Nephrology in Rajasthan

Abstract

Rajasthan's eastern region is densely populated and faces a rising burden of chronic kidney disease (CKD), straining the healthcare system. Key nephrology training centers include AIIMS Jodhpur and SMS Medical College, with new facilities opening in Kota and Udaipur State Medical College recently. Renal replacement therapies, such as hemodialysis and deceased donor transplantation, are operational with public and corporate support. Awareness of CKD risk factors and early diagnosis are required to control the disease burden. Enhanced coordination in academic and research activities is necessary to strengthen the healthcare system's response to this growing challenge.

Keywords: *CKD, RRT, Nephrology, Rajasthan, India*

Rajasthan, located in north-western India, is the largest state by land area and the 6th most populous. It shares borders with Pakistan to the west and five Indian states in other directions: Punjab to the north, Haryana and Uttar Pradesh to the northeast, Madhya Pradesh to the northeast, and Gujarat to the southwest. Its population is 8.13 crores, expected to reach 9.08 crores by 2036.[1] The state is geographically divided into two important regions by the Aravalli Mountain Range: the eastern part, which constitutes 20% of the area, is more densely populated with 33% of the total population (332 persons per sq. km). About 40% of people reside in the western desert region, which covers 61% of the state's area, with the least density of 130 persons per sq. km. Rajasthan has been a major route for human migration since ancient times, and many studies, including from the southern part, have found the highest average genetic heterozygosity among the populations of Rajasthan, possibly due to gene flow from different directions, which makes it genetically rich, in addition to cultural richness.[2]

Chronic kidney disease (CKD) has emerged as one of the leading non-communicable causes of death worldwide, driven by the increasing burden of diabetes mellitus and hypertension. In Rajasthan, the prevalence of diabetes is lower compared to other states of the Indian Union, with rates of 3.5% in females and 5.7% in males and an overall prevalence of 10%, while pre-diabetes affects 15.2% of the population.[3,4] The prevalence of hypertension in Rajasthan is also lower than the average national prevalence, with rates of 18.3% in rural areas and 26.1% in urban areas compared to the national average of 29.8%.[5] Another study from a public tertiary care center in Rajasthan highlighted the difference in CKD etiology related to age, financial status, and geographic location.[6] With increasing urbanization, elderly population, and rising obesity and diabetes, nephrology services in the state of Rajasthan play an important role in handling the increasing load of kidney disease.

Advanced nephrology services, including interventional nephrology and renal transplantation, are predominantly located in four major cities, i.e., Jaipur, Jodhpur, Udaipur, and Kota. SMS Medical College in Jaipur is the oldest and has trained the highest number of trainees in nephrology in the state [Table 1] and the only public

Table 1: Nephrology training institute/college, courses, trainees passed with yearly intake, number of nephrologists in different districts, transplant centers and interventional nephrology facility availability in Rajasthan

City	Training Institute/ College	Public/ Private	DM/DNB	Trainee/ yr	Total Trainee Passed till 2023	Nephrologist	Pediatric Nephrologist	Transplant Centers	Interventional Nephrology facility
State	9	6+3		26/yr	70	53	11	13	
Jaipur	3	1+2	DM	13	62	26	8	8	Yes
	SMS Medical College & Hospital	Public	DM	7	56	5			Yes
	MGH	Private	DM	4	5	1			Yes
	NIMS	Private	DM	2	1	2			±
Jodhpur	2	2+0	DM	4	8	9	2	2	Yes
	AIIMS	Public	DM	4	8	3	1		Yes
	SN MC JDH	Public	-	-	-	1			-
Udaipur	2	1+1	DM	7	0	9		2	Yes
	RNT Medical College	Public	DM	5	0	1			±
	Geetanjali Medical College	Private	DM	2	0	1			Yes

contd.,

Table 1: Continued.

Kota	1+0	1+0	DM	2	0	3	1	1	±
	Govt. Medical College	Public	DM	2	0	1	1	1	±
Bikaner	1	1+0				2			±
	GMC, Bikaner	Public				1			
Sri Ganga Nagar						2			±
Ajmer						1			
Bharatpur						1			

SMS: Sawai Mann Singh; MGH: Mahatama Gandhi Hospital; NIMS: National Institute of Medical Sciences; AIIMS: All India Institute of Medical Sciences; SNMC: Sampurnanand Medical College; JDH: Jodhpur; RNT: Rabindranath Tagore; GMC: Government Medical College; DM: Doctor of Medicine; DNB: Diplomate of National Board

tertiary center in eastern Rajasthan. AIIMS in Jodhpur, located in the western part of the state, is the fastest-growing advanced nephrology care center. In the last 12 years of its establishment, it stood at the thirteenth position in the NIRF ranking, the highest of any medical college in the state.[7] AIIMS received referrals for a wide spectrum of nephrological conditions from the western part of Rajasthan and neighboring states. Government medical colleges in Kota and Udaipur have recently started nephrology training programs. Two private medical colleges in Jaipur (MGH and NIMS) and one in Udaipur train and provide quality nephrology care [Table 1].

