Nephrology in Madhya Pradesh

Abstract

Chronic kidney disease (CKD) is a global public health problem. The last two decades have seen significant changes in provisions and access to CKD care in all low- and middle-income countries. India is the most populous country in the world and each state has its unique combination of policies, infrastructure, financials, and human resources. This paper traces the initiation of CKD care and then describes the status of its care in Madhya Pradesh, a central province in India.

Keywords: *Nephrology, CKD, Dialysis, Transplant, Madhya Pradesh*

Gopesh K Modi[1], Himanshu Sharma[2]

[1]Department of Nephrology, Samarpan Kidney Center, [2]Department of Medicine and Nephrology, Gandhi Medical College, Bhopal, Madhya Pradesh, India

Corresponding author:
Gopesh K Modi, Department of Nephrology, Samarpan Kidney Center, Bhopal, Madhya Pradesh, India. E-mail: gopesh.samarpan@gmail.com

DOI: 10.25259/IJN_697_2024

Received: 13-11-2024
Accepted: 20-11-2024
Online First: 31-01-2025
Published: ***

Introduction

The burden of chronic kidney disease (CKD) is rising worldwide. By 2040, CKD is projected to be the fifth highest cause of years of life lost (YLL), globally driven by the steadily increasing age-adjusted mortality unlike the falling rates of conventional noncommunicable diseases (NCDs), whose rates are falling. The magnitude of the problem, its disproportionate impact on low- and middle-income countries (LMIC), and the lack of a commensurate response has been repeatedly highlighted.[1]

India is now the most populated country in the world. It has a population of more than 1.4 billion with a lot of demographic, geographic, economic, and social-political heterogeneity. Many states of India are larger in size and population than many countries. We present the current status of nephrology in Madhya Pradesh (MP).

Methodology

There is an absence of systematic information on this subject. The information presented below is available on some official websites, key publications on burden of CKD and end-stage kidney disease (ESKD), informal interviews of healthcare workers and physicians, personal experience, data received from vendors who provide dialysis supplies, and a structured survey of all the nephrologists in MP.

MP is the second-largest state of India in terms of area and the fifth-largest in terms of population, with an estimated population of 87.7 million. The state had been lagging the national averages on many health fronts. The sheer size of the state and the suboptimal financial capacity of its population make it challenging to deliver healthcare. The key facts about MP are presented in Table 1.[2,3]

History of Nephrology in MP

Conventionally, the beginning of dedicated nephrology services is timed to when the first dialysis treatment or kidney transplant was done. The first dialysis machine in MP was delivered to the Choithram Hospital and Research Center in Indore in 1981. The first live donor and cadaver donor kidney transplants were done at the same center in 1985 and 1989, respectively. Other private centers in MP started doing kidney transplants after 2000. The first official Nephrology Department in the government sector was established at the Bhopal Memorial Hospital and Research Center in 1999. It took three decades to get a kidney transplant in the government sector—Gandhi Medical College, Bhopal in September 2021.

Current Status of Nephrology in MP

Clinical aspects of nephrology include preventive nephrology, care of established CKD, kidney replacement therapy (KRT) for ESKD and palliative care, acute kidney injury (AKI), and critical care nephrology. Since there is no specific data pertaining to AKI, we focus on CKD in this paper.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, transform, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

How to cite this article: Modi GK, Sharma H. Nephrology in Madhya Pradesh. Indian J Nephrol. doi: 10.25259/IJN_697_2024

CKD Management Across the State

The only government-supported CKD-specific vertical in MP is the provision of KRT. There are no other regional or statewide CKD-specific preventive or treatment programs. No thrust areas or standard treatment workflows involve streamlined screening or treatments across the state. The nephrology service in MP is thus a vectorial of many variables: patient preferences, awareness, healthcare workers, health system, financial factors, and access to facilities/treatment.

