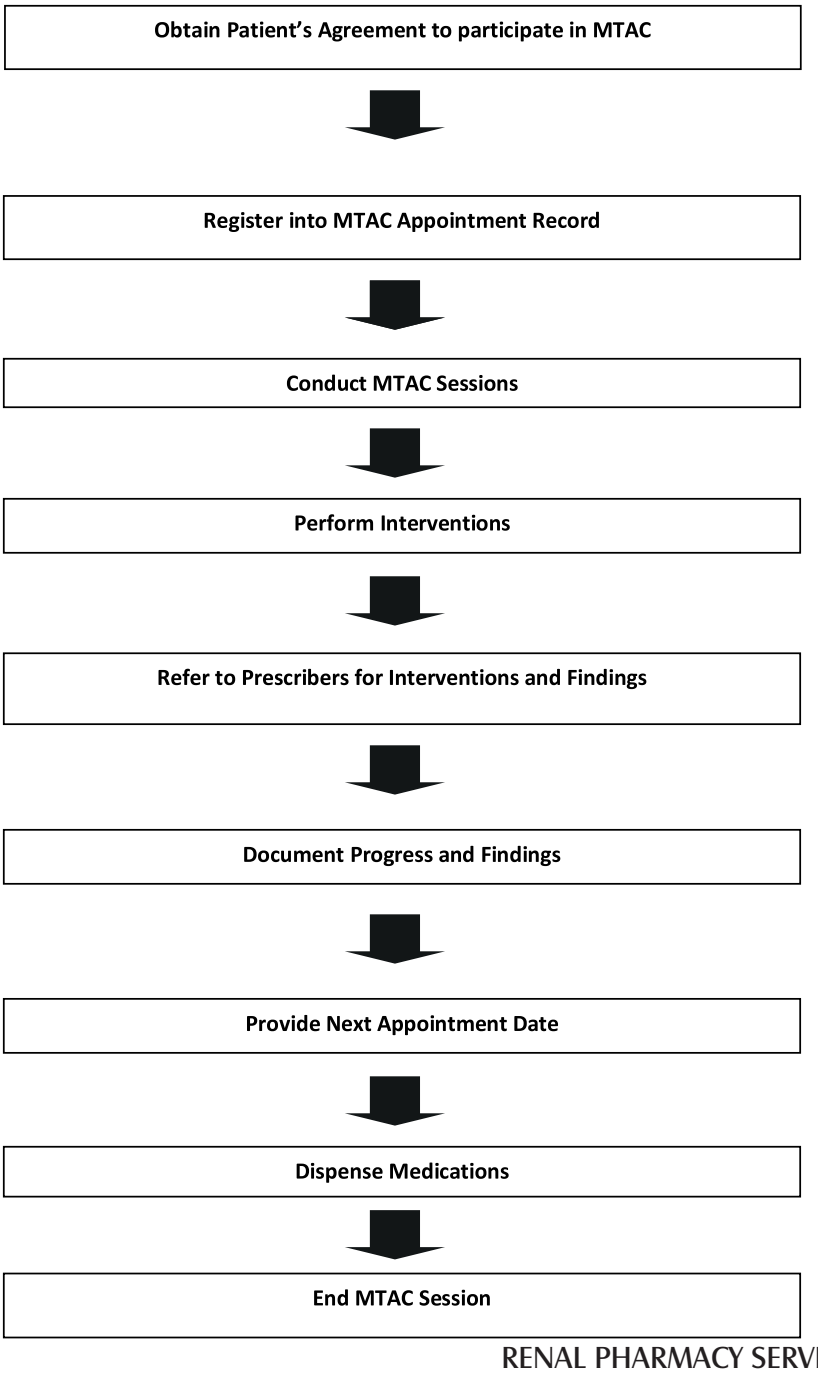
Figure 4.2 : Workflow for the identification of specific pharmaceutical care issues in kidney disease

5.0 AMBULATORY CARE FOR PATIENTS WITH KIDNEY DISEASE

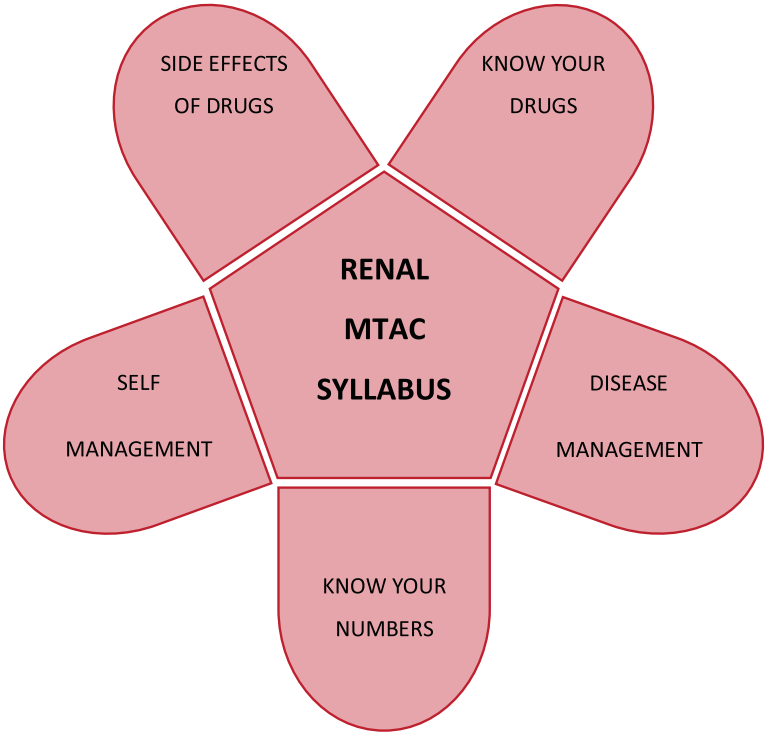
5.1 Renal Medication Therapy Adherence Clinic (MTAC) Program

Ambulatory patients who have kidney disease are often dispensed multiple number of medications for their various co-morbidities. Proper counselling and follow-up strategies are needed to educate and improve patients' understanding on their complex medication regimen as well as to inform their targets in improving their disease outcomes. The renal MTAC program should be outlined to complement the pharmacy activities in the outpatient settings. Specialised ambulatory care for kidney disease patients by pharmacists have been shown to improve patient outcomes. The core areas that should be targeted are the chronic kidney disease (Stage 1- 4 of CKD), dialysis (Stage 5 of CKD) and renal transplantation.

5.1 Workflow for Renal MTAC Activities



5.3 Renal MTAC Counselling Module



** Syllabus above is not arranged in any specific sequence. It can be taught at any visit depending on patients' individualized need.*

** Syllabus above may be completed in 6 or more MTAC. sessions depending on patients' understanding and clinical progression.*

5.3 Chronic Kidney Disease (CKD) MTAC

Apart from renal system, cardiovascular system involvement (lipids and blood pressure), diabetes management and dietary restrictions affects chronic kidney disease (CKD) patients. This may result in many different practice areas to be involved in the care of a CKD patient. While the primary care physician may play a role in care coordination, dieticians, nephrologists, endocrinologists, cardiologists and pharmacists are essential when addressing the many interacting disorders.

Without interdisciplinary involvement, care for patients may become fragmented. Preventing progression to ESRD may improve quality of life and help to reduce health care budget. Thus MTAC CKD program is one of the ways for pharmacist to have a role in promoting adherence and medication knowledge among CKD patient as well as to ensure that co-morbidities such as hypertension, diabetes, anaemia and bone and mineral metabolism disorders are appropriately evaluated and managed.[17]

5.4.1 Specific objectives and module

1. To delay the onset and progression of chronic kidney disease and its related complications through early therapeutic intervention.
2. To detect, manage or prevent drug related problem in patient's drug therapy.

CHRONIC KIDNEY DISEASE (CKD) MTAC MODULE

Learning Outcome:

1. To introduce the pharmacists' role in optimizing drug therapy in patients on chronic kidney disease.
2. To improve patients' adherence towards their drug therapy.
3. To enhance patients' drug knowledge.
4. To educate patients on the recognition, prevention and minimization of adverse effects from their medications.

Introduction	**Syllabus 1** **Know your drugs**	**Syllabus 2** **Disease management**	**Syllabus 3** **Know your numbers**	**Syllabus 4** **Side Effects of drug**	**Syllabus 5** **Self Management**	**Outcome** **Assessment/** **Follow Up**
- Introduction to the importance of MTAC and roles of pharmacists. - Baseline drug knowledge and compliance assessment.	- Generic and Trade name of drugs - Indications - Administration ways – before/after food - Provide individualised medication list - Provide patients' education materials - Adherence & compliance enhancement	- CKD - DM - Cardiovascular - Anaemia - Renal bone disease - Hyperlipidemia - Others	- FBG/RBS/HbA1C - BP - Hb - PO4, CaXPO4 product, albumin, ALP, iPTH - Lipid profile (total cholesterol, HDL, LDL, TG)	- Recognize, prevent, minimize and manage	- What to do if missed dose? - Healthy Lifestyle - Compliance Aids (pill box, diaries keeping, organiser, alarm clock etc)	- Drug knowledge and compliance assessment - Clinical outcome parameters

*Syllabus above may be completed in 6 or more weeks depending on patients' understanding and clinical progression.

* Syllabus above is not arranged in any specific sequence. It can be taught at any visit depending on patients' individualised need.

e.g. during a visit, patient's PO4 high, pharmacist can counsel on renal bone disease (syllabus 2), target PO4 (syllabus 3) and low PO4 diet (syllabus 5)

5.4.2 CKD MTAC education outline

Please kindly refer to the table below for the educational outline of CKD MTAC.

Table 5.1 : Educational outline for CKD MTAC

TOPIC	COUNSELLING POINTS
CKD	- Stages of CKD - Goal of treatment - to retard progression of CKD - Complications of CKD – may progress to ESRF(dialysis/transplant)
Diabetes mellitus	- Medications (oral antidiabetic/insulin) - Type 1 or 2 DM - Target HbA1c, fasting glucose level and post prandial glucose - Complications of uncontrolled DM (macrovascular : stroke, CVS) or microvascular : nephropathy, retinopathy, neuropathy) - Insulin injection technique and storage - Symptom of hypoglycaemia & management
Cardiovascular	- Medications (antihypertensive/ cardiovascular agent) - Target BP - Complications of high BP - Administration time isosorbide dinitrate (ISDN) / isosorbide mononitrate (ISMN)- nitrate free period - Salt and fluid restrictions
Anemia	- Medications (oral iron, folic acid, B complex, EPO, IV iron) - Target haemoglobin - Administration ways : oral iron – take on empty stomach - EPO : adherence, storage, injection technique, BP monitoring - Symptoms of anaemia - Complications of low /high Hb
Hyperlipidaemia	- Medications (statin, fibrates) - Target : total cholesterol, HDL, LDL, TG - Complications
Healthy Lifestyle	- Low salt diet (for HPT) - Low sugar diet (for DM) - Low protein diet (CKD) - Low phosphate diet - Low fat diet (hyperlipidaemia)

	- Low potassium diet - Exercise - Achieving normal BMI - Smoking cessation
Others	- Avoid nephrotoxic drugs such as NSAIDs, unregistered traditional medicines/herbs, herbal drugs known to be nephrotoxic etc. - Inform health care providers if plan to take supplements/over-the-counter products.

5.5 Dialysis MTAC

End Stage Renal Disease (ESRD) patients have multiple diseases that require multiple medications. The average number of medications which a haemodialysis patient can receive, is 10 prescription and 2 non-prescription items. [18] These patients are thus at increased risk of non-compliance, drug interactions, adverse drug reactions and drug-related problems.

Involvement of a clinical pharmacist can bring positive impact in this group of patients by reducing drug-related problems and improving patients' knowledge and adherence towards their therapy. Through medications review during MTAC, pharmacists are able to manage drugs to suit the patient, identify unnecessary drugs and hopefully reduce incidence of ADR.[19] The provision of clinical pharmacy services has been reported to reduce not only costs of therapy but also morbidity and mortality.[20]

Medication Therapy Adherence Clinic for dialysis patients can be divided into two types, Haemodialysis MTAC and Peritoneal Dialysis MTAC. Haemodialysis patients usually come to the dialysis centre three times a week for a four hour dialysis session each time. On another hand, peritoneal dialysis is divided into Continuous Ambulatory Peritoneal Dialysis (CAPD) and Automated Peritoneal Dialysis (APD) in which the patients do dialysis exchanges at home. For haemodialysis patients, the pharmacists may either conduct MTAC during their weekly dialysis sessions or during their clinic visits with physicians. For peritoneal dialysis patients, MTAC may be conducted during patient's clinic visit with the doctors.

The following section serves as a guide for pharmacist who would like to start MTAC in haemodialysis and peritoneal dialysis patients.

5.5.1 Specific objectives and module

1. To provide continuity of pharmaceutical care to dialysis patients to prevent drug-related problems.
2. To prolong the life expectancy of HD/CAPD patients as well as to improve their quality of life.
3. To optimize patients' adherence towards the complicated pharmacotherapy regimens.

DIALYSIS MTAC MODULE

Learning Outcome:

1.To introduce the pharmacists' role in optimizing drug therapy in patients on dialysis.
2.To improve patients' adherence towards their drug therapy.
3.To enhance patients' drug knowledge.
4.To educate patients on the recognition, prevention and minimization of adverse effects from their medications.

Introduction	**Syllabus 1**	**Syllabus 2**	**Syllabus 3**	**Syllabus 4**	**Syllabus 5**	**Outcome**
	Know your drugs	**Disease management**	**Know your numbers**	**Side Effects of drug**	**Self Management**	**Assessment/ Follow Up**
- Introduction to the importance of MTAC and roles of pharmacists. - Baseline drug knowledge and compliance assessment.	- Generic and Trade name of drugs - Indications - Administration ways eg. before/after food - Provide individualised medication list - Provide patients' education materials	- DM - Cardiovascular - Anemia - Renal bone disease - Hyperlipidaemia - Others	- Dry weight - FBG/RBS/HbA1C - BP - Hb - PO_4, Ca x PO_4 product, albumin, ALP, iPTH - Lipid profile (total cholesterol, HDL, LDL, TG) - Electrolyte (K)	- Recognize, prevent, minimize and manage	- What to do if missed a dose? - Healthy Lifestyle - Compliance Aids (pill box, diaries keeping, organiser, alarm clock etc)	- Drug knowledge and compliance assessment - Clinical outcome parameters

*Syllabus above may be completed in 6 or more weeks depending on patients' understanding and clinical progression.
* Syllabus above is not arranged in any specific sequence. It can be taught at any visit depending on patients' individualised need.
e.g. during a visit, patient's PO_4 high, pharmacist can counsel on renal bone disease (syllabus 2), target PO_4 (syllabus 3) and low PO_4 diet (syllabus 5)

5.5.2 Dialysis MTAC education outline

Please kindly refer to the table below for the educational outline of MTAC dialysis.

Table 5.2 : Educational outline for Dialysis MTAC

TOPICS	POINTS
Diabetes mellitus	- Medications (oral antidiabetic/insulin) - Type 1 or 2 DM - Target HbA1c, fasting glucose level and post prandial glucose - Complications of uncontrolled DM (macrovascular : stroke, CVS or microvascular : nephropathy, retinopathy, neuropathy) - Insulin injection technique and storage - Symptom of hypoglycemia & management
Cardiovascular	- Medications (antihypertensive/cardiovascular agent) - Target BP and dry weight - Complications of high BP - Administration time of isosorbide dinitrate (ISDN) / isosorbidemononitrate (ISMN)- nitrate free periods (10-12hrs each day)[4] - Salt and fluid restrictions - Precaution : you may omit antihypertensive medication if BP < 90/50mmHg ; or before dialysis if experience intradialytic / postdialytic hypotension
Anaemia	- Medications (oral iron, folic acid, B complex, Erythropoetin, IV iron) - Target of Hb : 11-12g/dL - Administration ways : oral iron – take on empty stomach - EPO : adherence, storage, injection technique, BP monitoring - Symptoms of anemia - Complications of low /high Hb
Renal Bone Disease	- Medications ($CaCO_3$, calcium lactate, calcitriol/alphacalcidol, lanthanum carbonate) - Target calcium, phosphate & Ca x PO_4 product, iPTH - Complications of hyperphosphatemia - Administration ways : phosphate binders - chew tablet with food, CaCO3 capsule – open capsule and sprinkle on food.
Hyperlipidemia	- Medications (statin, fibrates) - Target : total cholesterol, HDL, LDL, TG - Complications
Healthy Lifestyle	- Low salt diet (for HPT)

5.6 Renal Transplant MTAC

Like any other organ transplant recipients, post-renal transplantation is associated with multiple complications. [21] This is because post-renal transplant patients often have several diseases, namely hypertension, diabetes, dyslipidaemia, and infectious diseases, in addition to being immunocompromised due to immunosuppressant therapy. [22] A typical renal transplant patient takes more than 10 different medications per day, and many of these medications have significant adverse effects.

The long term use of immunosuppressive agents is also associated with many post-transplant complications which may compromise the outcome of renal transplantation. Examples of complications are calcineurin inhibitor (CNI) toxicity, drug-drug interactions which may lead to sub-therapeutic or toxic drug level and other adverse drug reactions that may compromise patient or graft survival.

The involvement of pharmacist in renal transplant MTAC can help to detect the problems or complications and to rectify it as soon as possible to minimize its consequences, apart from possibly preventing them from occurring in the first place. Instilling knowledge on drug therapy, in particular of immunosuppressive agents and promoting medication adherence can have a great impact on the success rate of a renal transplantation. [23] Renal transplant patients are particularly prone to non-adherence because of the number of medications they take, which, in most cases, are needed for the rest of the patient's life or as long as the individual has a functional graft. [22,23] All of this can be done via renal transplant MTAC services by pharmacists as all the possible adverse events may occur at any stages after transplant and to address them early would surely help to reduce mortality and morbidity, thus rendering better quality of life. [22,23]

The following section serves as a guide for pharmacist who would like to start MTAC in renal transplant patients.

5.6.1 Specific objectives and module

1. To provide adequate and relevant information on medication and transplantation.
2. To enhance compliance status of the individual patient.
3. To assess patients compliance and understanding towards the need for immunosuppressant.
4. To monitor and address issues of co-morbidities.

RENAL TRANSPLANTATION MTAC MODULE

Learning Outcome:

1. To introduce the pharmacists' role in post-transplant management.
2. To improve patients' adherence towards their drug therapy.
3. To enhance patients' drug knowledge especially immunosuppressant (IS) therapy.
4. To identify and prevent any possible drug-drug interactions especially with immunosuppressant therapy.
5. To educate patients on the recognition, prevention, and minimization of adverse effects from their medications.

Introduction	**Syllabus 1** **Know your drugs**	**Syllabus 2** **Know your numbers**	**Syllabus 3** **Why should adhere to immunosuppressants**	**Syllabus 4** **Side Effects of Immunosuppressants**	**Syllabus 5** **Self Management**	**Outcome Assessment**
- Introduce the importance of MTAC and roles of pharmacist - Demographic profile – RT 1 - Pre-test	- Generic and Trade name of drugs - Indications - Administration Ways – before/after food - Adverse/side effects - Provide individualised medication list - Provide patients' education materials	- Target BP - Target Glucose/HbA1c - Target Creatinine - Target immuno-suppressant level - Target lipid profile - Targer BMI	- Immunosuppressants and Rejections - How drugs help to prolong graft/patients' survival	- Recognize, prevent, minimize and manage	- What to do if missed dose - Healthy Lifestyle - Compliance Aids (pill box, diaries keeping, organiser, alarm clock etc)	- Post-test - BP, glucose levels and Laboratory results

Figure 5.5 : Module for Renal Transplantation MTAC

*Note: The above illustration describes the core activities conducted throughout an MTAC Renal Transplant for a particular post-renal transplant patient. The important things to be covered are clearly explained under each syllabus. The syllabus does not need to run through in sequence; it can be conducted at any sequence in accordance to the needs of your patients.

