Internship Training

at

PricewaterhouseCoopers Pvt. Ltd., Delhi

Market Review for Business Expansion Opportunities in Indian Dialysis Industry

by

Name: Dr. Arpita Mehta

Enroll No.: PG/15/016

Under the guidance of

Dr. Manish Priyadarshi

Post Graduate Diploma in Hospital and Health Management
2015-17

International Institute of Health Management Research, New Delhi

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pwc

The certificate is awarded to

Dr. Arpita Mehta

In recognition of having successfully completed his project while doing her Internship in the department of

Management Consulting (Healthcare)

The project was on

Market Review for Business Expansion Opportunities in Indian Dialysis Market
Commenced from

From 20th February, 2017 to 08th May, 2017

In PricewaterhouseCoopers Private Limited

And will be continue working with PwC till 09th June, 2017

She comes across as a committed, sincere & diligent person who has a strong drive and zeal for learning.

We wish her all the best for future endeavors.

Human Capital Department

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TO WHOMSOEVER IT MAY CONCERN

This is to certify that Dr. Arpita Mehta student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone internship training at **PricewaterhouseCoopers Pvt. Ltd, Delhi** from **February 2017 to May 2017**.

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

Dr. A.K. Agarwal
Dean, Academics and Student Affairs
IIHMR, New Delhi

Dr. Manish Priyadarshi
Mentor
IIHMR, New Delhi

Certificate of Approval

The following dissertation titled **"Market Review for Business Expansion Opportunities in Indian Dialysis Industry"** at PricewaterhouseCoopers Pvt. Ltd, Delhi is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Name:	Signature:
Dr. Poonam Rajput	
Dr. A.K. Khokhar	
Dr. Sanjiv Kumar	

Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Arpita Mehta,** a graduate student of the **Post- Graduate Diploma in Health and Hospital Management** has worked under our guidance and supervision. He/ She is submitting this dissertation titled "**Market Review for Business Expansion Opportunities in Indian Dialysis Industry**" at PricewaterhouseCoopers Pvt. Ltd., