

## **ISN/IPNA-SPONSORED FELLOWSHIP – Dr Michelo Sharon Choopa**

### **END OF TRAINING REPORT**

**Name of fellow:** Dr Michelo Sharon Choopa

**Duration of training:** 05 January, 2015 to 30 June, 2016 (18 months)

**Country of origin:** Zambia

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## **Introduction**

This is an ISN/IPNA sponsored end of training report for Dr Michelo Sharon Choopa. I am a female pediatrician who received a scholarship to attain pediatric nephrology training at the University of Pretoria, Steve Biko Academic Hospital, Department of Pediatrics and Child Health, Pediatric Nephrology Unit under the supervision of Prof Gertruida van Biljon.

## **Executive summary**

Pediatric nephrology is a rare sub-specialty component of pediatrics in Zambia. There is currently only one recently trained pediatric nephrologist working on the Zambian public health sector, in a tertiary institution. Pediatric nephrology health care is provided by the pediatricians and medical officers in the country.

With the advent of the HIV/AIDS disease, the disease itself and the use of drugs for treatment have an effect on the kidneys and ultimately affect the quality of life of patients, both children and adults. Further management of kidney diseases includes consideration of renal replacement therapy (mainly hemodialysis and peritoneal dialysis) and this is mainly provided by the adult nephrology service in adults and some children in Zambia.

Chronic kidney disease due to various causes is an undermanaged component of kidney disease in children, and the continuum of care from diagnosis to end-of-care treatment is often not provided. This is because intricate knowledge of the details involved in the management of kidney diseases in children may be lacking, or may be superseded by the spotlight on the overwhelming burden of infectious diseases in these children.

This training has given me the opportunity to learn how to manage both acute and chronic kidney diseases in children from diagnosis to end-of-care therapy.

## **Purpose of training**

The purpose of my training was to learn how to manage kidney diseases in children and to help implement a non-existent pediatric nephrology service in a number of regions in my country.

## **Training program**

The training programme comprised the following components:

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## **General Objectives**

The general objectives of the training in Pediatric Nephrology would be to prepare the candidate to practice renal medicine competently in a South African or African setting. The candidate should have a good working knowledge of the management of renal disease and related problems on a background of the relevant basic sciences. The candidate should be able to serve as a pediatric nephrology consultant to pediatricians and other medical sub-specialties, as well as the specialty services such as Pediatric Intensive Care, Pediatric Urology, Pediatric Surgery - regarding kidney diseases and renal manifestation of systemic diseases. Experience in both ambulatory and inpatients settings should be obtained.

## **Specific objectives**

The candidate should be familiar with both primary renal diseases and those which occur in the context of new-born and premature infants, systemic disorders such as infectious diseases, cardiovascular diseases, nutritional disorders, diabetes mellitus, connective tissue disease, hematological diseases, as well as other metabolic infiltrative and inflammatory diseases and also in the context of diseases in remote organ systems such as heart failure and hepato-renal syndrome. The diseases unique to our region or which occur predominantly in a third world setting should be appreciated and understood.

## **ACADEMIC COMPONENT** (As proposed by the Pediatric nephrologists of South Africa)

The following aspects are included in the curriculum and it was expected that the candidate have sound knowledge in the following fields:

### **Renal conditions with antenatal onset and presenting at birth or early infancy**

#### **Inherited kidney diseases**

- Autosomal dominant and autosomal recessive inherited kidney diseases
- Common syndromes associated with renal abnormalities
- Other inherited kidney diseases

- Genetics of kidney disease, including understanding the principles of inheritance e.g. of autosomal, sex-linked, monogenic, polygenic and other inheritance patterns.
- Inherited Metabolic Diseases associated with renal disease.

### **Urinary Tract Disease**

- Fetal hydronephrosis
- The dilated urinary tract
- Vesico-ureteric reflux and reflux nephropathy
- Obstructive uropathy
- Tubulo-interstitial nephritis

### **Basic working knowledge of voiding dysfunction**

- Urinary incontinence, diurnal and nocturnal enuresis
- Voiding dysfunction, bladder dyssnergia
- Neurogenic bladder (isolated or as part of spinal dysraphism)
- Work-up, diagnosis and management of the above conditions

### **Renal stone disease**

- Etiology / pathophysiology of nephrolithiasis
- Approach to diagnosis, investigation and management of nephrolithiasis

### **Systemic infections and the kidney**

- HIV / AIDS and the kidney
- Renal tuberculosis
- Schistosomiasis
- Malaria
- Hepatitis B and C etc

### **The kidney and normal /abnormal growth and development**

- Role of the kidney in normal and abnormal growth
- Endocrine functions of the kidney
- Central nervous system and the kidney

### **Acute renal failure**

Diagnosis, differential diagnosis, investigation and management of acute renal failure and its complications.

### **Renal replacement therapy**

The physiology of, indications for, complications of, the various forms of hemodialysis and peritoneal dialysis. Experience with the management of patients on acute and chronic dialysis.