5.6.2 Renal Transplant MTAC education outline

Please kindly refer to the table below for the educational outline of Renal Transplant MTAC.

Table 5.3 : Educational outline for Renal Transplant MTAC

TOPICS	POINTS
Renal transplantation	- Explain on renal transplantation in general
Graft rejection	- Types of rejection eg. Hyperacute, acute and chronic rejection - Signs and symptoms of rejection - Actions to be taken if experienced rejection
Immunosuppressant agents (ISA)	- Definition and function of ISA - The importance of taking the medication - Consequences of not taking your medication - Side effects
Medication knowledge	- Indication - Strength - Dose - Administration time - Frequency - Duration - Side effects
Diabetes Mellitus	- Steroid induced insulin resistance - Home sugar monitoring - Targets - Low sugar intake
Hypertension	- Impact of uncontrolled hypertension - Home monitoring of blood pressure - Targets - Low salt intake
Hyperlipidaemia	- Targets: total cholesterol, HDL, LDL, TG - Low cholesterol diet
Cardiovascular disease	- Medications (antihypertensive/cardiovascular agent) - Target BP and dry weight - Complications of high BP - Administration time of isosorbide dinitrate (ISDN) / isosorbide mononitrate (ISMN)- nitrate free periods

	(10-12hrs each day) - Salt and fluid restrictions
Healthy lifestyle	- Exercise - Low salt and sugar and cholesterol intake - Eat more fruits and vegetables
Medication Adherence	- Importance of medication adherence - Supporting tools e.g. pill box, alarm clock - Medication chart
Adverse Drug Reaction (ADR)	- Common side effects of medication - Actions to be taken once encounter an ADR

6.0 DOCUMENTATION

Document is defined as a written or printed paper that provides the original, official or legal form of something and can be used to furnish decisive evidence or information.

Documentation is essential because it is a basis for comparing what is required to what is actually done in order to prevent any risk of potential litigation. Besides, it can be a guide in performing tasks in order to ensure good quality of pharmacy services. Therefore, comprehensive and precise documentation of every activity or process is vital in medical and healthcare services.

Documentation in pharmacy clinical services is essential for standards of care to be met. For example, patients may be cared by different pharmacist and everyone needs to be kept up to date with what others are doing. A good documentation system provides all the information about a specific patient so that any pharmacist looking at the record would know what are the care plans to be developed for that patient. Without such documentation, quality of patients' care would be compromised.

Documentation in clinical pharmacy services in Ministry of Health can be divided into two types, which are In-patient (ward) and Out-patient (MTAC) documentation (please refer to appendix).

6.1 In-patient (Ward)

1. Medication History Assessment Form (CP 1)
2. Pharmacotherapy Review (CP 2)
3. Clinical Pharmacy Report Form (CP 3)
4. Discharge Referral Note (CP 4)

6.2 Out-patient (MTAC)

6.2.1 General Forms

1.1. Progression Notes (R 1)
1.2. Drug Regime (R 2)
1.3. Compliance Assessment (Modified Morisky Scale) (R 3)
1.4. Medication Profile (R 4)
1.5. ADR Form

6.2.2 MTAC Renal Transplant

2.1.Patient's Profile (RT 1)
2.2. Checklist (RT 2)
2.3. ADR Checklist (RT 3)
2.4. Lab Investigation (RT 4)
2.5. Immunosuppressant Regime (RT 5)
2.6. Drug Knowledge Assessment (RT 6)

6.2.3 MTAC CKD

3.1.	Patient's Profile	(RC 1)
3.2.	Checklist	(RC 2)
3.3.	Lab Investigation	(RC 3)
3.4.	Drug Knowledge Assessment	(RC 4)

6.2.4 MTAC Dialysis

4.1. Patient's Profile	(RD 1)
4.2. Checklist	(RD 2)
4.3. Lab Investigation	(RD 3)
4.4. Drug Knowledge Assessment	(RD 4)

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APPENDIX A

APPENDIX A

Special consideration for patients with kidney disease

1. Fluid restriction
   a. Almost all renal patients will be on fluid restriction. Oedematous patients resulting from sodium and water retention should be fluid restricted.
   b. Renal patients are often prescribed with a large number of medications. The amount of fluid needed to take together with the medications forms part of the total daily fluid that is allowed for the patients.
   c. For in-patients, amount of intravenous fluids given and fluids used to dilute drugs need to be taken into account.

2. Electrolytes Imbalance
   a. All chronic kidney disease patients have a high tendency of developing hyper kalemia as they progress towards ESRD.

   b. ESRD patients:
      i. Haemodialysis : patient may have to restrict potassium intake*
      ii. CAPD : potassium supplement (may be/usually) needed in these patients*.
      *subjected to patient's serum K+ level.
   c. Caution is needed when prescribing certain drugs to these patients eg. ACEI, ARB, Potassium Sparing Diuretics, Antibiotics (eg. Natural penicillins)

3. Altered pharmacokinetic profile
   a. Absorption of drugs is reduced due to uraemia induced nausea and vomiting, co-administration of chelating agents, structural abnormality or marked disturbance of the functions of gastrointestinal tract such as GUT oedema, reduced gastrointes tinal motility and increased gastric emptying time.

   b. There is an altered volume of distribution of drugs in renal patients due to changes in hydration status, protein binding and tissue binding.
      i. Some drugs are highly bound to albumin. In dialysis patients with low albu min level, more free drugs are available to exert its pharmacological effect. Thus, increase in drug effect/ toxicity may occur.

   c. Certain drugs metabolized/activated by the kidney need to be taken into account. Eg. Vitamin D. Dosage adjustment is especially crucial in patients with concomitant impaired liver function.

   d. Kidneys are one of the main organs involved in elimination of drugs and metabo lites in the body. Eg. insulin, antibiotics.
      i. All renal patients will have some degree of impaired renal function depend

ing on stages of failure.

ii. Dosage of drugs excreted extensively by the kidney need to be adjusted based on the patient's estimated Clcr.

4. Therapeutic Drug Monitoring (TDM)

a. Monitoring of narrow therapeutic drugs is vital as these patients have modified pharmacokinetic and pharmacodynamic profiles.

b. Common drugs used:

i. Aminoglycoside & Vancomycin : stat dose given every 3-5 days depending on the serum drug level.

ii. Phenytoin: corrected phenytoin level needs to be calculated by taking into account of albumin levels and dialysis status of the patient.

5. Dietary Consideration

a. Adequate serum albumin level is crucial in maintaining osmotic and oncotic pres sure.

b. In renal patients they are prone to have low albumin level due to dialysis, nephrotic syndrome and poor oral intake.

c. Parenteral Nutrition

i. Renal patients may require parenteral nutrition to supplement their total calories intake.

ii. Dialysis patient may need intra-dialytic parenteral nutrition (IDPN) during dialysis period eg. Nutriflex infused during dialysis. This is indicated normally for malnourished patient, low albumin level & poor oral intake

iii. Total protein requirement is dependent on whether patient is in pre-dialy sis or dialysis stage.

d. Restriction of dietary potassium intake is dependent on patients' stages of CKD or types of dialysis undergoing.

6. Complex medication regime

a. Renal patients have a multiple drug regime with a high pill burden. Therefore, compliance is an important issue that needs to be emphasized. When counseling discharged patients, the importance of compliance towards medication and understanding of the functions of each medication need to be conveyed.

b. Counseling:

i. Phosphate binders need to be chewed together with meals

ii. Ferrous fumarate tablets need to be administered at least 2 hours apart from phosphate binders.

APPENDIX B

APPENDIX B

Suggested reading material

Standard texts

- Micromedex
- Charles F Lacy. Drug Information Handbook Lexi-comp Inc.
- Mary Anne Koda-Kimble. Applied Therapeutics: The Clinical Use of Drugs. Lippincott Wil liams & Wilkins.
- National Antibiotic Guideline 2008
- American Hospital Formulary Service
- Stanford Guide to Antibiotic Therapy
- Handbook of Clinical Drug Data Knoben & Anderson (ASHP)
- National Kidney Foundation Kidney Disease Outcome Quality Initiative (NKF KDOQI) Guide lines

General introduction

- www.pharmj.com/noticeboard/series/renal.html - PJ online continuing education articles on renal failure
- www.medscape.com

Specific renal references

- Clinical Pharmacokinetics Drug Data Handbook, J Mammen, Adis Press
- European Best Practice Guidelines for the Management of Anaemia in Patients with Chron ic Renal Failure
- International Society for Peritoneal Dialysis (ISPD) Guidelines
- Introduction to Renal Therapeutics by Caroline Ashley
- Renal Pharmacy Handbook, A Practical Guide to Drug Therapy 2009
- Renal Replacement Therapy CPG, MOH – Malaysian CPG on renal replacement therapy
- The Renal Drug Handbook, Bunn & Ashley UK Renal Pharmacy Group, Radcliffe Press
- www.kdoqi.org – American CPG on Kidney and Dialysis Quality Indicator
- www.msn.org – Malaysian Society of Nephrology website for latest news on Malaysian Renal Regisrty
- www.kdp-baptist.louisville.edu/renalfailure - Drug Prescribing in Renal Failure, American College of Physicians
- www.tpis.upmc.edu/tpis/kidney/KCC.html - creatinine equation
- www.nephrologypharmacy.com - Dialysis of Drugs 2003, Nephrology Pharmacy Associates / AMGEN
- www.mst.org – Malaysian Society of Transplantation

Treatment of Peritonitis

- Sanford Guide to Antibiotic Therapy
- www.ispd.org/guidelines/articles/update/ispdperitonitis.pdf

Pharmacy & Renal sites

- www.nephrologypharmacy.com
- www.renalpharmacy.org.uk
- www.renalpharmacists.net
- www.eneph.com
- www.kidneyatlas.org
- www.kidney.org.au
- www.anzdata.org.au
- www.cari.kidney.au

APPENDIX C

APPENDIX C

Forms for Documentation

In-patient (Ward)

Medication History Assessment Form	(CP 1)
Pharmacotherapy Review	(CP 2)
Clinical Pharmacy Report Form	(CP 3)
Discharge Referral Note	(CP 4)

Out-patient (MTAC)

General Forms

Progression Notes	(R 1)
Drug Regime	(R 2)
Compliance Assessment (Modified Morisky Scale)	(R 3)
Medication Profile	(R 4)
ADR Form	

MTAC Renal Transplant

Patient's Profile	(RT 1)
Checklist	(RT 2)
ADR Checklist	(RT 3)
Lab Investigation	(RT 4)
Immunosuppressant Regime	(RT 5)
Drug Knowledge Assessment	(RT 6)

MTAC CKD

Patient's Profile	(RC 1)
Checklist	(RC 2)
Lab Investigation	(RC 3)
Drug Knowledge Assessment	(RC 4)

MTAC Dialysis

Patient's Profile	(RD 1)
Checklist	(RD 2)
Lab Investigation	(RD 3)
Drug Knowledge Assessment	(RD 4)

Appendix C1: Medication History Assessment Form (CPI)

MEDICATION HISTORY ASSESSMENT FORM

PHARMACY DEPARTMENT, HOSPITAL .....

