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REVIEW ARTICLE

RENAL DISEASE IN BANGLADESH PERSPECTIVE

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Abstract:

Bangladesh is one of the most densely populated areas in the world. Renal diseases are increasingly recognized and encompasses a large share of the health sector. About 20 million people are suffering from chronic kidney disease, and of them, approximately 35,000–40,000 develop end-stage renal disease each year. Chronic glomerulonephritis, diabetes mellitus and hypertension are the principal causes of chronic kidney disease. Hypovolemia, sepsis, obstetric complications and drugs (including herbal and homeopathic remedies) are common causes of acute kidney injury. All three renal replacement therapy modalities (hemodialysis, peritoneal dialysis and renal transplantation) are performed in Bangladesh, yet only 25% of end-stage renal disease patients have access to treatment due to inadequate facilities and high healthcare costs. Nephrology as a specialty started its journey in 1973 in Bangladesh and now about 300 Nephrologists are managing the subject. Still there is huge need for more Nephrologists, as only one nephrologist is available for about every 0.8 million people. The country has improved financially from low- to low-middle-income country. Health sector is also more improving gradually. The government is now setting up renal care at rural level, introducing screening programs for early detection and prevention of kidney and other noncommunicable diseases. At the same time steps are under way to improve the advanced renal services at secondary and tertiary health institutes. Kidney transplantation started in 1982 and only live related transplantation are being done in several government and private organization. ABO-incompatible kidney transplantation has already been performed. Recently decease renal transplantation has also been performed. Research and training opportunities are expanding in collaboration with international organizations. Renal services appears up to date in this country but needs more and more enhancement to cope up the ever increasing burden.

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Introduction:

Nephrology, as a medical specialty, has evolved significantly in Bangladesh over the years. This review article aims to consolidate the wealth of knowledge provided by published literature on nephrology aspects in the country. It seeks to highlight the historical progression of nephrology and provide a comprehensive understanding of the challenges and advancements in this critical field of healthcare

History of Nephrology in Bangladesh:

In the vibrant journey of Bangladesh since its independence in 1971, the field of nephrology has undergone a remarkable transformation. Back in 1973, the pioneering presence of Professor Dr. Matiur Rahman, the country's lone nephrologist, marked the beginning of a medical revolution into Institute of Postgraduate Medicine and Research (IPGMR), now known as Bangabandhu Sheikh Mujib Medical University (BSMMU). The initiation of nine-bed

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nephrology ward in 1973 marked the beginning of a big growth in nephrology care. Joining the endeavor in 1981, Dr. Harun Ur Rashid, a postgraduate doctor in internal medicine, returned from the University of Newcastle Upon Tyne with a Ph.D. in nephrology. Together, these two dedicated specialists worked tirelessly to elevate nephrology from primary clinical care to kidney transplantation, touching lives across the nation.

1974 marked a defining moment when Intermittent Peritoneal Dialysis (IPD) emerged as a distinct treatment for End Stage Renal Disease (ESRD), catapulting nephrology into the realm of specialized medicine. The possibilities of hemodialysis (HD) had been attempted before, but it was only in 1986 that this therapeutic technique blossomed into a regular form of treatment, bringing hope to countless patients. The year 1982 witnessed a milestone event - the first successful live related kidney transplantation (KT), ushering in a new era of cutting-edge nephrological practice in Bangladesh. Noteworthy progress was further accentuated with the establishment of the Bangladesh Renal Association in 1977, a monumental stride towards the advancement of nephrology in the country. Scientific seminars in nephrology have since become an annual affair, attracting esteemed nephrologists from across the globe, making it a melting pot of knowledge and innovation.

The dawn of the '80s welcomed the birth of the country's sole nephrology journal, the esteemed 'Bangladesh Renal Journal (BRJ),' lending a platform for groundbreaking research and profound discoveries. The subsequent launch of postgraduate courses started in nephrology in 1986. Additionally, the Kidney Foundation, Bangladesh's Renal Registry, and data sharing with the United States Renal Data System (USRDS) contributed to global advancements.[1]

The tale of nephrology in Bangladesh is one of resilience, innovation, and compassion - a tale that continues to unfold, enriching lives, and reaching new heights of excellence with each passing year.

Acute kidney injury- Bangladesh scenario:

Incidence of AKI is poorly known because we do not have a national registry, there is no system of reporting, regional disparities and there is never a national or regional survey. There is difference in definition and case management protocols in the treating institutes. There is practically no referral culture and most of the cases come with delayed referral leading to poor outcome.