The state-run healthcare system of MP is like all other states in India—organized as primary care centers, community health centers, civil hospitals, district hospitals (DHs), and medical colleges [Table 1]. The nongovernment/private system comprises independent clinics, small and large nursing homes, large hospitals (trust, private, corporates), and private medical colleges. Individuals seek care for their symptoms through self-checks and physician-administered tests based on risk factors. The knowledge and practices of non-nephrology physicians are based on their routine training and on-the-job learning. They are not specifically trained for seeking out or treating CKD. There are no binding guidelines for referrals or standardized outcome measures. Referral to a nephrologist is by the physician's discretion or patient awareness. Patients' medical records are often shared with them; some facilities have private data systems. The seamless sharing of medical records is being planned nationwide but is yet to take off. This initiative empowers citizens to create their Unique Ayushman Bharat Health Account (ABHA) number that will be linked to the Unified Health Interface.[4]

Table 1: Madhya Pradesh: Basic factsheet[2,3]

Capital	Bhopal
Largest city	Indore
Other important cities	Gwalior, Jabalpur, Ujjain, Dewas, Sagar, Satna, Rewa
Districts	55
Total area	308,252 km^2
Dimensions	
Length (km)	605
Width (km)	870
Population 2011 census	72,626,809 (72.6 million)*
Population density	240/km^2
GDP	
Total (2022–2023)	INR 11.69 trillion
Per capita	INR 164,685 (24th)**
HDI (2018)	0.606 (34th)**
Medical colleges	
Government	13
Private	10
Population per doctor	18,466
Total hospital beds	
District hospitals	16,850
Civil hospitals	11,225
Community health centers	10,440

HDI: Human development index, GDP: Gross domestic produce, *: Current projections stand at 87.7 million, **: The ranking amongst the states of India, 28 state and 8 union territories

Nephrologists and CKD Care

The kidney-specific care is led by nephrologists. The first formally trained nephrologist came to MP in 1993. The number of nephrologists in the state remained below 10 for a decade after. Table 2 summarizes the current information on nephrologists, practice patterns, services, and delivery. With 44 nephrologists, MP has just about one nephrologist per two million population. Some major cities don't have nephrologists. All nephrology centers perform real-time ultrasound-guided kidney biopsies and place tunneled dialysis catheters. However, only five centers have in-house renal histopathology, and none performs electron microscopy. Similarly, very few centers perform arteriovenous (AV) fistula plasty/stenting, central vein plasty/stenting, or complex vascular access procedures. Home hemodialysis (HHD) is being done for only one patient. Hemodiafiltration (HDF) is offered by 10 nephrologists, with the total number of HDF sessions being 250–300 per month. While the majority have reverse osmosis (RO) water testing protocols, half do not have access to reliable laboratories. Just over a third (19/44) of nephrologists do preventive nephrology, usually restricted to public lectures, patient awareness programs, or activities on occasions like the World Kidney Day. No systematic community-based or broad-based preventive program is being done by any center.

Diagnostic Facilities

Diagnostic facilities across the state are fairly available. Essential serum chemistry and urine routine tests are available at DHs; sample collection for tests is also available at peripheral centers, which are then processed at DH. Ultrasounds are available in many DHs. Private sectors have most of these facilities, even in smaller towns.

Healthcare Funding

State-supported healthcare is either free or very subsidized. According to the survey, almost 50–60% of treatment funding is based on out-of-pocket expenditures or health insurance. The Ayushman Bharat—Pradhan Mantri Jan Arogya Yojna now provides coverage to almost 40 million MP residents.[5] A third of nephrologists reported using it in their services. Only 5–10% of centers have charitable trusts for kidney care.