FORM TO BE FILLED BY THE PHARMACIST UPON PATIENT ADMISSION

A: PATIENT BIODATA

Full Name : _____

Gender : M / F Age : _____

RN/IC : _____

Address : _____

_____ Phone No. : _____

Admission Date/Time : _____

Ward/Bed : _____

PMHx : _____

Last Discharge/ Review Date : _____

B: REASON FOR ADMISSION

C: ALLERGY & ADVERSE DRUG REACTION

D: DRUG HISTORY

Patient's own drugs checked?

☐ YES ☐ NO

Source of medication list :

MEDICATION (Specify strength)	DOSE	FREQUENCY	BALANCE FROM PREVIOUS SUPPLY	WRITE C FOR CONTINUE, DC FOR DISCONTINUE	COMMENTS

NON-PRESCRIPTION MEDICATION (Includes Herbal/Vitamin/Other Supplements)	REASON FOR TAKING	BALANCE/COMMENTS

E: PHARMACIST NOTES

Pharmacist Sign & Stamp : _____ Time / Date: _____

Original To be kept in patient's folder
Duplicate To be kept by Pharmacy

Pin. 1/10

COMPLIANCE ASSESSMENT

(Choose either A or B)

A. i) Patient's Report (*Morisky Scale*)

NO.	QUESTIONS	YES - 1 / NO - 0
1.	Do you ever forget to take your medications?	
2.	Are you careless at times about taking your medications? (*Do you sometimes miss a dose?*)	
3.	When you feel better, do you sometimes stop taking your medications?	
4.	Sometimes if you feel worse when you take your medications, do you stop taking them?	
	SCORE	

* Compliance score indicator:
(4) non-compliant; (3) poor; (2) average; (1) satisfactory; (0) compliant

If patient is non-compliant, please proceed to the following:

ii) Other relevant questions	**Yes**	**No**
1. Does the patient take full responsibility for his/her medication administration or is he/she assisted by someone else?	☐	☐
2. Does patient understand reason for taking medication?	☐	☐
3. Does patient ever use someone else's medication?	☐	☐
4. Does patient ever share medication with anyone else?	☐	☐
5. Does patient normally bring along medication with him/her?	☐	☐
6. Does patient worry about side effects of his/her medication?	☐	☐

7. What does patient do if a dose is missed? _____

_____

8. Under what circumstances and how frequently are doses missed? _____

_____

9. How are the medications stored? _____

_____

B. Pill/Tablet Counts

Compliance score is calculated according to the following formula:

$$\text{Compliance score} = \frac{\text{No. of tablets dispensed - No. of tablets not taken}}{\text{Correct no. of tablets should be taken}} \times 100\%$$

$$\text{Compliance score} = \frac{(\quad) - (\quad)}{(\quad)} \times 100\% = \_\_\_\_\_$$

* Compliant to medication when score is ≥ 85%

DISCHARGE MEDICATION
NEXT TCA:

PHARMACOTHERAPY REVIEW Pharmacy Department, Hospital _____ CP2

Ref. no:

ALLERGY

Name :	**MRN :**	**Age :**	**Gender : M / F**
Race : M / C / I / Others	**Ht/Wt :**	**DOA :**	**Ward/Bed :**

Chief Complaint:

History of Present Illness:

Past Medical History:	**Review of system:** BP: mmHg RR: b/min PR: p/min T: °C
Social/Family History:	Smoking Alcohol Drug Abuse Pregnant
Past Medication History:	**Compliance Evaluation:**
Diagnosis/Surgical Procedure:	

Sign & Stamp:

DATE	PHARMACEUTICAL CARE ISSUES	PHARMACIST RECOMMENDATION	OUTCOME

WARD MEDICATION

DRUG / REGIMEN	DATE START	DATE STOP

ELECTROLYTE THERAPY

DRUG / REGIMEN	DATE START	DATE STOP

CARDIOVASCULAR

DRUG / REGIMEN	DATE START	DATE STOP

ANTIBIOTIC

DATE	PHARMACEUTICAL CARE ISSUES	PHARMACIST RECOMMENDATION	OUTCOME

DIABETES

WARD MEDICATION		
DRUG / REGIMEN	DATE START	DATE STOP

OTHERS

INFUSION CHART

DATE									
Dopa									
Dobu									
Norad									
Mida									
Morp									
Mida/Morp									
Insulin									

I/O chart

INPUT									
OUTPUT									
BALANCE									

	Day & Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	N. Range																		
FBC	TWBC	4–11 x10/L																		
	Hb	11.5-16.5 g/100mL																		
	RBC	4.5-6.3x10^6																		
	HCT	0.4/0.37-0.52/0.48																		
	Platlet	150-400 x10/L																		
BUSE / Renal profile	Urea	1.7-8.3 mmol/L																		
	Na	135-145 mmol/L																		
	K	3.5-5.0 mmol/L																		
	Cl	96-106 mmol/L																		
	Ca	2.1-2.6 mmol/L																		
	Mg	0.7-1.3 mmol/L																		
	PO4-	0.8-1.45 mmol/L																		
	SCr	64-122 umol/L																		
	ClCr	105-150 mL/min																		
Liver profile	Albumin	35 – 50 g/L																		
	T.Bilirubin	<20 umol/L																		
	T.Protein	66 – 87 g/L																		
	ALP	53 – 141 u/L																		
	ALT	<32 u/L																		
Coag. Profile	PT	10-13.5 sec																		
	APTT	26 – 42 sec																		
	INR	<1.5																		
Cardiac enzymes	CK	24 – 195 u/l																		
	LDH	0 – 248 u/l																		
	AAT	<37																		
ABG	pH	7.35-7.45																		
	pCO_2	35-45mmHg																		
	pO_2	72-100mmHg																		
	HCO_3	22-29mmol/L																		
	O_2 sat	90-95%																		
Others	RBS	< 11 mmol/L																		
Vital SignS	BP																			
	TEMP																			
	RR	12 – 18 b/min																		
	PR	60 – 100 p/min																		

C&S

Date	Date (sampling)	Source/sample	M/organism	Sensitivity	Resistant

LIPID

Date				
T. Chol	<5.7 mmol/L			
C-TG	<1.7 mmol/L			
C-HDL	>1.7mmol/L			
C-LDL	<3.9 mmol/L			

Appendix C3: CLINICAL PHARMACY REPORT FORM (CP3)

CP3

CLINICAL PHARMACY REPORT FORM

Pharmacy Department, Hospital ……..

A: WARD PHARMACY ACTIVITY

Date	**:**	**Routine Rounds**	
Ward	**:**	**Grand Rounds**	
Task	**: Full Time / Part Time**	**Pharmacist Rounds**	
Physician(s)	**:**	**Number of Cases Clerked**	
		Number of Cases Reviewed	
		Number of Patients in Ward	
		Number of Medication History (CP1) Taken	

B: INTERVENTIONS / REQUESTS ENCOUNTERED

Interventions	Description	Number of interventions	Number of interventions accepted	Request / Information Provided	Number	Total
(1) Incomplete Prescription	Patient data			**Adverse Drug Reaction**		
	Drug			**Drug Toxicity**		
	Dose			**Drug Dosage**		
	Frequency			**Therapeutic Efficacy**		
	Duration			**Drug Indication**		
	Dr's Stamp & Sign			**Drug Interaction**		
(2) Incorrect/ Inappropriate/ Inadequate Regimen	Drug			**Pharmacokinetic**		
	Dose			**TPN**		
	Frequency			**General Product Information**		
	Duration			**Pharmaceutical Availability**		
(3) Inappropriate Prescription	Polypharmacy			**Pharmaceutical Compatibility**		
	Contraindication			**Pharmaceutical Identification**		
	Drug Interaction					
	Incompatibility					
(4) Miscellaneous	Unclear Handwriting					
	Authenticity of Prescription/ Prescriber			**TOTAL INFORMATION PROVIDED**		
	Drug Administration Error					
	Suggest For Vital Signs Monitoring/ Laboratory Investigation					
	TDM					
	TPN					
TOTAL INTERVENTIONS						

COUNSELLING	Number Of Sessions	Total No. Of Patients
Bedside Counselling		
Discharge Counselling		
Group Counselling		
GRAND TOTAL		

C: DESCRIPTION OF REQUESTS / INTERVENTIONS ENCOUNTERED

D: FOLLOW-UP REQUIRED

No	FOLLOW-UP	CHECKLIST	SIGN

.....
Pharmacist Sign & Stamp
Date:

Pin. 1/10

Appendix C4: CP4 DISCHARGE REFERRAL NOTE

DISCHARGE REFERRAL NOTE

CP4

NOTA RUJUKAN DISCAJ

Jabatan Farmasi, Hospital .....

KEPADA:
Pegawai Perubatan/Pegawai Farmasi,

PER: RUJUKAN DISCAJ: _____ / _____ / _____
NAMA **MRN** **NO. KP**

Pesakit ini **TELAH / BELUM DIBERI KAUNSELING UBAT-UBATAN** untuk dinilai tahap kefahaman/ kepatuhan terhadap terapi ubat yang dipreskripsikan. Diharapkan pihak tuan/puan dapat memberi kaunseling dan penilaian susulan yang diperlukan untuk meningkatkan keberkesanan rawatan.

2. DIAGNOSIS: _____

3. SENARAI UBAT DISCAJ:

NAMA UBAT / DOS / JANGKAMASA BEKALAN

4. PENILAIAN KEFAHAMAN & KEPATUHAN TERHADAP TERAPI UBAT *(tidak berkenaan jika pesakit belum dikaunsel):*

a) Pesakit telah dikaunsel dan faham tentang ubat/alat bantuan pengubatan yang dipreskripsikan ☐ Ya ☐ Tidak

b) Tahap kepatuhan terhadap ubat-ubatan ☐ Memuaskan ☐ Tidak Memuaskan

c) Alat bantuan kepatuhan ☐ *Pill Box* ☐ Risalah Ubat ☐ Lain-lain ☐ Tiada

5. TINDAKAN SUSULAN YANG DIPERLUKAN:
[Sila tandakan (√) di kotak yang disediakan]

	Kaunseling ubat-ubatan dan alat bantuan pengubatan yang dipreskripsikan
	Menilai kepatuhan dan kefahaman terhadap terapi ubat yang dipreskripsikan
	Pemonitoran terapeutik ..... (ubat)
	Isu penyimpanan ubat-ubatan
	Lain-lain :

Sekian, terima kasih.

.....
Cop & Tandatangan Pegawai Farmasi
No Tel :
Tarikh :

Salinan asal : Untuk dihantar kepada fasiliti yang dirujuk
Salinan pendua : Untuk simpanan Farmasi

Pin. 1/10

Appendix C5: PROGRESS NOTES (R1)

R 1

MTAC RENAL TRANSPLANT / CAPD / HD / CKD

Date					Pharmacist						
Visit	1	2	3	4	5	6	7	8	9	10	Others:

Pharmacist's Notes:

Current Diagnosis
Chief Complaints/ Current Problems
Points Counselled
Pharmaceutical Care Issues (PCIs)

Current Medications:

Plan:

Compliance Assessment (When Necessary)

Morisky Scale	**Yes (1)**	**No (0)**
1. Have you ever forgotten to take your medications? 2. Are you sometimes neglectful in regard to your medication hours? 3. Do you skip your medicine hours when you are feeling well? 4. When you feel unwell due to the medicine, do you skip it?		
Total Score		
Compliant Score Indicators: (4) Non-compliant; (3) Poor; (2) Average; (1) Satisfactory; (0) Compliant		

Appendix C6: DRUG REGIME (R2)

R 2

DRUG REGIME

DRUGS / REGIMEN	DATE START	DATE STOP	PHARMACIST'S COMMENTS
IMMUNOSUPPRESSANTS			
☐ Cyclosporine / Tacrolimus	.....	.....	.....
☐ MMF / MPA	.....	.....	.....
☐ Everolimus / Sirolimus	.....	.....	.....
☐ Prednisolone	.....	.....	.....
CHEMOPROPHYLAXIS			
☐ Trimethoprim + Sulphamethoxazole	.....	.....	.....
☐ Nystatin Suspension	.....	.....	.....
☐ Valganciclovir	.....	.....	.....
		.....	
CARDIOVASCULAR			
☐ Metoprolol / Atenolol / _____	.....	.....	.....
☐ Amlodipine / Felodipine / Diltiazem / _____	.....	.....	.....
☐ Prazosin / _____	.....	.....	.....
☐ Perindopril / Enalapril / Captopril / _____	.....	.....	.....
☐ Telmisartan / Irbesartan / Losartan / _____	.....	.....	.....
☐ Aspirin / _____	.....	.....	.....
☐ Isosorbide Dinitrate / Isosorbide Mononitrate	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
		.....	
DIABETES			
☐ Gliclazide / _____	.....	.....	.....
☐ Insulin	.....	.....	.....
.....	.....	.....	.....
.....			
.....			
HYPERLIPIDEMIA			
☐ Lovastatin / Pravastatin / Atorvastatin	.....	.....	.....
.....	.....	.....	.....
OTHERS	.....		
☐ Calcium Carbonate / Calcium Lactate / Lanthanum	.....	.....	.....
☐ Calcitriol / Alphacalcidol	.....	.....	.....
☐ Erythropoietin (Eprex / Recormon/ Others.....)	.....	.....	.....
☐ Ranitidine / Omeprazole	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

MODIFIED MORISKY MEDICATION ADHERENCE SCALE

Patient's Name: _____ **Date:** _____

Please tick (√) at the applicable columns . *Sila tandakan (√) pada ruangan yang berkenaan.*

NO	QUESTIONS / *SOALAN*	Yes / *Ya* (1)	No / *Tidak* (0)
1.	**Have you ever forgotten to take your medications?** *Pernahkah anda lupa mengambil ubat anda?*		
2.	**Are you sometimes neglectful in regard to your medication hours?** *Kadangkala, adakah anda lalai terhadap masa pengambilan ubat anda?*		
3.	**Do you skip your medicine hours when you are feeling well?** *Adakah anda tidak mengambil ubat anda apabila anda berasa sihat?*		
4.	**When you feel unwell due to the medicine, do you skip it?** *Jika anda merasa tidak sihat disebabkan oleh ubat, adakah anda tidak mengambilnya?*		
5.	**Have you ever forgotten your medication while traveling/going on a trip?** *Pernahkah anda lupa membawa ubat anda ketika pergi bercuti/keluar dari rumah?*		
6.	**Do you have problems in remembering to take your medication?** *Adakah anda mempunyai sebarang masalah untuk mengigati pengambilan ubat anda?*		
7.	**Does the current treatment regime come across to you as troublesome?** *Pernahkah anda rasa rawatan ini menyusahkan?*		
8.	**Frequency of forgetting medication :** *Kekerapan anda lupa mengambil ubat anda :* **a) Never/rarely** *Tidak pernah* ***b)* Once in a while** *Sekali sekala* ***c)* Occasionally** *Ada masa-masa tertentu* ***d)* Often** *Selalu* *e)* **Frequently** *Sentiasa*		
	Total score		
	Pharmacist		

R 3

MODIFIED MORISKY MEDICATION ADHERENCE SCALE

Patient's Name: _____ **Date:** _____

Please tick (√) at the applicable columns . *Sila tandakan (√) pada ruangan yang berkenaan.*

NO	QUESTIONS / *SOALAN*	Yes / *Ya* (1)	No / *Tidak* (0)
1.	**Have you ever forgotten to take your medications?** *Pernahkah anda lupa mengambil ubat anda?*		
2.	**Are you sometimes neglectful in regard to your medication hours?** *Kadangkala, adakah anda lalai terhadap masa pengambilan ubat anda?*		
3.	**Do you skip your medicine hours when you are feeling well?** *Adakah anda tidak mengambil ubat anda apabila anda berasa sihat?*		
4.	**When you feel unwell due to the medicine, do you skip it?** *Jika anda merasa tidak sihat disebabkan oleh ubat, adakah anda tidak mengambilnya?*		
5.	**Have you ever forgotten your medication while traveling/going on a trip?** *Pernahkah anda lupa membawa ubat anda ketika pergi bercuti/keluar dari rumah?*		
6.	**Do you have problems in remembering to take your medication?** *Adakah anda mempunyai sebarang masalah untuk mengigati pengambilan ubat anda?*		
7.	**Does the current treatment regime come across to you as troublesome?** *Pernahkah anda rasa rawatan ini menyusahkan?*		
8.	**Frequency of forgetting medication :** *Kekerapan anda lupa mengambil ubat anda :* **a) Never/rarely** *Tidak pernah* ***b)* Once in a while** *Sekali sekala* ***c)* Occasionally** *Ada masa-masa tertentu* ***d)* Often** *Selalu* *e)* **Frequently** *Sentiasa*		
	Total score		
	Pharmacist		

PROFIL UBAT PESAKIT

NAMA PESAKIT		**NAMA PEGAWAI FARMASI BERTUGAS**	
RN / NO. KAD PENGENALAN		**HOSPITAL**	
DIAGNOSIS		**TELEFON**	
ALAHAN			

Ubat	Nama Dagang	Dos	Indikasi	Masa Mengambil Ubat				Sebelum Makan	Selepas Makan	Catatan

- **SENARAI UBAT YANG TELAH DIHENTIKAN :**

PERINGATAN :

• Sila patuhi carta ini untuk rawatan yang lebih berkesan.

• Jangan berhenti mengambil ubat yang dipreskrib atau memulakan sebarang ubat (herba; ubat tradisional;supplemen dan seumpamanya) tanpa pengetahuan doktor dan pegawai farmasi untuk keselamatan anda.

Appendix C9: ADR FORM

REPORT ON SUSPECTED ADVERSE DRUG REACTIONS

NATIONAL CENTRE FOR ADVERSE DRUG REACTIONS MONITORING

www.bpfk.gov.my

(Please report **all** suspected drug reactions including those for vaccines and traditional medicines. Do not hesitate to report if some details are not known. Identities of Reporter, Patient and Institution will remain **Confidential**.)

REPORT No. .....(for official use only)

PATIENT INFORMATION

R/N or Initials	Age	Sex	Wt (kg)	Ethnic Group	Institution

ADVERSE REACTION DESCRIPTION

Time to onset of reaction : Date of reaction : Date end of reaction :

Reaction subsided after stopping drug / reducing dose : Yes ☐ No ☐ Unknown ☐

Reaction reappeared after reintroducing drug : Yes ☐ No ☐ Not applicable ☐

Extent of Reaction : Mild ☐ Moderate ☐ Severe ☐

Treatment of adverse reaction :

Outcome Recovered ☐ Not yet recovered ☐ Unknown ☐ Fatal ☐ - Date of death : .....