An online survey of nephrologists across Rajasthan revealed that around 94% of patients received center-based hemodialysis, 5.8% were on PD, and home-based HD was only 0.47%. There was a 13.15% increase in dialysis sessions from 2022 to 2023. Around 7.9% of hemodialysis patients had hepatitis C, 2.8% had hepatitis B, and around 0.48% were HIV-positive. Of those who initiated hemodialysis, only 6.5%–11.9% in the public sector started with AVF compared to 10%–38% in the corporate sector. A study from the public sector reported that only 5.97% had an AV fistula at the time of HD initiation.[6] In terms of quality of dialysis delivery, 33% responded to be adequate in duration, frequency, and dose; 25% responded that duration and frequency were adequate but not sure about the dose of dialysis; 29 % responded that duration was adequate but not sure about frequency and the dose, and 8% were in the opinion that delivery of dialysis needs improvement in duration, frequency, and dose. Dialysis centers are mostly in the private sector, with few public-private partnerships (PPP) operating in government district centers [Figure 1].

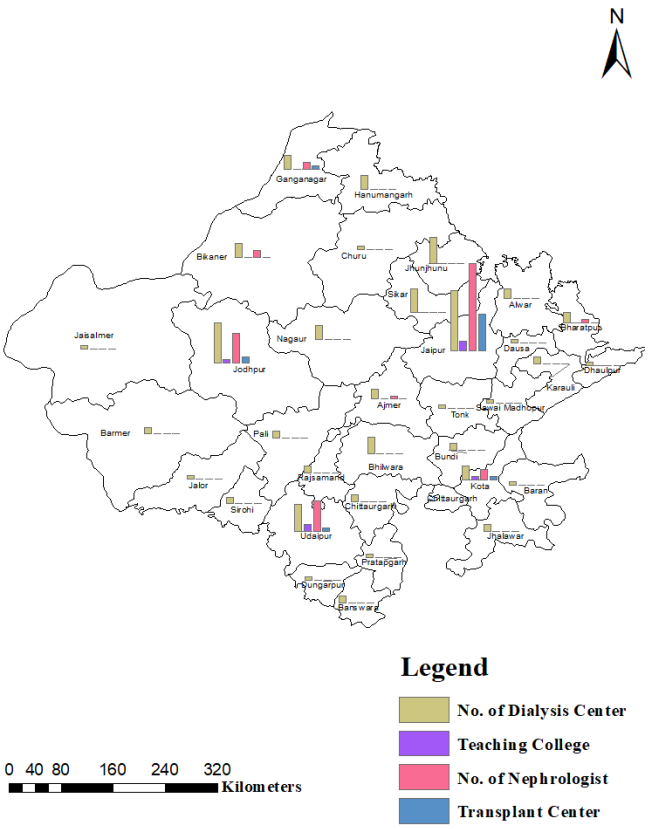

Figure 1: Bar diagram showing the number of dialysis centers, nephrology teaching colleges/institutes, and the number of nephrologists and transplant centers in different districts of Rajasthan. (Source of data: an online survey and telephonically inquiry of dialysis center, number of nephrologists from local unregistered nephrology society, transplantation center from SOTTO site https://sotto.rajasthan.gov.in/Home/kidney Hospital). SOTTO: State Organ and Tissue Transplantation Organization

The field of pediatric nephrology has grown widely over the past 5–6 years owing to the constant efforts by the International Paediatric Nephrology Association (IPNA). AIIMS Jodhpur was the first to start a formal Paediatric Nephrology training program. At the same time, SMS Medical College Jaipur has developed a separate Paediatric Nephrology Department. There are 10–12 Pediatric Nephrologists in the state (primarily in Jaipur and Jodhpur), and many are under training at AIIMS and SMS Jaipur. AIIMS Jodhpur offers a 1-year training course in Pediatric Nephrology with an annual intake of 2 trainees.[8] The department also offers interventional nephrology with the support of Interventional Radiology and the main Nephrology department. The Pediatric Nephrology at AIIMS and SMS Jaipur are also part of the IPNA–

ISPN RRT registry, a joint venture of IPNA and ISPN. The penetrance of PD remains low in the state, mainly due to cost constraints. While HD is covered under state health insurance schemes, expenditure on PD is primarily out of pocket. Pediatric renal transplantation rates remain poor.