### **Chronic renal failure (CRF)**

- Diagnosis and conservative management of CRF
- Strategies for slowing the progression of chronic renal failure
- Management of anaemia in CRF
- Dietary prescription in CRF
- Normal renal function of children of all ages, including renal function of the pre-term and full-term baby. (neonatal renal function)

### **Investigation of abnormal renal function including investigation of**

- Glomerular and tubular function
- Metabolic acidosis / alkalosis
- Urinary concentration defects
- Investigation of disturbances of water homeostasis
- Hematuria
- Proteinuria (mechanisms)
- Investigation of disturbances of calcium, phosphate and bone metabolism.

## **Drugs and the kidney**

- Principles of pharmacodynamics, pharmacokinetics and pharmacogenomics
- Prescribing medication where adaptation is necessary e.g. with associated organ failure e.g. liver failure, renal impairment / renal failure
- Knowledge of drug-drug interactions
- Drug toxicity and adverse drug reactions – recognition and management
- Monitoring of drug levels: indication and interpretation
- Understanding of minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) of antibiotic treatment
- Drugs used for immunosuppression in transplantation (combinations, toxicity, adverse effects, interactions and monitoring)
- Uses and indications for prophylactic antibiotics (e.g. in recurrent UTI, vesico-ureteric reflux, post-transplant)
- Immunization in renal patients on chronic medication (immunosuppressive drugs) ▪ Use of blood products in patients with renal conditions

## **The principles of immunology involved in the mechanisms of renal disease.**

- The management of renal transplant, including understanding of the donor and the recipient's selection, histocompatibility typing, mechanisms of rejection and management of immunosuppression and its complications.

## **Genetics, cell biology and molecular medicine as applicable to renal disease.**

## **Ethical issues related to the practice of renal medicine in South Africa and the African continent.**

## **CLINICAL COMPONENT**

**Practical skills and applied knowledge will mainly be gained through the management of pediatric patients seen in the following areas**

- pediatric nephrology clinic

- general pediatric ward where patients with acute and chronic kidney diseases are admitted
- pediatric intensive care unit
- neonatal unit
- neonatal intensive care unit

**Additional training /knowledge was gained through attendance of academic ward rounds at the**

- Morningside Children's kidney treatment centre's hemodialysis unit
- Pediatric Urology/Surgery ward at Steve Biko Academic Hospital
- Renal Transplant Units at the Charlotte Maxeke Johannesburg Academic Hospital and the Donald Gordon Hospital linked to the University of the Witwatersrand

Active participation was expected in academic meetings

- Post graduate meetings
- Workshops
- Lectures
- Journal clubs
- Self-study
- Congresses
- Organized CME's

**Additional skills**

- Urinalysis including examination of the urine sediment.
- The performance and interpretation of the renal function tests.
- Interpretation of radiological, radio-isotopic and ultrasound examination of the urinary tract.
- Performance of renal biopsies, including indications, preparation and complications.
- Interpretation of basic renal histopathology.
- The ability to establish access for acute dialysis.
- Critical appraisal of scientific publications, including basic research, pertinent to nephrology.
- Manage other staff working in a renal unit in a team fashion.
- Basic administrative skill required in the management of dialysis unit and renal patients.

- Be able to identify the problems unique to practicing renal medicine in a developing country.
- Understand the principles of scientific research and be able to write a basic research protocol, as well as be able to conduct a scientific study.

#### **LOG BOOK**

A log book of all activities related to training in the sub-specialty was certified by the head of the training unit and satellite training unit

#### **RESEARCH PROJECT**

This was a requirement as part of the training program and at the end of the study:

- to have presented a research report at a national or international congress or
- to have to have an article accepted for publication in a peer review journal as first author

## **Achievements during the training period:**

### **Academic**

I was involved in a number of academic programs at the training site and satellite teaching site as well as outside attendances of lectures, workshops, CMEs, conferences and congresses.

It was a requirement to present a number of journals with discussions on pediatric nephrology information to trainee colleagues. These were journal club discussions on topics that were relevant to our training from the latest literature of various journals. The journal clubs were held weekly and different trainees presented each week on a rotational basis.

A few lectures were given by renowned experts and I attended these. There were nephrology urology meetings that were held between the sub-specialists in both the public and private hospitals. I was regularly invited to attend these and gave presentations on some challenging patients that we had managed in our unit. There were urology tutorials held two times a week at the host institution and I was invited to attend and I had given a few case presentations at the same meetings on challenging patients.

Renal histopathology meetings were held monthly in Johannesburg and every two to three months at Steve Biko Academic Hospital in Pretoria, which I attended. Our patients' biopsy results were discussed in detail at the meetings in Pretoria.

There were inter-departmental nephrology meetings held with pediatric surgery, adult nephrology (journal club) and urology (tutorials) which I attended. There were monthly ICU academic ward rounds in Johannesburg which I infrequently attended. Intra-departmental meetings in pediatrics included pediatric nephrology symposia, journal club presentations and radiology meetings where I was required to give a number of presentations and lectures.

I have given a number of lectures and tutorials on acute kidney injury to medical students at the university as well as a number of other pediatric nephrology related topics as lectures.

I attended the World Congress of Nephrology in Cape Town and the satellite symposium, the ESPN IPNA Junior Master Class of 2015 and ESPN in Brussels and the IRRIV Course in Vicenza in 2016.

I had one-on-one discussions of journal articles, patients in our care, all investigations and interpretation of these as well as long-term plans of patients with my supervisors. This was a critical part of my training as I had the privilege of querying aspects of investigations and management of kidney disease in children that I did not understand which culminated into fruitful discussions.

## **Clinical**

**Ward rounds:** These were conducted on a daily basis in the main wards and involved critical thinking to adequately manage the various medical and surgical conditions of the children with kidney diseases, both acute and chronic. These rounds were either clinical or academic which involved teaching on clinical conditions in the patients. Interpretation of investigations comprised a major aspect of ward rounds. Patients in neonatal, cardio-thoracic and pediatric intensive care units that we asked to review by colleagues in other disciplines were also reviewed on a daily basis.

The conditions managed during training included acute renal dysfunction such as fluid and electrolyte disturbances, acute kidney injury due to various causes in both neonates and older children, glomerulonephritides, hypertension, CAKUT, chronic kidney disease, genetic diseases, patients on peritoneal dialysis (in Pretoria) and hemodialysis and transplant patients (satellite site). At the satellite site, ward rounds were similar to the host institution although I did not attend these on a daily basis. These ward rounds also included clinical and academic review of patients in all the wards i.e. main wards and the neonatal and pediatric intensive care units.

**Investigations:** These were done in accordance with the clinical history and the suspected diagnoses and they included blood, urine and urine flow studies as well as radiologic and histologic investigations.

I specifically learned how to conduct sonar-guided kidney biopsies and was able to do over forty kidney biopsies during my training.

**Out-patient clinics:** These were conducted twice weekly at the host institution and daily at the satellite site to review the patients with chronic kidney diseases. A number of different kidney diseases were reviewed every week which accorded me an opportunity to learn how to manage and follow up the different types of kidney diseases in children. Various investigations were ordered during the follow of the patients. Old and new patients were reviewed during the outpatient clinics.

## **Plans for Zambia**

### **My plans for implementing a pediatric nephrology service in Zambia**

These are divided into five areas:

1. Establishment of a pediatric nephrology service at one of the tertiary hospitals in Zambia in order that patients from other health centers and hospitals around the region will have a referral center for further management of complicated kidney diseases in children. At this center I will set up the following:
  - i.) Specific wards for the management of kidney diseases in children with collaborative effort from the local pediatric surgeons, urologists and dieticians.
  - ii.) In the long run, a specific dialysis ward or unit (initially peritoneal dialysis and subsequently hemodialysis) will be established for training of nursing staff, care-givers and parents on how to conduct peritoneal dialysis at home. Concerted efforts will be implemented to try and obtain a local company to produce peritoneal dialysis fluid in order to reduce on importation costs. This will be in order to make peritoneal dialysis consumables readily available in order to be used in both the acute and chronic kidney disease patients needing peritoneal dialysis.
  - iii.) I will conduct renal biopsies and teach other doctors how to do sonar-guided renal biopsies with the assistance of the doctors in the radiology department.
  - iv.) I will conduct frequent awareness lectures in CMEs on kidney diseases in children hopefully as a lecturer at the medical schools as well as at local and national medical forums.
  - v.) Hopefully in the long run with an established pediatric nephrology service and more trained personnel, a kidney transplantation service will be feasible.
2. Create awareness about the importance of kidney disease in children at local and national CMEs meetings by giving lectures and creating short courses on manageable and life-saving procedures that can be done in remote health center prior to referral of patients.
3. Conduct epidemiologic studies on kidney diseases in children in Zambia, locally, regionally and nationally, with future collaboration with other African countries all in the view of the aim of the ISN Oby25 campaign.
4. Expansion of the proposed pediatric nephrology services to other bigger hospitals. Mentoring of other doctors to manage kidney diseases in children.

With the assistance of the Zambian government (political will) in the implementation of this service as well as involvement of various stakeholders, the knowledge of the existence of kidney diseases in Zambia will be disseminated to the health care workers and the general population, and a positive way forward towards achieving in part or in full the aim of the ISN's Oby25 campaign.

**Acknowledgement and gratitude:**

I would like to sincerely express my unreserved gratitude to the ISN and IPNA for affording me this great opportunity to train under one of the great African pediatric nephrologist and supervisor, Prof G. van Biljon at the University of Pretoria and also Dr Errol Gottlich at the satellite hospital at Morningside Hospital in Johannesburg. It has been a great privilege learning the intricate details of kidney health and disease in children. As challenging as it may be, continued learning and experience is required to keep up to date with recent trends in the management of kidney diseases in children.