Drug Reactions Relationship : Certain ☐ Probable ☐ Possible ☐ Unlikely ☐ Unclassifiable ☐

Suspected Drug :

Product/Generic Name	Dosage Given	MAL and Batch No.	Therapy Dates		Indication
			Start	Stop	

Concomitant Drug:

Product/Generic Name	Dosage Given	MAL and Batch No.	Therapy Dates		Indication
			Start	Stop	

**Please attach further papers if necessary

Relevant Investigations / Laboratory Data	Relevant Medical History

Reporter

Name : Address :

Designation : Tel No :

Email Address : Date of Report : Signature :

Submission of a report does not constitute an admission that medical personnel or the products caused or contributed to the reaction. Thank you for reporting.

BAYARAN POS
AKAN DIBAYAR
OLEH PEMEGANG
PERMIT

SETEM POS TIDAK
PERLU JIKA
DIPOSKAN DI DALAM
MALAYSIA

SAMPUL LIPAT JAWAPAN PERNIAGAAN
NO. PERMIT SEL 0259

PUSAT PEMONITORAN KESAN ADVERS

UBAT KEBANGSAAN

BIRO PENGAWALAN FARMASEUTIKAL KEBANGSAAN

PETI SURAT 319, JALAN SULTAN,

46730 PETALING JAYA

Lipat di sini

Lipat di sini

PROGRAM PEMONITORAN
KESAN ADVERS UBAT
KEMENTERIAN KESIHATAN MALAYSIA

Nama dan alamat pengirim

.....

.....

.....

Sila basahkan gam dan lipat. Tekan beberapa saat dan pastikan pelekatan adalah memuaskan.

Appendix C10: PATIENT'S PROFILE (RT1)

RT 1

PATIENT'S PROFILE

Filled by: _____ **Date:** _____

DEMOGRAPHIC BACKGROUND					
Name:		Age:		Height (cm):	
IC No.:		MRN:		Weight (kg):	
Race:	M / C / I / O	Gender:	M / F	BMI:	
Marital Status:		Allergies:			
Address:					
Contact Number:	(H)	(HP)			
Educational Level:	☐ No formal education ☐ Primary ☐ Secondary ☐ College / University				

SOCIAL HISTORY			
Smoking history:	☐ Yes (Cigarette: _____sticks/ day) ☐ Ex-smoker ☐ No	Alcohol history:	☐ Yes (Alcohol: _____ cans/ day) ☐ No

FAMILY HISTORY

PAST MEDICAL & SURGICAL HISTORY

Disease:	(√)	**End-Stage Renal Disease Secondary to:**	(√)
Hypertension		Long standing hypertension	
Diabetes Mellitus		Diabetic nephropathy	
Dyslipidemia		Lupus nephritis	
Coronary Artery Disease			

Others:

PAST MEDICATION HISTORY

History of taking traditional or herbal medications?	Y / N	If YES, please state:	
Medications taken before transplant:			

TRANSPLANT HISTORY

Date of Transplantation:		Place of Transplantation	Local / Overseas
Type of Transplantation	Cadaveric / Living Related / Living Non-Related		
Treatment Received:	Simulect / OKT3 / Anti-thymocyte (Horse / Rabbit) Renal Biopsy (Yes / No)		

Schedule of Activities in Each Month Post Renal Transplant

RT 2

	PARAMETERS	MONTHS POST TRANSPLANT												RECORDS
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	
MONITORING	FBG / HbA1c	√		√			√						√	Refer to RT 4: Lab Investigation
	Lipid Profile	√					√						√	
	BP	To be monitored on every visit												
	Renal Profile	To be monitored on every visit												
	CSA / FK level	3 times weekly x 3/12, 2 times weekly x 3/12, Once a week x 3/12, Once every fortnight x 3/12												
	Suspected ADR	To be monitored on every visit												Refer to RT 3: ADR of Immunosuppressant / MADRAC Form
MTAC ACTIVITIES	Introduction to MTAC Program	√[a]												
	Past Medical History	√[a]												Refer to RT 1: Patient's Profile
	Past Medication History	√[a]												
	Immunosuppressant Medication Checklist	To be monitored on every visit												Refer to R 2: Drug Regime
	Drug Knowledge Assessment	To be assessed on the 1st and last visit												Refer to RT 6: Drug Knowledge Assessment Form (Renal Transplant)
	Compliance Assessment	√	√	√	√	√	√	√	√	√	√	√	√	Refer to R 3: Modified Morisky Scale
	Patient Education	√	√	√	√	√	√	√	√	√	√	√	√	Refer to MTAC Renal Transplant Counseling Module
	Medication Chart/ List	To be provided in the 1st visit and subsequent visit when necessary												Refer to R 4: Profil Ubat Pesakit
	Drug Container Labeling	To be provided in the 1st visit and subsequent visit when necessary												

[a] First encounter

RT 3

ADR of Immunosuppressant Post Transplant

Systems	Side effects/ Adverse events	Date										
Cardiovascular	Hypertension											
CNS	Headache											
Dermatologic	Abnormal pigmentation											
	Acne											
	Hirsutism											
Endocrine & Metabolic	Hyperlipidemia											
	Hyperglycemia											
	Hyperkalemia											
	↑ Appetite											
	Cushing's syndrome											
Gastrointestinal	Gum hyperplasia											
	Nausea											
	Diarrhea											
	Abdominal discomfort											
	Weight gain											
Neuromuscular & Skeletal	Tremor											
	Paresthesia											
	Leg cramps/ Muscle contractions											
Renal	Renal dysfunction/ Nephropathy											
	↑ Serum creatinine											
Haematologic	Leucopenia											
	Thrombocytopenia											
Hepatic	↑ Liver enzyme											
Misc												

Lab Investigation

RT 4

Date											
Weight (kg)											
BP (mmHg)											
FBG (mmol/L)											
HbA1C (%)											

RBC											
Hb / HCT											
TWBC											
Platelet											
Lymphocytes (%)											

Urea											
Sodium / Potassium											
SCr (mmol/L)											
ClCr (ml/min)											
Calcium (mmol/L)											
Phosphate (mmol/L)											
Uric acid (mmol/L)											

Albumin / Globulin											
T. Bilirubin (mmol/L)											
T. Protein (g/L)											
ALP											
ALT / AST											
T. Cholesterol / TG (mmol/L)											
HDL / LDL (mmol/L)											

CSA dosage											
C_0											
C_2											
FK dosage											
FK level											

Urine C & S											

Appendix C14: IMMUNOSUPPRESSENT REGIME (RT5)

RT 5

Immunosuppressant Regimen

Date:	Dose	TDM Level	Date:	Dose	TDM Level
Cyclosporin / Tacrolimus MMF / MYF Sirolimus / Everolimus Prednisolone			Cyclosporin / Tacrolimus MMF / MYF Sirolimus / Everolimus Prednisolone		

Date:	Dose	TDM Level	Date:	Dose	TDM Level
Cyclosporin / Tacrolimus MMF / MYF Sirolimus / Everolimus Prednisolone			Cyclosporin / Tacrolimus MMF / MYF Sirolimus / Everolimus Prednisolone		

Date:	Dose	TDM Level	Date:	Dose	TDM Level
Cyclosporin / Tacrolimus MMF / MYF Sirolimus / Everolimus Prednisolone			Cyclosporin / Tacrolimus MMF / MYF Sirolimus / Everolimus Prednisolone		

Date:	Dose	TDM Level	Date:	Dose	TDM Level
Cyclosporin / Tacrolimus MMF / MYF Sirolimus / Everolimus Prednisolone			Cyclosporin / Tacrolimus MMF / MYF Sirolimus / Everolimus Prednisolone		

Date:	Dose	TDM Level	Date:	Dose	TDM Level
Cyclosporin / Tacrolimus MMF / MYF Sirolimus / Everolimus Prednisolone			Cyclosporin / Tacrolimus MMF / MYF Sirolimus / Everolimus Prednisolone		

Appendix C15: DRUG KNOWLEDGE ASSESSMENT (RT6)

RT 6

DRUG KNOWLEDGE ASSESSMENT FORM

RENAL TRANSPLANT

Patient's Name: _____ **Date: _____**

NO	QUESTIONS / *SOALAN*	Yes / *Ya*	No / *Tidak*	I am not sure / *Saya tidak pasti*
1	**What does immunosuppressant medicines means?** *Apakah yang dimaksudkan dengan ubat immunosupresi?* **a) Medicines that lowers the body immune system** *Ubat yang merendahkan daya pertahanan tubuh* **b) Medicines that prevent rejection of the transplanted organ** *Ubat yang menghalang rejeksi organ transplan* **c) Medicines that promotes graft cell production** *Ubat yang menggalakan pembentukan sel organ transplan*			
2	**Why do you have to take immunosuppressant?** *Kenapa anda perlu mengambil ubat immunosupresi?* **a) To protect myself from infections** *Untuk melindungi diri daripada jangkitan* **b) To prevent rejection of my newly transplanted organ** *Menghalang penolakan organ transplan* **c) To prolong the life of my newly transplanted organ** *Memanjangkan hayat organ transplant*			
3	**How do I take the immunosuppressant?** *Bagaimana saya harus mengambil ubat immunosupresi?* **a) After meal** *Selepas makan* **b) Before meal** *Sebelum makan* **c) Chew/Swallow with food** *Kunyah bersama makanan*			
4	**What is the correct way to keep your immunosuppressant?** *Bagaimanakah cara penyimpanan ubat immunosupressi yang betul?* **a) Keep in fridge** *Simpan di dalam peti sejuk/ ais*			