In one study 8.1% of the total hospitalized patients had AKI, and the death rate was 18.5%. In the same study out of 3764 patients in the ICU, 14% had AKI out of which 17.2% of the patients died.[2]

The causes of acute kidney injury are mostly medical, surgical and obstetrical causes are responsible in less than 25% cases. Pre-renal cause accounted for 63%, renal 19% and post-renal 18%. The most common etiology of pre-renal AKI was post-diarrheal hypovolemia, renal cause of AKI includes glomerulonephritis.[2] Recently AKI related to sepsis is an important issue in managing critically ill patients.[3]

Prevalence of CKD in Bangladesh:

Bangladesh, a densely populated developing nation in Southeast Asia, is witnessing a notable increase in the annual prevalence of chronic kidney disease (CKD). According to the latest WHO data published in 2020 Kidney Disease Deaths in Bangladesh reached 10,841 or 1.51% of total deaths. The age adjusted Death Rate is 9.14 per 100,000 of population ranks Bangladesh 143 in the world.[2] A global assessment encompassing multiple regions, including Bangladesh, approximated the overall CKD prevalence at 18%.[4,5] As part of the world warming Bangladesh is becoming the one of the worst countries to suffer the devastation. This country currently ranks 10th among the most vulnerable countries for a population with kidney ailments because of climate change. Research conducted in Dhaka city revealed a CKD prevalence of 26% among adults aged over 30,[6,7,8] while a study among urban Dhaka residents aged over 15 found a 13% prevalence.[9] A 2013 analysis of community-based prevalence data unveiled that one-third of rural individuals in Bangladesh were at risk of undiagnosed CKD [10]. It's highlighted that CKD prevalence varies among age groups, genders, socioeconomic conditions, and geographical locations. Those with CKD face a heightened risk of progressing to End-Stage Renal Disease (ESRD), which necessitates resource-intensive management like dialysis and kidney transplantation.

The prevalence of chronic kidney disease (CKD) in Bangladesh surpasses the global and even South Asian averages. This revelation raises an alarm, urging us to take notice. It becomes imperative for policymakers in public health and government officials to step in, addressing this critical issue head-on. The focus must shift towards controlling and mitigating the high risk of CKD-related disabilities, thus safeguarding the health and well-being of our population.

CAPD in Bangladesh:

Continuous Ambulatory Peritoneal Dialysis (CAPD) holds a significant yet underexplored status in the context of Bangladesh's healthcare landscape. Although the initial implementation of Continuous Ambulatory Peritoneal Dialysis (CAPD) in Bangladesh took place in 1982, there was a temporary pause due to shortages of peritoneal dialysis (PD) fluids. However, since 1992, nephrologists have consistently carried out CAPD procedures on a regular basis.

CAPD presents itself as a viable and patient-friendly option for renal replacement therapy, its utilization remains limited within the country. Challenges related to patient awareness, healthcare infrastructure, and trained personnel pose hurdles to its wider adoption.

Barriers of increasing use of CAPD in Bangladesh:[11]

- *Cost of Supplies*: The foremost concern in low- and middle-income countries (LMICs) is the substantial cost associated with peritoneal dialysis (PD) supplies. Importing dialysate fluid, a critical component of PD, often incurs high expenses. Bangladesh, levies an advanced income tax of 5% and handling charge 2% on these imports contributing to the overall expense. Trade value added tax is exempted.
- *Import Tax*: The high import taxes placed on PD supplies act as a significant barrier. In contrast, countries like Thailand, Malaysia, and Nepal have adopted a different approach, charging minimal or no import taxes on these materials.
- *National PD-First Program*: Implementing a national PD-first program has shown promise. This approach involves prescribing PD as the default treatment, with hemodialysis (HD) recommended only if PD is not suitable for the patient. This strategy, adopted in Thailand and Hong Kong, has resulted in a surge in PD utilization rates. The economies of scale generated by promoting PD adoption can significantly reduce the costs associated with PD supplies and equipment.
- *Lack of Trained Personnel*: A critical hurdle is the shortage of well-trained personnel capable of administering PD therapy. Both nephrologists and non-specialists can be trained to offer PD. However, efforts are being made to address this gap.
- *Nursing Shortage*: Nurses play a vital role in the success of PD therapy. However, their scarcity is evident in Bangladesh, where only around 15,000 are actively practicing [12]. Various organizations, including non-governmental entities, are attempting to bridge this gap through scholarship support. However, ensuring the long-term sustainability of such programs remains a challenge.

Despite these obstacles, a growing awareness of CAPD's advantages, such as increased autonomy and decreased dependency on healthcare facilities, is fostering interest among healthcare providers and patients alike. Initiatives aimed at raising awareness, building specialized centers, and training healthcare personnel could potentially contribute to a more robust presence of CAPD in Bangladesh, offering patients an alternative and flexible approach to managing their kidney health.