Jaipur has the highest number of transplant centers, followed by Jodhpur, Udaipur, and Kota [Figure 1]. About 88-90% of transplants were performed in corporate sectors in 2022-2023. MGH Jaipur performed the highest number of live renal transplants in the state. Among the public sector hospitals, SMS Medical College, AIIMS Jodhpur, GMC Kota, and SN MC Jodhpur perform kidney transplants. Pediatric transplantations are conducted at AIIMS Jodhpur and SMS & Mahatma Gandhi Hospital Jaipur [Figure 2]. Since 2015, more than 60 deceased renal transplants have been performed in the state.

Nephrology services in Rajasthan are continuously growing. The dialysis facility under the government-funded insurance scheme [Bhamashah Swasthya Bima Yojana (BSBY) or Ayushman Chiranjeevi Yojana] helped increase access to RRT for ESRD patients.[6] As this scheme did not cover PD, this initiation also shifted patients from PD to HD. Kidney transplantation is continuously increasing in the state (34.3% increase in 2023 compared to 2022). Research activities in nephrology are limited to medical colleges offering training programs; limited collaboration between centers is likely due to a lack of research incentives, with promotions for medical state teachers focused on tenure rather than research achievements. Additionally, private practice in state medical colleges diverts focus from academic and research activities. The health policies of the central and state governments focus on patients with advanced CKD, emphasizing the need for increased public awareness on kidney disease, preventive nephrology, CKD care, timely creation of AV fistula, dialysis delivery, improving dialysis quality, increasing renal transplantation from live to deceased to swap with mutual support, cooperation, and coordination between public and corporate sectors in complementing each other in providing complete kidney care to the CKD patients. Collaboration with local centers for maintaining kidney disease registries with support and coordination in clinical research will boost the generation of research-oriented trainees in the state for the nation.

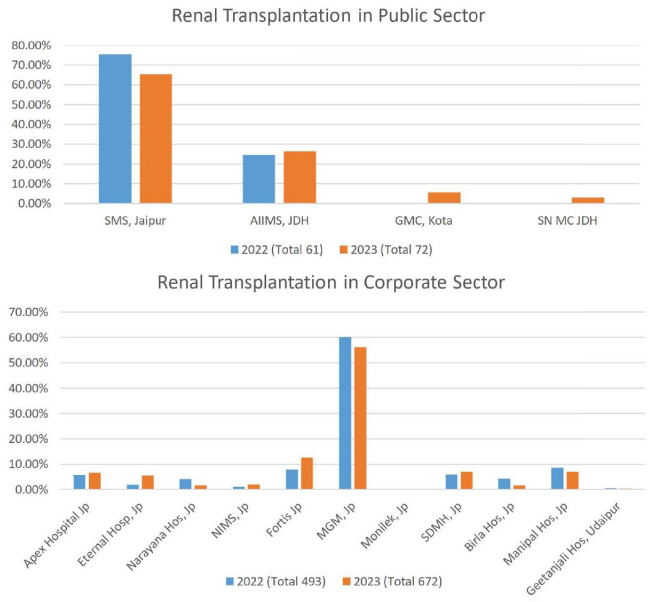

Figure 2: Bar diagram showing numbers of renal transplantation done in Rajasthan at different transplantation centers both in public and corporate sectors. The blue bar shows renal transplantation in 2022, and the orange bar shows renal transplantation in 2023. Data represented in percentage. Source: https://sotto.rajasthan.gov.in). SMS: Sawai Mann Singh; AIIMS: All India Institute of Medical Sciences; JDH: Jodhpur; GMC: Government Medical College; SNMC: Sampurnanand Medical College; NIMS: National Institute of Medical Sciences; MGM: Mahatama Gandhi Medical College; SDMH: Santokba Durlabhji Memorial Hospital; Jp: Jaipur

To conclude, the nephrology services in Rajasthan are increasing continuously. However, advanced services are limited to four major cities. The option of RRT for ESRD patients' needs to be extended for PD in the center and state health schemes, which give options to ESRD patients living far from the cities and dialysis centers. Risk factors of CKD and early detection of kidney disease should be the focus to control the increasing number of ESRD patients in the state. More coordination in academic and research activities are required to manage the disease burden and prepare the healthcare system to deal with future challenges.

Conflicts of interest

There are no conflicts of interest.

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