NO	QUESTIONS / *SOALAN*	Yes / *Ya*	No / *Tidak*	I am not sure / *Saya tidak pasti*
	b) Keep in a car for long time *Simpan di dalam kenderaan untuk jangka masa yang lama* **c) Keep in an airtight container, at a dry place away from direct sunlight** *Simpan di dalam bekas kedap udara, kering dan jauh dari cahaya matahari*			
5.	**Why do you have to do regular blood tests while on immunosuppressant treatment?** *Mengapa anda perlu menjalani ujian darah semasa menerima rawatan immunosupresi?* **a) To check the presence of infections** *Untuk mengesan jangkitan sekiranya ada* **b) To check the function of the transplanted organ** *Untuk memeriksa fungsi organ transplan* **c) To check the concentration of immunosuppressant in the blood** *Untuk memeriksa kepekatan ubat immunosupresi dalam darah*			
6.	**What do you usually do when you MISSED a dose(s) of your immunosuppressant?** *Apa yang akan anda lakukan sekiranya anda TERLUPA untuk mengambil ubat immunosupresi?* **a) I will take it as soon as I remember. But, if its time for the next dose, I will omit the missed dose and continue with the next scheduled dose.** *Mengambilnya sebaik sahaja teringat. Tetapi, jika masanya lebih hampir dengan masa dos seterusnya, saya akan tinggalkan dos tersebut dan ambil ubat pada dos yang seterusnya.* **b) Leave it out and continue with the next scheduled dose.** *Membiarkan sahaja dan mengambilnya pada waktu dos seterusnya.* **c) Accumulate the missed dose together with the next dose.** *Menggandakan dos*			
7.	**What to do if you have any side effects while taking immunosuppressant?** *Apakah yang akan anda lakukan jika anda mengalami kesan-kesan sampingan ketika mengambil ubat immunosupresi?* **a) Stop taking without notify the doctor/ pharmacist**			

NO	QUESTIONS / *SOALAN*	Yes / *Ya*	No / *Tidak*	I am not sure / *Saya tidak pasti*
	Berhenti mengambil ubat tanpa memberitahu doktor/pegawai farmasi **b) Stop take it and consult doctor immediately** *Berhenti mengambil ubat dan terus berjumpa doktor* **c) Take other medication to resolve it without notify the doctor/ pharmacist** *Mengambil ubat lain untuk megubatinya tanpa pengetahuan doktor/ pegawai farmasi*			
8.	**What to do if you want to take supplement and traditional medication while taking immunosuppressant?** *Apakah yang akan anda lakukan jika anda mahu mengambil ubat tradisional atau ubat suplemen?* **a) Notify doctor/pharmacist before taking it** *Memberitahu doktor/ pegawai farmasi sebelum mengambil ubat tersebut* **b) Take it together with immunosuppressant without notify the doctor/ pharmacist** *Mengambilnya bersama ubat immunosupresi tanpa pengetahuan doktor/pegawai farmasi* **c) Take supplement and stop immunosuppressant** *Mengambil ubat tersebut dan berhenti mengambil ubat immunosupresi*			
	Total Score / *Jumlah Markah*			
	Pharmacist / *Pegawai Farmasi*			

Appendix C16: Patient's Profile (RC1)

RC 1

PATIENT'S PROFILE

Filled by: _____ **Date:** _____

DEMOGRAPHIC BACKGROUND					
Name:		Age:		Height (cm):	
IC No.:		MRN:		Weight (kg):	
Race:	M / C / I / O	Gender:	M / F	BMI:	
Marital Status:		Allergies:			
Address:					
Contact Number:	(H)	(HP)			
Educational Level:	☐ No formal education ☐ Primary ☐ Secondary ☐ College / University				

SOCIAL HISTORY			
Smoking history:	☐ Yes (Cigarette: _____sticks/ day) ☐ Ex-smoker ☐ No	Alcohol intake history:	☐ Yes (Alcohol: _____ cans/ day) ☐ No

FAMILY HISTORY

PAST MEDICAL & SURGICAL HISTORY			
Disease:	(√)	**CKD secondary to:**	(√)
Hypertension		Hypertension	
Diabetes Mellitus		Diabetes Mellitus	
Dyslipidemia		SLE	
Coronary Artery Disease		Unknown	
Others:			

PAST MEDICATION HISTORY			
History of taking traditional or herbal medications?	Y / N	If YES, please state:	
Medications:			

RENAL HISTORY			
Stage of CKD	1 / 2 / 3 / 4		

Schedule of Activities for MTAC CKD

RC 2

	PARAMETERS	VISIT NUMBER												RECORDS
		1	2	3	4	5	6	7	8	9	10	11	12	
MONITORING	BP	To be monitored on every visit												Refer to RC 3: Lab Investigation
	Renal Profile	To be monitored on every visit												
	FBG	To be monitored in the 1st visit and every 3/12 if applicable												
	HbA1c	To be monitored on the 1st visit and every 3 – 6 months[1]												
	Lipid Profile	To be monitored in the 1st visit and every 4/12 if applicable												
	Hb	To be monitored in the 1st visit and every 3/12 if applicable												
	Calcium	To be monitored in the 1st visit and every 3/12 if applicable												
	Phosphate	To be monitored in the 1st visit and every 3/12 if applicable												
	Albumin	To be monitored in the 1st visit and every 3/12 if applicable												
	Iron Study	Applicable in CKD Stage 4. To be monitored for baseline and subsequent level when necessary.												
	iPTH	Applicable in CKD Stage 4. To be monitored for baseline and subsequent level when necessary.												
	Suspected ADR	To be monitored on every visit												Refer to MADRAC FORM
MTAC ACTIVITIES	Introduction to MTAC Program	√¤												
	Past Medical /Medication history	√¤												Refer to RC 1: Patient's Profile
	Drug Knowledge Assessment	To be assessed on the 1st visit (as baseline) and after a few sessions of counseling (reassess patient's understanding)												Refer to RC 4: Drug Knowledge Assessment (CKD)
	Compliance Assessment	√	√	√	√	√	√	√	√	√	√	√	√	Refer to R 3: Modified Morisky Scale
	Patient Education	√	√	√	√	√	√	√	√	√	√	√	√	Refer to MTAC CKD Counseling Module
	Medication Chart/ List	To be provided in the 1st visit and subsequent visit when necessary												Refer to R 4: Profil Ubat Pesakit
	Drug Container Labeling	To be provided in the 1st visit and subsequent visit when necessary												

¤ First encounter

[1] Wan Bebakar W.M, and panel. Clinical Practice Guidelines on Management of Type 2 Diabetes Mellitus. 4th Edition. Ministry of Health, Malaysia. 2009

Lab Investigation

RC 3

Date											
Urea (mmol/L)											
Sodium (mmol/L)											
Potassium (mmol/L)											
SCr (mmol/L)											
ClCr (ml/min)											
Calcium (mmol/L)											
Phosphate (mmol/L)											
Uric acid (mmol/L)											
FBG (mmol/L)											
HbA1C (%)											
Serum iPTH (pg/ml)											

RBC											
Hb / HCT											
TWBC											
Platelet											
Serum Iron (µmol/L)											
Serum Ferritin (µg/L)											
UIBC / TIBC											
TSAT (%)											

Albumin											
T. Bilirubin (mmol/L)											
T. Protein (g/L)											
ALP											
ALT / AST											

T. Cholestrol (mmol/L)											
TG (mmol/L)											
HDL (mmol/L)											
LDL (mmol/L)											

Weight (kg)											
BP (mmHg)											

Appendix C19: Drug Knowledge Assessment (RC4)

RC 4

DRUG KNOWLEDGE ASSESSMENT FORM

CHRONIC KIDNEY DISEASE (CKD)

Patient's Name: _____ Date: _____

NO	QUESTIONS / *SOALAN*	Yes / *Ya*	No / *Tidak*	I am not sure / *Saya tidak pasti*
1	**What is the function of kidney?** *Apakah fungsi buah pinggang anda?* **a) *To clean my blood*** *Untuk membersihkan darah* ***b)* To remove wastes and toxin from my body** *Menyingkirkan bahan buangan dan toksik daripada badan* **c) To dilute my blood** *Untuk mencairkan darah* **d) To increase my blood pressure** *Meningkatkan tekanan darah*			
2	**What might happen to you if your kidney fails?** *Apakah yang akan terjadi jika buah pinggang anda gagal berfungsi?* **a) Swelling in the leg, ankles, face or hands** *Kaki, buku lali, muka atau tangan menjadi bengkak* **b) Feel tired excessively** *Keletihan yang berlebihan* **c) Nausea and loss of appetite** *Loya dan hilang selera makan* **d) Need for dialysis or transplant** *Perlu menjalani dialisis atau pemindahan organ*			
3	**What is(are) the risk factor(s) of kidney failure?** *Apakah faktor-faktor yang menyumbang kepada kegagalan buah pinggang?* **a) Uncontrolled hypertension** *Penyakit darah tinggi yang tidak terkawal*			

NO	QUESTIONS / *SOALAN*	Yes / *Ya*	No / *Tidak*	I am not sure / *Saya tidak pasti*
	b) Uncontrolled diabetes *Penyakit kencing manis yang tidak terkawal* **c) Infected from others** *Berjangkit daripada orang lain* **d) Overuse of certain painkillers** *Penggunaan secara berlebihan ubat tahan sakit yang tertentu*			
4	**People with high blood pressure should take their medicine** *Pesakit darah tinggi perlu mengambil ubat –ubatan pada* **a) Every day** *Setiap hari* **b) At least a few times a week** *Sekurang-kurangnya beberapa kali dalam seminggu* **c) Only when they feel sick** *Apabila berasa tidak sihat sahaja* **d) Only when the blood pressure is high** *Hanya apabila tekanan darah menjadi tinggi*			
5.	**Which are the following healthy life styles help to delay kidney failure :** *Berikut merupakan gaya hidup yang boleh melambatkan kegagalan fungsi buah pinggang :* **a) Restricting salty diet** *Kurangkan pengambilan makanan yang masin* **b) Restricting fatty food** *Kurangkan pengambilan makanan yang berlemak* **c) Eating sweet dishes** *Menggemari makanan yang manis* **d) Regular exercise** *Mengamalkan senaman*			
	Total Score / *Jumlah Markah*			
	Pharmacist / *Pegawai Farmasi*			

Appendix C20: Patient Profile (RD1)

