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Trainees' Perspectives on Nephrology Fellowship Training Experiences in Saudi Arabia

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ABSTRACT

Background: The prevalence of chronic kidney disease and its related risk factors has significantly increased over the last years in Saudi Arabia, resulting in growing number of patients requiring nephrology care. The burden to ensure adequate training and preparedness of nephrology fellows in taking care of this increasing population falls largely on the fellowship training programs. The aim of this study was to explore trainees' perspectives on training experiences during the Saudi nephrology fellowship program.

Methods and Material: This was a survey-based, cross-sectional study. The survey was electronically distributed via email using Google Forms to adult nephrology fellows who have completed their nephrology training program over the last 3 years. Data were analyzed using Microsoft Excel spreadsheet analytic functions.

Results: Overall, 34 nephrologists who have completed the Saudi nephrology fellowship program over the last 3 years participated in this study (40% response rate). Most participants described the overall quality of education and training as either "excellent" (47%) or "good" (47%). By the end of the training, 56% of participants felt "fully prepared" for entering independent nephrology practice, while 35% felt "moderately prepared", and 9% felt "minimally prepared. Glomerulonephritis was the most chosen topic (47%) where participant felt the need for additional training and education, followed by peritoneal dialysis (41%), and kidney histopathology interpretation (38%).

Conclusion: Most participants found the quality of training and education as excellent or good, with most trainees feeling prepared for entering the independent practice by the end of their nephrology fellowship. Evaluating and strengthening the training in the Saudi nephrology fellowship program is of critical importance to provide quality nephrology care to the increasing population with kidney diseases.

KEYWORDS: Nephrology training, Saudi Fellowship, Trainees' perspective.

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INTRODUCTION

Chronic kidney disease (CKD) remains a major public health challenge that contributes to substantial patients' mobility, mortality, and decreased quality of life [1-3]. The prevalence of CKD has increased over the last two decades by 29.3%, affecting 10-15% of worldwide population [4]. In fact. this prevalence is likely to be underestimated given the asymptomatic nature of early stages of CKD and the lack of standardized nationwide screening programs [5]. In Saudi Arabia, the prevalence of different risk factors for CKD, including diabetes mellitus, hypertension, obesity, sedentary lifestyle, and smoking has significantly increased over the last years, resulting in higher risks of CKD and growing number of patients requiring nephrology care [6-9]. The burden to ensure adequate training and preparedness of nephrology fellows in taking care of this increasing population of patients with CKD falls largely on the fellowship training programs.

The Saudi fellowship program in adult Nephrology consists of two years of full-time supervised training in nephrology and its related fields, with the Canadian Medical Education Directives for Specialists (CanMEDS) framework being the adopted model to establish the core curriculum of the program. In order to prepare the future generation of nephrologists to practice independently following the completion of their fellowship, such program should be evaluated and strengthen on regular bases. This includes exploring the trainees' perspectives on their educational experiences during the fellowship training program. As a result, this study aimed to determine the nephrology fellows' educational needs in Saudi Arabia, and to assess their interest in different potential educational interventions.

SUBJECTS AND METHODS

This was a survey-based, cross-sectional study. The questionnaire (Appendix A) was adopted with modifications from a survey-based needs assessment in nephrology training by Robe *et. al*., and following the review of relevant literature and the current curriculum of the Saudi nephrology fellowship program [10]. The questionnaire consisted of 10 close-ended questions that required the participants to respond to a binary or ordinal scale, and a final open-ended question. The questionnaire was pretested on a sample of three nephrology fellows before distribution. After obtaining ethical approval for the study protocol, the questionnaire was electronically distributed using Google Forms with the help of program directors to adult nephrology fellows who have completed their nephrology training program over the last 3 years. The present study adhere to the declaration of Helsinki and all participants had been provided an informed written consent for being included in the study. The survey was first sent to the participants on May 25, 2024, followed by a reminder on June 25, 2024, and was closed on July 25, 2024. Data were analyzed using the analytic functions of Microsoft Excel spreadsheet. The study protocol was approved by the Research Ethics Committee of King Faisal University, Saudi Arabia (reference number: KFU-REC-2024-MAY-ETHICS2278).

RESULTS

Overall, 34 nephrologists who have completed the Saudi nephrology fellowship program over the last 3 years participated in this study by responding to the survey (40% response rate). The demographic data of all participants are shown in Table 1. When participants were asked about their educational experiences during the fellowship program, most respondents described the overall quality of education and training as either "excellent" (47%) or "good" (47%) (Figure 1). Additionally, by the end of their training, 56% of the participants felt "fully prepared" for entering independent nephrology practice, while 35% felt "moderately prepared", and 9% felt "minimally prepared" (Figure 2). When participants were asked to identify topics that they would like to receive additional education and training during fellowship, glomerulonephritis (GN) diagnosis and management was the most chosen topic (47%), followed by peritoneal dialysis (PD) (41%), and kidney pathology interpretation (38%) (Table 2). In terms of educational tools and resources, most participants (73.5%) found the American society of nephrology (ASN) Nephrology Self-Assessment Program (NephSAP) as the most useful education tool, followed by the kidney disease improving global outcome (KDIGO) guidelines (62%), and UpToDate (50%) (Table 3). When participants were asked about different educational activities that they were most likely to participate at during their fellowship training, journal club was the most chosen educational activity (62%), followed by grand rounds (59%), and lectures led by fellows or consultants (53%) (Table 4). Only 26% of the participants responded to the last (optional) open-ended question: "Describe two changes that could improve your fellowship's educational experience." Responses were centered around the desire for additional hands-on training on hemodialysis (HD) and PD catheter placement, ultrasound training, and extensive histopathology sessions.

DISCUSSION

Over the last several decades, the prevalence of CKD and its related risk factors has significantly increased in Saudi Arabia, resulting in a larger population of patients requiring nephrology care [6]. In order to meet such demand of nephrology care, it is important to ensure adequate training and education for the future generation of nephrologists, particularly those who are trained by the Suadi nephrology fellowship program. Given the lack of previous studies assessing the educational needs and the quality of training in the Saudi nephrology fellowship program, the present study provides an initial insight on the state of nephrology training in Saudi Arabia from a trainee perspective. It was encouraging to note that 94% of participants described the overall quality of education and training as either excellent or good, with the vast majority (91%) feeling either fully or moderately prepared for entering independent nephrology practice.

When it comes to different nephrology fields, GN diagnosis and management was identified as the most chosen topic were participant expressed the need for additional training and education. Of note, nondiabetic glomerular diseases are responsible for more than 25% of the cases of CKD worldwide and are the third leading cause of kidney failure in Saudi Arabia [11-13]. As a result, training in GN is an important core component of any nephrology fellowship curriculum, including the Saudi nephrology program. However, the fact the nephrology training in Saudi Arabia is largely focused on inpatient management may lead to less time being spent in specialized glomerular disease clinics. This is particularly important as the care of patients with GN requires an n-depth knowledge and understanding of disease pathogenesis, clinical presentation, histopathology, and expertise in immunosuppression management. Such competency in managing GN usually requires adequate exposure and clinical experience. In a recent study assessing glomerular disease education experience across nephrology fellowship programs in the United States, trainees from hospitals equipped with dedicated GN clinic reported a higher level of competency on the diagnosis and management of patients with GN, compared to those trained in a hospital with no specialized GN clinic [14]. In addition, the presence of an onsite nephropathologist with dedicated sessions in histopathology was also associated with higher levels of competency and trainees' satisfaction [15]. As a result, nephrology trainees in Saudi Arabia should be allocated to centers with specialized GN clinics during their GN rotations, and preferably where dedicated teaching sessions in histopathology are undertaken.

Despite the several patient-level and health care system benefits of PD compared to HD, the growth in PD utilization in Saudi Arabia has been limited, with only 7.5% of the dialysis population being on PD [13]. Of note, the inadequate PD training and education for nephrology fellows has been identified in a recent study as a major challenge toward higher PD uptake in Saudi Arabia as this can influence nephrologist's motivation and comfort when it comes to advocating for PD as a dialysis modality [16]. In the present study, PD was the second most chosen topic were participants felt the need for additional training and education. Given the relatively small number of PD patients compared to HD in Saudi Arabia, adequate exposure and experience on PD cannot be ensured. Program directors should consider limiting PD rotations to hospitals with reasonable volumes of PD patient, involving the fellows in the longitudinal PD clinics, and to improve training needs assessments and competencies in PD to

overcome this problem.

Achieving competencies in performing procedures, particularly the insertion of non-tunneled (temporary) HD catheter is an important requirement for any nephrology training program. Previous studies have demonstrated higher rate of complications when such procedure is performed by an inexperienced operator [17, 18]. In the present study, around third of the participants expressed the need for additional training in temporary HD catheter placement. Although kidney biopsy was historically performed by nephrologists, the use of real-time imaging, such as ultrasound, computed tomographic (CT), or fluoroscopic imaging—guidance has become the standard of care for this procedure. As a result, kidney biopsies nowadays are frequently performed by intervention radiologists. An important and well-studied measure that can significantly improve competency in temporary HD catheter placement is the use of simulation–based mastery learning (SBML). Previous studies have showed that the use of SBML improved trainees' skills in performing HD catheter placement, and reduced the risk of mechanical and infectious complications [19-23]. SBML is an educational competency-based model of training, where participants can learn the procedure through the use of realistic simulators. The trainees' performance can be then assessed and graded using a standardized checklist, followed by directed feedback. Such type of training should be considered for trainees in the Saudi nephrology program and may need to conducted at regular intervals of 6-12 months to reinforce the skills and maintain the competency in this important procedure.

The role of program directors in managing the fellowship program is important in ensuring that different program requirements and competencies among fellows are met. Exploring the perspectives of program directors will be the next step for better understanding and assessment of the quality of education and training in the Saudi nephrology fellowship program. The strengths of this study include the wide representation of nephrology fellows among different geographic areas and medical sectors across Saudi Arabia, and that it is the only current assessment of fellows' perspectives on nephrology training experiences in Saudi Arabia. Nevertheless, this study has some limitations, including the low response rate (40%), hence the possibility of non-response bias, which would be expected in studies with this nature. In addition, this study is unique to the nephrology training program in Saudi Arabia, and such findings may not be generalizable to nephrology fellowship programs in other countries.

In summary, this study has provided the first insight on educational and training experience during the nephrology fellowship program in Saudi Arabia from a trainee perspective. It is encouraging that the vast majority of participants found the quality of training as excellent or good, and that most trainees felt prepared for entering the independent practice in nephrology. However, many participants expressed the need for additional training and education in some areas of nephrology, such as GN, PD, and histopathology. Evaluating and strengthening the training in the Saudi nephrology fellowship program is of critical importance to provide quality nephrology care to growing population with kidney diseases. The next important step would be to survey the program directors for better understanding and assessment of the current state and outcomes of a such training program.

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Data Availability: The data that support the findings of this study are available from the corresponding author, MS, upon reasonable request.

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Table 1. Demographics of participants (*n*=34 adult nephrology fellows).

Demographic	N (%)
Gender	
Male	20 (59%)
Female	14 (41%)
Age category (years)	
30–35	23 (68%)
36–40	10 (29%)
>40	1 (3%)
Medical sector the participant is affiliated to	
Ministry of Health (MOH)	11 (32%)
University Hospital	7 (21%)
National Guard Hospitals	6 (18%)
Military and Armed Forces Hospitals	5 (15%)
Others	5 (15%)
Province where the participant is practicing	
Central	14 (41%)
Eastern	11 (32%)
Western	8 (24%)
Southern	1 (3%)
graduation year	
2022	12 (35%)
2023	12 (35%)
2024	10 (30%)

Table 2. Additional teaching and training during fellowship.