ESKD Care

The most visible aspect of CKD is ESKD. Until a few decades ago, the majority of patients with ESKD perished within

Table 2: Details of nephrologists in MP

Total number of nephrologists*	
Adult	42
Pediatric	02
Bhopal	12
Indore	17
Jabalpur	6
Gwalior	4
Rewa	2
Sagar	1
Affiliation	
Government	12
Private	36
Medical college	16
Large/Corporate hospital	28
Nursing home/Clinics	14
DM/DNB Training centers	8
Total DM/DNB trained till date	21
DM/DNB per year	7
Interventional nephrology available	35/38
AVF by nephrologist	3/38
ICU RRT	
CRRT	15
Acute PD	17
SLED/PIRRT	35
Active in research activities	17
Part of any renal registry	06

*Of the 44 nephrologists, 38 responded. MP: Madhya pradesh, DM: Doctor of medicine, DNB: Diplomate of national board, ICU: Intensive care unit, RRT: Renal replacement therapy, CRRT: Continuous renal replacement therapy, PD: Peritoneal dialysis, SLED: Slow low efficiency dialysis, PIRRT: Prolonged intermittent renal replacement therapy.

Table 3: RRT services in MP

Total number of HD units	201
PMNDP/State Government	51/201
Total HD per month 2024	41000–43000
Total MHD patients	4700–5100
Total Number of HD machines	1300–1400
HD Machines in PMNDP	171
Number of HD units with more than ten machines	32–35
Total PD adult patients	65
APD	3
CAPD	62
Pediatric ESKD patients	
MHD	9
PD	4
Kidney transplant total till date	1726
Kidney transplant per year current	291
Cost of live donor kidney transplant	INR 500,000–800,000
Percentage of HD patients with AVF as access	Between 74 and 87
Frequency of HD/week	
1/week	2%
2/week	74%
3/week	21
4/week	Rare
Patients on single use dialyzers	Mean 8% (5–30% range)

All numbers are rounded off to the closest total estimate. HD: Hemodialysis, PMNDP: Pradhan mantri national dialysis programme, MHD: Maintenance hemodialysis, APD: Automated peritoneal dialysis, CAPD: Continuous ambulatory peritoneal dialysis, ESKD: End stage kidney disease, PD: Perintoneal dialysis, AVF: Arterio-venous fistula

three months of diagnosis. While the RRT in the private sector has been growing, the initiation of state-supported RRT led to a spurt in the number of patients receiving dialysis. The Pradhan Mantri National Dialysis Programme (PMNDP) has led to the establishment of dialysis units in all districts of MP that provide free or subsidized dialysis to the citizens. Table 3 includes current information about ESKD care in MP. Nocturnal HD is yet to be practiced. The state-sponsored dialysis units constitute 25% of all HD units and contribute 13% of the total installed dialysis machines in MP. About 5000 patients are currently on regular dialysis in MP, a number far lower than the ESKD incidence rate. This implies that still a substantial proportion (perhaps > 50–70%) of patients don't survive long with ESKD.

Peritoneal Dialysis

Continuous ambulatory peritoneal dialysis (CAPD) appears well suited for a state of this size and with limited healthcare infrastructure. However, patient preference and cost present roadblocks. Even though the latter is offset in subjects with employer support or some state-supported schemes, the uptake remains low. A total of 65 prevalent patients are on peritoneal dialysis (PD), with only three being on ambulatory peritoneal dialysis (APD). The annual attrition and new patient addition are balanced at present, with about 20–30 new starts and losses.

Kidney Transplantation

The THOA (Transplantation of Human Organs Act) was accepted by the MP Government in 2011. As of now, 13 centers are registered for kidney transplantation. The busiest center in MP does about 120 transplants per year. Deceased donor transplant rates remain low due to many well-known reasons. The cost of a blood group compatible kidney transplant is between INR 500,000 and 800,000 (approximately USD 8000–10,000). Some centers are performing ABO incompatible transplants.

Pediatric Nephrology

The domain of pediatric nephrology is in its infancy. Pediatric nephrology needs are mostly serviced by adult nephrologists or the children are referred to higher centers. Currently, MP has two pediatric nephrologists providing a

wide range of services. Twelve pediatric transplants have been done, 12 pediatric patients are on maintenance hemodialysis (MHD), and four are on CAPD. One center has started Doctor of Medicine (DM) in pediatric nephrology in 2024.