RD 1

PATIENT'S PROFILE

Filled by: _____ **Date:** _____

DEMOGRAPHIC BACKGROUND					
Name:		Age:		Height (cm):	
IC No.:		MRN:		Weight (kg):	
Race:	M / C / I / O	Gender:	M / F	BMI:	
Marital Status:		Allergies:			
Address:					
Contact Number:	(H)	(HP)			
Educational Level:	☐ No formal education ☐ Primary ☐ Secondary ☐ College / University				

SOCIAL HISTORY			
Smoking history:	☐ Yes (Cigarette: _____sticks/ day) ☐ Ex-smoker ☐ No	Alcohol history:	☐ Yes (Alcohol: ____ cans/ day) ☐ No

FAMILY HISTORY

PAST MEDICAL & SURGICAL HISTORY			
Disease:	(√)	**End-Stage Renal Disease Secondary to:**	(√)
Hypertension		Long standing hypertension	
Diabetes Mellitus		Diabetic nephropathy	
Dyslipidemia		Lupus nephritis	
Coronary Artery Disease			
Others:			

PAST MEDICATION HISTORY			
History of taking traditional or herbal medications?	Y / N	If YES, please state:	
Medications taken before dialysis:			

DIALYSIS HISTORY			
Date of Initiation		Type of Dialysis	HD / CAPD / APD

Schedule of Activities for MTAC Dialysis

RD 2

	PARAMETERS	VISITS												RECORDS
		V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	
MONITORING	BP/Dry Weight	To be monitored on every visit												Refer to RD 3: Lab Investigation
	Renal Profile	To be monitored on every visit												
	FBG / RBS	To be monitored on the 1st visit and every 3 months												
	ALP	To be monitored on the 1st visit and every 3 months[2]												
	Iron Study (Iron, UIBC, Ferritin TSAT)	To be monitored on the 1st visit and every 3 months												
	HbA1c	To be monitored on the 1st visit and every 3-6 months[1]												
	Lipid Profile	To be monitored on the 1st visit and every 3-6 months [2]												
	iPTH	To be monitored on the 1st visit and at least twice a year[2]												
	Ca / PO4 / Alb	To be monitored on the 1st visit and every 3 months[2] (More frequent if receive high dose phosphate binder/ calcitriol/ on low calcium dialysate[2]/ unstable)												
	FBC/Hb	Hb should be checked every 2/52 at initiation or change in epoetin dosage until Hb stabilizes; then every 3 months[2]												
	Suspected ADR	To be monitored on every visit												Refer to MADRAC Form
MTAC ACTIVITIES	Introduction to MTAC program	√¤												
	Past medical /Medication history	√¤												Refer to RD 1: Patient's Profile
	Drug knowledge assessment	To be assessed on the 1st visit (as baseline) and after a few sessions of counseling (reassess patient's understanding)												Refer to RD 4: Drug Knowledge Assessment Form (Dialysis)
	Compliance Assessment	√	√	√	√	√	√	√	√	√	√	√	√	Refer to R 3: Modified Morisky Scale
	Patient Education	√	√	√	√	√	√	√	√	√	√	√	√	Refer to MTAC Dialysis Counseling Module
	Medication Profile/ List	To be provided in the 1st visit and subsequent visit when necessary												Refer to R 4: Profil Ubat Pesakit

¤ First encounter

[1] Wan Bebakar W.M, and panel. Clinical Practice Guidelines on Management of Type 2 Diabetes Mellitus. 4th Edition. Ministry of Health, Malaysia. 2009

[2] Ahmad G, Hooi L.S, Lim Y.N, Ong L.M, Ghazalli R, Tan C.C et al. Clinical Practice Guidelines on Renal Replacement Therapy. 2nd Edition. Ministry of Health, Malaysia. 2004

RD 3

Lab Investigation

Date											
Urea (mmol/L)											
Sodium (mmol/L)											
Potassium (mmol/L)											
SCr (mmol/L)											
Calcium (mmol/L)											
Phosphate (mmol/L)											
Serum iPTH (pg/ml)											
FBG / RBS (mmol/L)											
HbA1C (%)											

RBC											
Hb/HCT											
TWBC											
Platelet											
Serum Iron (µmol/L)											
Serum Ferritin (µg/L)											
UIBC / TIBC											
TSAT (%)											

Albumin											
T. Bilirubin (mmol/L)											
T. Protein (g/L)											
ALP											
ALT / AST											
T. Cholestrol (mmol/L)											
TG (mmol/L)											
HDL (mmol/L)											
LDL (mmol/L)											

Dry Weight (kg)												
BP (mmHg)	Pre-HD											
	Post-HD											
	PD											

Appendix C23: Drug Knowledge Assessment Form (RD4)

RD 4

DRUG KNOWLEDGE ASSESSMENT FORM

DIALYSIS

Patient's Name: _____ Date: _____

NO	QUESTIONS / *SOALAN*	Yes / *Ya*	No / *Tidak*	I am not sure / *Saya tidak pasti*
1	**Why do I have to do dialysis?** *Mengapa saya perlu menjalani dialisis?* **a) To clean my blood** *Untuk membersihkan darah saya* **b) To remove wastes and toxin from my body** *Untuk menyingkirkan bahan buangan dan toksin dari badan* **c) To dilute my blood** *Untuk mencairkan darah* **d) To increase my blood pressure** *Untuk meningkatkan tekanan darah*			
2	**What is (are) the appropriate way(s) to take iron tablet?** *Apakah cara terbaik pengambilan zat besi?* **a) Take on empty stomach (half an hour before food or 2 hours after food)** *Ambil semasa perut kosong (setengah jam sebelum atau 2 jam selepas makan)* **b) Take after meal, if I have gastric or stomach discomfort when taken on empty stomach** *Ambil selepas makan, jika saya ada gastrik/sakit perut* **c) Take together with food** *Ambil bersama makanan* **d) It should be separated from calcium carbonate for 1-2 hours** *Jarakkan 1-2 jam daripada pengambilan calcium carbonate*			
3	**What is (are) the appropriate way to take calcium carbonate?** *Apakah cara terbaik pengambilan calcium carbonate?*			

NO	QUESTIONS / *SOALAN*	Yes / *Ya*	No / *Tidak*	I am not sure / *Saya tidak pasti*
	a) Swallow ½ hour after meal *Telan setengah jam selepas makan* **b) Chew/Sprinkle with food** *Kunyah atau tabur di atas makanan* **c) Can be taken before or after meal** *Boleh diambil sebelum atau selepas makan* **d) Omit it if I skip my meal and adjust accordingly later on** *Tinggalkan dos ubat jika anda tidak mengambil makanan dan aturkan pengambilan dos ubat kemudian*			
4	**What is (are) function(s) of calcium carbonate?** *Apakah fungsi calcium carbonate?* **a) As a calcium supplement** *Sebagai suplemen calcium* **b) As iron supplement** *Sebagai suplemen zat besi* **c) To control potassium level** *Untuk mengawal paras potassium* **d) To control phosphate level** *Untuk mengawal paras fosfat*			
5.	**What do you usually do when you MISSED a dose(s)?** *Apa yang akan anda lakukan sekiranya anda TERLUPA untuk mengambil ubat anda?* **a) I will take it as soon as I remember. But, if its time for the next dose, I will omit the missed dose and continue with the next scheduled dose.** *Mengambilnya sebaik sahaja teringat. Tetapi, jika masanya lebih hampir dengan masa dos seterusnya, saya akan tinggalkan dos tersebut dan ambil ubat pada dos yang seterusnya.* **b) Leave it out and continue with the next scheduled dose.** *Membiarkan sahaja dan mengambilnya pada waktu dos seterusnya.* **c) Accumulate the missed dose together with the next dose.** *Menggandakan dos*			
	Total Score / *Jumlah Markah*			
	Pharmacist / *Pegawai Farmasi*			

APPENDIX D

Sample

MTAC RENAL TRANSPLANT/CAPD/HD/CKD

Date					**Pharmacist**						
Visit	1	2	3	4	5	6	7	8	9	10	Others:

Pharmacist's Notes:

Current Diagnosis

ESRF 2° DM/HPT
Hyperphosphotaemia
HPT / DM

Chief Complaints/ Current Problems

CC: couldn't sleep at night.

CC: hard to remember to take calcium carbonate.

Current problems: Uncontrolled DM

Points Counselled

Counselled patient on the risk of renal bone disease and the need to comply to calcium carbonate.

Suggested patient to use pill box to help him to remember to take CaCO3.

Patient agreed to try.

Patient had been drinking tea at night – might be why patient couldn't sleep. Advised to avoid drinking tea at night.

Educate patient on the risk of uncontrolled DM and low sugar diet. Patient understood.

Pharmaceutical Care Issues (PCIs)

1. Doctor missed out alfacalcidol in the prescription.
   - Told Dr XXX and correction done.
2. Patient not compliant to calcium carbonate. PO4 - 2mmol/L
   - Counselled. Patient understood.
3. Uncontrolled DM – HbA1c 9%, FBS 10mmol/L
   - Dr XXX increased Humulin 30/70 to 30/15 and counselled patient on the new dosage of insulin.

Current Medications:

Amlodipine 10mg od
Perindopril 8mg od
Metoprolol 100mg bd
Calcium Carbonate 1g tds
Humulin 30/70 30/12 bd
Isosorbide Dinitrate 10mg tds
Alfacalcidol 0.25mcg eod
Ferrous Fumarate 200mg tds
Folic Acid 5mg
B Complex 1 tab od
Recormon 2000u 2x/week

Plan:

1. Follow up on patient's Ca/PO4.
2. Follow up patient's HbA1c and RBS after increment in insulin dose.
3. To monitor patient's iPTH – if remain high and PO4 well controlled, to suggest increase alfacalcidol dose.
4. Next TCA – 3/12 from now – 5/8/10

Compliance Assessment (When Necessary)

Morisky Scale	**Yes (1)**	**No (0)**
1. Have you ever forgotten to take your medications? 2. Are you sometimes oneglectful in regard to your medication hours? 3. Do you skip your medicine hours when you are feeling well? 4. When you feel unwell due to the medicine, do you skip it?		
Total Score		
Compliant Score Indicators: (4) Non-complaint; (3) Poor; (2) Average; (1) Satisfactory; (0) Complaint		