

Review Article

Investigating the Training Programs in Pediatric Nephrology: An Experience From Iran



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ABSTRACT

Training in pediatric nephrology officially started in 1990 in Iran, and since then, 143 pediatric nephrologists have been trained. The first curriculum was published in 2009 and has been revised twice. The timetable consists of a two-year program to train them by anticipating the prerequisite clinical skills and problem-solving thinking to apply in their upcoming careers. The training program accepts one fellow per year for each qualified training center. Until now, the ratio of pediatric nephrology is 5.6 per one million children.

Keywords: Education, Teaching, Professional competence, Nephrology, Pediatrics

Introduction

By the 1960s, given the requisite of developing the spectrum of childhood kidney disease in prevention, assessment, and management in Iran, Hashemi GH. returned to [Namazi Hospital](#) in Shiraz City, Iran, after a two-year sabbatical at Boston Medical Center in the USA. With two other colleagues, they structured a kidney ward for children. Subsequently, Esfandiari B. returned to Children Hospital Medical Center in Tehran City, Iran, after spending a two-year fellowship in [Necker-Enfants Maladies Hospital](#) in Paris ([Figure 1](#)). He launched a kid-

ney laboratory in collaboration with pathologists to study the samples of kidney biopsies [[1, 2](#)].

Academic pediatric nephrology training was officially started in 1990, firstly in two academics and training centers, and then increased to six centers distributed in the cities of Tehran, Shiraz, Kermanshah, Mashhad, and Ahwaz in Iran ([Figure 2](#)). Currently, there are about 146 graduated pediatric nephrology fellows in-house. Of the 148 pediatric nephrology fellows, four passed away, four immigrated, and four are retired or inactive. Until now, the number of active pediatric nephrologists is 5.6 per one million children.



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Figure 1. Schematic history of pediatric nephrology in Iran

The first curriculum was published in 2009 and revised for the second time in 2022. A summary of the program, the overall structure of the course, the role and expectations, and the assessment are depicted in [Figure 2 \[3\]](#).

Program description

The course aims for trainees to acquire adequate knowledge, skills, and attitudes to manage children with simple and complex kidney and urological diseases; furthermore, they will be able to play roles as consultants, instructors, researchers and manager administrators.