Renal transplantation in Bangladesh:

In 1982, a significant milestone was achieved in Bangladesh with the country's first successful donor kidney transplantation. Since then, more than 2,300 kidney transplants have been performed, marking a considerable advancement in renal care. In 2018, the introduction of ABO-incompatible kidney transplantation further expanded the possibilities in this field, with seven cases successfully executed.[13]

Despite these achievements, challenges persist in both living and deceased donor transplantation. Scarcity of living donors remains a primary obstacle due to a lack of awareness and fear of donation among potential donors. Moreover, the high cost of investigations, surgery, and immunosuppressive drugs, coupled with limited government subsidies, renders transplantation unaffordable for many patients. Additionally, the shortage of trained transplant physicians, surgeons, and nurses, as well as inadequate laboratory facilities, poses significant hurdles in the smooth execution of transplant procedures. These issues need to be addressed to enhance transplant services and provide better care to patients with end-stage renal disease (ESRD).

In the context of deceased donor transplantation, several challenges hinder its implementation. The lack of intensive care unit (ICU) infrastructure for identifying, declaring, and managing brain-dead donors is a crucial concern. Furthermore, insufficient awareness among the general population and healthcare professionals about deceased donation, combined with certain socio-cultural and religious beliefs, contributes to the scarcity of deceased donors.

To address these challenges, efforts are underway to raise awareness about organ donation in Bangladesh. Various programs and conferences have been

organized, involving healthcare professionals, the general public, Islamic scholars, and international advisors. Informational leaflets, posters, and donor cards have been developed to disseminate knowledge about the importance of organ donation.

To facilitate deceased donor transplantation, dedicated committees such as the Brain Death Committee and Organ Procurement Committee have been established. Moreover, training programs for transplant coordinators and grief counselors have been initiated to ensure appropriate support and care for both donors and recipients.

While living donor transplants have been the primary focus thus far, the collective efforts aim to pave the way for deceased donor transplantation in Bangladesh. By increasing awareness, enhancing infrastructure, and training healthcare professionals, it is hoped that deceased donor transplantation will become more feasible and accessible in the future.

Country's 1st Deceased donor transplantation took place in January 2023. Whenever the topic of organ transplantation arises, one name instantly comes toto the forefront: Sarah Islam. In a touching gesture, 20-year-old Sarah expressed her desire to donate her organs while on her deathbed, leaving a lasting impact. Sarah's kidneys and corneas were transplanted in four individuals. The collaboration between Bangabandhu Sheikh Mujib Medical University (BSMMU) and the Kidney Foundation made this accomplishment possible.

Human OrganTransplant Act of Bangladesh:

Under the *Human Organ Transplantation Act of 1999*, only close relatives are authorized to donate organs with the sole purpose of saving the lives of other close relatives. This category includes first and second-degree blood relatives, as well as spouses. First-degree blood relatives encompass parents, adult siblings, adult children, while second-degree blood relatives consist of paternal and maternal uncles and aunts. Spouses, encompassing both husbands and wives, are also recognized. Apart from these closely related individuals, no one was legally permitted to donate organs.

In January 2018, the government endorsed a series of amendments to several provisions of the existing law. The updated Act from 2018 broadens the definition of "close relatives" to now encompass third-degree blood relatives, expanding upon the existing donor criteria. In this expanded scope, third-degree blood relatives encompass individuals such as grandparents, grandchildren, and first cousins.[14]

In December 2019, the High Court of Bangladesh enacted a revision to the 2018 legislation, permitting individuals with established relationships beyond relatives to contribute kidneys as donors. This amendment was accompanied by a comprehensive nine-point policy. The revised regulations mandated thorough physical and mental evaluations, alongside an assessment of the "genuine emotional intention" behind known or connected donors' contributions. Additionally, prerequisites such as historical photographs, a three-year financial record to identify significant inconsistencies in income, and other protocols were introduced.[15,16]

Arguments for donation restriction:

Limitations on organ donation are often supported by several key points.

Corruption and Commercialization: Permitting organ sales might lead to a rise in human trafficking, a concern seen particularly in countries like Bangladesh. Even when people know each other, money might still be involved. Stopping secret deals is very hard.

Exploitation: If organs are bought and sold freely, weaker people might be taken advantage of. It's not just about money – imbalances in relationships can also lead to exploitation.