Teaching, Training, and Research

MP has 23 medical colleges—13 government and 10 private. There are seven centers with DNB/DM nephrology programs. The dialysis technician training course is governed by the Paramedical Council, and 13 paramedical colleges offer diplomas in dialysis technology. Research in nephrology has seen less activity. MP does have representation in the Indian Council of Medical Research (ICMR)-driven projects, the national-level CKD registry of India, and the Indian Chronic Kidney Disease Project.

MP has contributed important data to estimate the burden of CKD in India. In a study from MP, the prevalence of CKD in adults was 17.5%.[6] Another population-based study from MP determined the crude and age-adjusted incidence of ESKD to be 151 and 232 per million.[7] This translates to 15 million prevalent CKD patients and between 13,000–22,000 new ESKD patients per year.

Challenges and Future Perspective

The key challenges reported by nephrologists are lack of statewide coordination of CKD care, absence of regular connectivity with healthcare authorities to share views and understand problems, the inadequacy of resources, delayed referral of patients, provision of dialysis by unsupervised technicians or non-nephrologists, lack of preventive activity and awareness, myths and claims by alternative medicine protagonists or quacks, poor professional reimbursement at many levels, underutilization of CAPD, and suboptimal training of dialysis technicians.

Nevertheless, barring two exceptions, all the respondents felt the future of nephrology was good because of an increasing number of nephrologists available to handle the anticipated burden of CKD. There is a need for statewide programs focused on kidney health. The impetus provided by the PMNDP will have a big impact as its scope, capacity, and quality of care get steadily better. Educating primary care physicians and providing an integrated framework for the management of CKD will be key interventions to achieve the goal of kidney care for all.

Acknowledgments

We acknowledge the support of the following nephrologists for participating in the survey: Drs. Akash Deep Suri, Anil Kumar Jain, Anita Chowksey, Ankit Sharma, Arpit Neema, Ashwani Kumar Pathak, Chaitanya Kulkarni, Dinesh Upadhyaya, Girish Bhatt, Hunaid Kagalwala, Isha Tiwari, Jai Kriplani, Jay Singh Arora, Mahendra Atlani, Manish Gupta, Neeraj Jain, Neha Agrawal, Omprakash Rathi, Pradeep Salgia, R R Barde, Rajesh Bharani, Rajesh Tarachandani, Riyaz Asad, Rohan Dwivedi, Rohit Khandelwal, Rubina Vohra, Sandeep Saxena, Sanjay Kumar Gupta, Shilpa Saxena, Shiv Shankar Sharma, Sonusing Patil, Tushar Dhakate, Vidyanand Tripathi, Vikas Gupta, and Vishal Wadhera; Dr Neha Agarwal for assistance with the survey instrument; Mr Vinod Tripathi, Balaji Associates, Fresenius Medical Care, and APEX Kidney care for Dialysis delivery data; and Mr Dharmendra Bandewar for administering the survey instrument and data entry.

Conflicts of interest: There are no conflicts of interest.

References

1. Francis A, Harhay MN, Ong ACM, Tummalapalli SL, Ortiz A, Fogo AB, *et al*. Chronic kidney disease and the global public health agenda: An international consensus. Nat Rev Nephrol 2024;20:473–85.
2. https://en.wikipedia.org/wiki/Madhya_Pradesh [last accessed on 30 March 2024]
3. Directorate of Public Health and Family Welfare, Government of MP. Available from: https://www.health.mp.gov.in/en/district-hospitals [last accessed on 5 Nov 2024]
4. National health authority, India. Available from: https://abdm.gov.in [last accessed on 31 MAR 2024].
5. National Health Authority, India. Available from: https://dashboard.pmjay.gov.in/pmj/#/ [last accessed on 31 MAR 2024].Modi and Sharma: Nephrology in Madhya Pradesh
6. Singh AK, Farag YM, Mittal BV, Subramanian KK, Reddy SR, Acharya VN, *et al*. Epidemiology and risk factors of chronic kidney disease in India - results from the SEEK (Screening and Early Evaluation of Kidney Disease) study. BMC Nephrol 2013;14:114.
7. Modi GK, Jha V: The incidence of end-stage renal disease in India: A population-based study. Kidney Int. 2006 Dec;70: 2131-33.