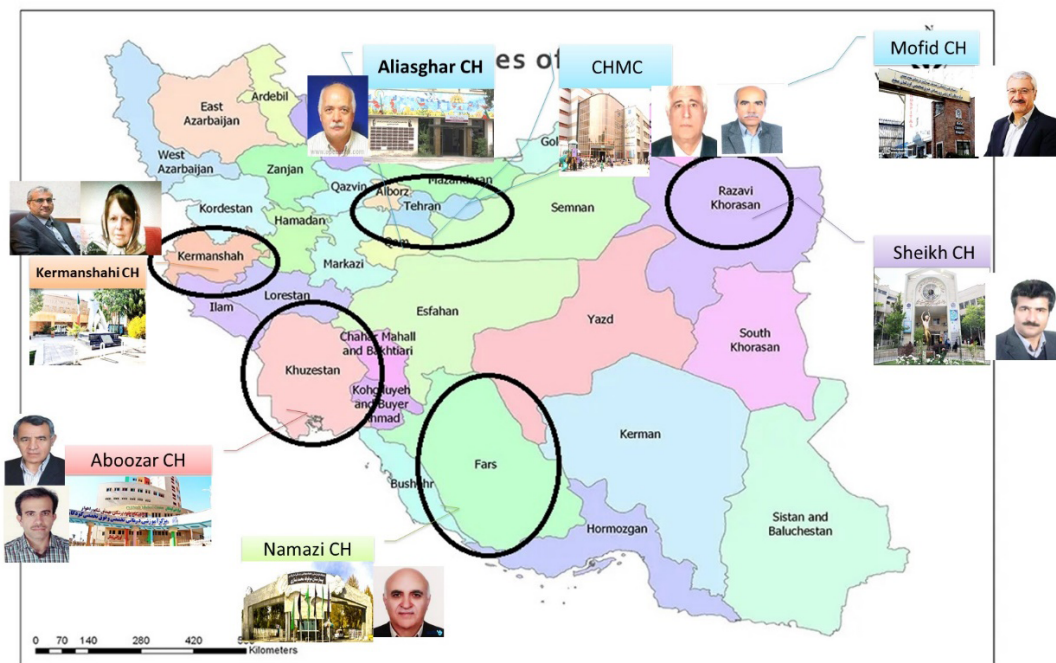


Figure 2. Qualified centers for training pediatric nephrology in Iran

Table 1. Overall structure of the course

Course	Duration
Clinical pediatric nephrology, urology, dialysis (PD-HD)	18 months
Hemodialysis, CRRT, plasmapheresis	1 month
Nephrology clinic	3 days/week
Kidney transplant ward	2 months
Pathology unit	1 month
Radiology ward	15 days
Nuclear medicine unit	15 days
Optional Rotation (UDS-ESWL procedures)	15 days
PICU	15 days

Abbreviations: PD: Peritoneal dialysis; HD: Hemodialysis; UDS: Urodynamic study; ESWL: Extracorporeal shock wave lithotripsy; PICU: Pediatric intensive care unit.

Admission requirements

The applicant must hold a medical doctor degree by completing 7-7.5 years at a medical school. Subsequently, they should have three years of residency in pediatrics and hold the Board Certification of Pediatrics. The applicant should have one or two years of postgraduate preparation in general and pediatric fields to be permitted to apply. Afterward, the candidate takes entrance exams that are multiple-choice questions and objective

structured clinical examination format. The training program accepts one fellow per year.

Overall structure of the course

Table 1 depicts the minimum rotation length in each service during the pediatric nephrology training. The trainee might routinely get involved in all of these items in their daily patient visit. A consultant supervises all the activities.

Table 2. Teaching and training activity

Inpatient Visit	Daily
Grand round	Weekly
Joint morning report	Monthly
Teaching rounds (for juniors)	Weekly
Kidney pathology	Weekly
Consult (other wards, NICU, PICU, satellite centers)	Daily
Outpatient visit	3 times/week
Book review	Weekly
Seminars- symposium	1 per month
Journal club	Weekly
Mortality–morbidity-audit	1 per month
Workshops	1-2 per year

NICU: Neonatal intensive care unit; PICU: Pediatric intensive care unit.

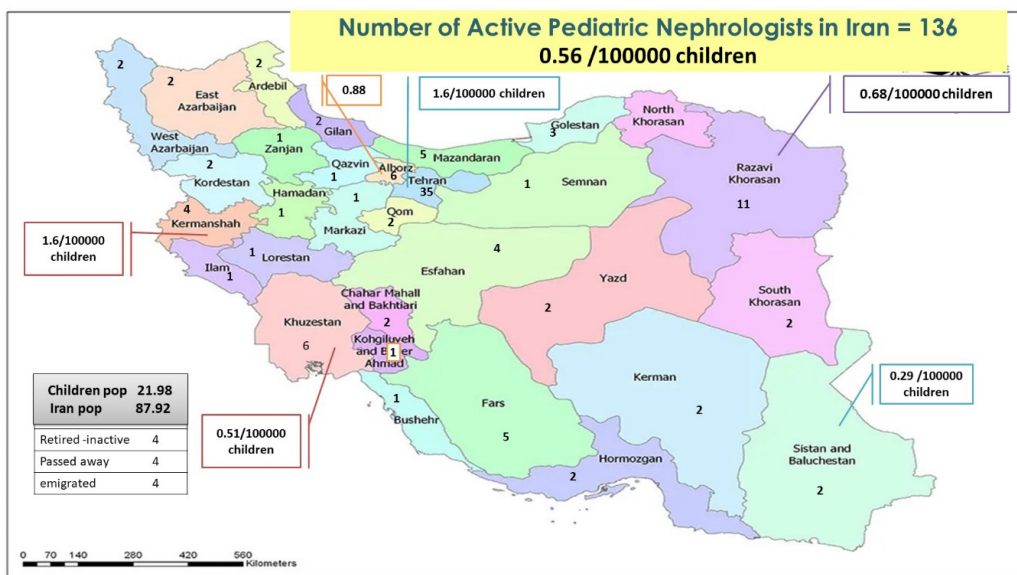


Figure 3. The distribution of active pediatric nephrologists in Iran

Teaching and training activities

Trainees of pediatric nephrology are expected to follow the suggested schedule (Table 2). Iranian Society of Pediatric Nephrology collaborates to have joint meetings of journal club, morning reports monthly and seminars.

Tasks

Trainees should be able to handle children with simple and complex kidney and urological diseases, learn how to prevent and provide care to patients, train to diagnose and manage evidence-based, role play as consultants for other wards and satellite centers, and instructors for students and juniors, a researcher and a manager administrator.

Trainee assessment

The trainee should demonstrate competency in knowledge, communication skills, critical thinking and problem-solving skills, professionalism, research, scientific writing, attitude and ethics to be eligible to attend the national pediatric nephrology board exam.

Assessment

1) Logbook; 2) MINI CEX and direct observation of procedural skills; 3) Completing a research project and defending before the exam; 4) Passing the national pediatric nephrology board exam (150 multiple choice questions and case-based questions), objective structured clinical examination, critical feature problem; 5) They

are obligated to work 48 months unsupervised (on the vacant position in teaching hospitals in remote provinces) as postgraduate preparation years before the pediatric nephrology board certificate gets issued.

Program requirements

The requirements for the program include the following items:

- 1) Minimum of three consultant pediatric nephrologists (professor, associate professor, and assistant professor);
- 2) Pediatric nephrology consultation service;
- 3) Minimum inpatient load per week;
- 4) Pediatric nephrology outpatient clinic supervised by a pediatric nephrologist;
- 5) Minimum of inpatient and outpatient load of 2000 per year with various types of kidney diseases, including the following items:

- 1. Congenital anomalies of the kidneys and urinary tracts (n=200);
- 2. Urinary tract infection (n=200);
- 3. Glomerulopathy (n=100);
- 4. Urolithiasis (n=100);
- 5. Hypertension (n=50);
- 6. Acute kidney injury (n=50);
- 6) Chronic kidney disease (n=100);
- 7. Kidney transplant and its complications (n=20);
- 8. Hereditary kidney diseases (n=50);
- 9. Tubular disease (n=50);
- 10. Complex fluid and electrolyte and acid-base disorders (n=200).

- 6) Availability of peritoneal, hemodialysis, and CRRT program for children;
- 7) Accessibility of pediatric kidney transplant program;
- 8) Available pediatric urology program;
- 9) Radiology department;
- 10) Pathologist interested in kidney pathology.

Sum up

Iran has a 1648195 km² dimension and approximately 85 million people. Nearly 147 pediatric nephrologists are trained in-house. Despite the uneven distribution, there are 5.48 pediatric nephrologists/ per million children (Figure 3). The median number of specialized pediatric nephrologists in 42 European countries was 4.2 per million children (range=0-15) [4]. What makes the difference between pediatric nephrology courses worldwide is the duration of the training, the prerequisite certificate, tasks, basics, and advanced subjects, the infrastructure, the availability of the facilities, the diversity of patients, and finally having the research activity and the interest to be trained as pediatric nephrology declined by time. The majority prefer to work in the capital or nearby. A total number of 2673 (780 active) kidney transplants [4], a total of 416 (111 active) chronic peritoneal dialysis [5-7] and 533 active hemodialysis in children have been recorded.

Conclusions

There are more than three decades of academic pediatric nephrology training in Iran. A total of 137 active qualified pediatric nephrologists are distributed unevenly in different provinces of the country. They care for a wide spectrum of children with kidney diseases.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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Conflict of interest

The authors declared no conflict of interest.

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