Government projects on Nephrology in Bangladesh:

- *Kidney Disease Prevention and Awareness Programs*: The government of Bangladesh has taken steps to raise awareness about kidney diseases, their prevention, and early detection. These programs aim to educate the public about risk factors, healthy lifestyle choices, and the importance of regular health check-ups.
- *Establishment of Dialysis Centers:*Government has decided to set up 10-bed dialysis centers at each 44 Sodor district hospitals across the country to provide essential dialysis services to patients with kidney diseasesalso to upgrade every medical college hospital with 50-bed dialysis centre. These centers will help to address the growing demand for dialysis and improve access to treatment.
- National Health Programs: Kidney health is integrated into the broader framework of national health programs in Bangladesh. These programs focus on providing accessible and affordable healthcare services to the population, including those with kidney-related issues.

- Increasing Manpower: Government has created for 3 dialysis technicians in every Sodor hospital dialysis center and 3 dialysis technicians for every medical college dialysis center.
- Capacity Building and Training: The government collaborates with medical institutions and universities to provide training and capacity-building programs for healthcare professionals, including doctors, nurses, and technicians. These programs enhance the expertise of medical professionals in diagnosing and managing kidney diseases.
- *Research and Data Collection:* The government supports research initiatives to gather data on the prevalence, causes, and outcomes of kidney diseases in the country. This information is crucial for developing effective strategies to address kidney health issues.

Nephrology trainings in Bangladesh:

In Bangladesh, postgraduate training in nephrology offers two types of courses: MD (Nephrology) and FCPS (Nephrology).

MD (Nephrology): Since 2009, MD residency courses began, focusing on practical training. Before that, only non-residency MD courses were available. Currently, only MD residency courses are available in many institutions like BSMMU, Dhaka medical college, National institute of kidney disease and Urology (NIKDU) and more. These courses last for 5 years, with 2 years in different medicine branches (Phase A) and 3 years in advanced nephrology training (Phase B). Renal transplant training and thesis work are included.

FCPS (Nephrology): After passing FCPS Nephrology Part 1, students undergo 2 years of medicine training before taking FCPS mid-term. Then, 3 years of advanced nephrology training with research work follows, accredited by BCPS in various hospitals. Dialysis and CAPD procedures are available in several institutions, while renal transplant is performed in select ones.

Presently, there are over 300 Nephrologists spread across the entire country, providing their expertise in each district of Bangladesh. Their services encompass the treatment of diverse kidney diseases, as well as the execution of critical procedures including kidney biopsy, vascular catheterization, intermittent peritoneal dialysis (IPD), and Continuous Ambulatory Peritoneal Dialysis (CAPD).

Renal care in private organization:

Bangladesh government through the public hospitals and institutes are gradually improving the Nephrology care countrywide but the bulk of the kidney care including dialysis and transplantation are now being provided by the private nongovernment organizations (NGO) and corporate hospitals. All types renal care is available in these corporate hospitals but beyond the reach of bulk population of the country. Different NGOs are serving the underprivileged citizens with affordable cost.

- *Gonoshasthaya Kendra*, a prominent non-profit organization in Bangladesh provides renal care with affordable cost. The center is the largest dialysis country, was founded with a clear objective: to make dialysis treatment easily accessible to individuals who require it. Operating under a non-profit model, they prioritize dialysis services at the lowest possible cost in Bangladesh according to financial ability of the patients. The treatment cost is according to a health insurance: poor will pay less and rich will pay more with same quality care for all. With highest number of hemodialysis machines, the center serves a substantial volume of patients, providing hemodialysis treatment to around 400 individuals daily. But it's not just about numbers — it's about the transformative impact on each person's life, on their families, and on the community as a whole. This initiative reflects their commitment to addressing the healthcare challenges faced by the underprivileged population in Bangladesh, particularly those suffering from kidney-related ailments.
- *Kidney Foundation:* The Kidney Foundation of Bangladesh is a nonprofit organization providing renal care at low cost and dedicated to quality services in kidney-related issues across the nation. Their efforts encompass a wide spectrum of activities, including offering comprehensive medical care such as dialysis and transplantation services, conducting awareness campaigns to educate the public, advancing research in kidney health, training healthcare professionals, advocating for policy changes, engaging with communities through outreach programs, and collaborating with international partners. Through these multifaceted initiatives, the foundation strives to prevent kidney diseases, improve treatment outcomes, and enhance the overall quality of life for individuals affected by kidney-related health challenges in Bangladesh.
- There are other small NGOs which are active in providing renal care especially dialysis services to the underprivileged population of the country.

Conclusion:

Nephrology burden of Bangladesh is huge and present resources are not sufficient. Every day there is upgradation of all modalities of renal care. As a developing nation Bangladesh is not lagging behind but needs more trained staff and resources to cope up.

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