Which topics would you most like to receive additional training during fellowship?	N (%)
Glomerulonephritis Diagnosis and Management	16 (47%)
Peritoneal Dialysis	14 (41%)
Kidney Pathology interpretation	13 (38%)
Temporary Hemodialysis catheter placement	11 (32%)
Obstetric Nephrology	11 (32%)
Home Hemodialysis	8 (24%)
Kidney Biopsy	7 (21%)
Genetic Kidney Diseases	7 (21%)
Kidney Ultrasound interpretation	6 (18%)
Hemodialysis	5 (15%)
Secondary Hypertension Diagnosis and Management	5 (15%)
Nephrolithiasis	5 (15%)
Intensive care Nephrology	5 (15%)
Mineral and Bone Disease	3 (9%)
Diabetic Kidney Disease	2 (6%)
Post Kidney Transplant Management	2 (6%)
Kidney Physiology	1 (3%)
General Chronic Kidney Disease Management	1 (3%)
Acute Kidney Injury Diagnosis and Management	1 (3%)

Table 3. Educational tools and resources.

Which of the following educational tools have you found most useful during your fellowship?	N (%)
ASN-NephSAP	25 (73%)
KDIGO Guidelines	21 (62%)
UpToDate	17 (50%)
Textbooks	15 (44%)
Journal Articles	10 (29%)
Nephrology Fellow Notes	9 (26%)

Table 4. Educational activities during fellowship.

Which of the following educational activities were your most likely to participate at during your fellowship?	N (%)
Journal Clubs—led by fellows or consultants	21 (62%)
Grand rounds—presented by fellows or consultants	20 (59%)
Lectures—led by fellows of consultants	18 (53%)
Fellow-led case reports ("morning report style")	15 (44%)
Renal Pathology Conferences	14 (41%)
Key articles or reading lists/collections	10 (29%)
Morbidity and Mortality Conferences	9 (26%)
Uninterrupted protected time for nephrology review	3 (9%)
Online collaborative learning activities	3 (9%)
Formal ultrasound training	3 (9%)
Temporary dialysis catheter simulation training	2 (6%)

Figure 1. Fellows Assessment of Teaching Quality

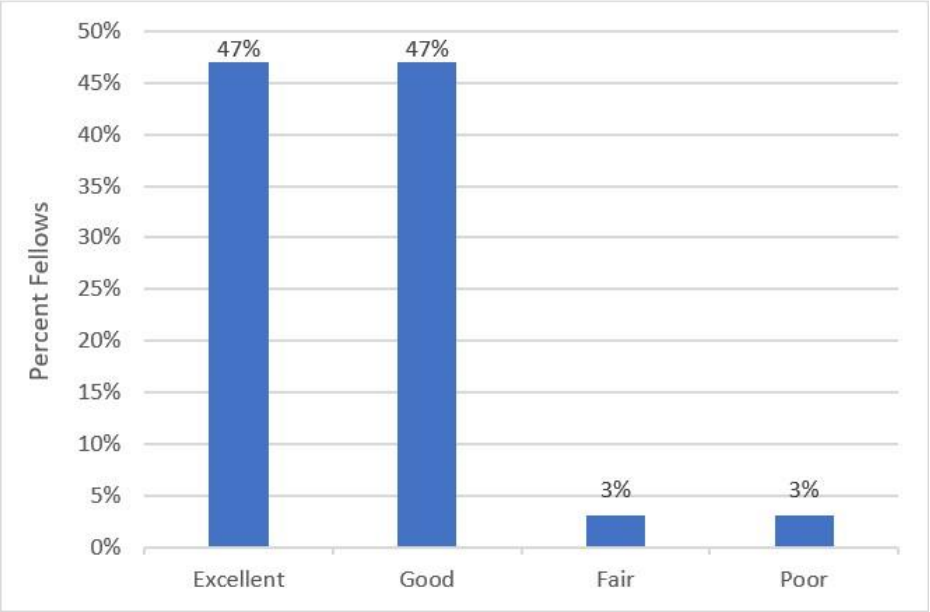

Figure 2. Fellows Preparedness for Entering Independent Nephrology Practice.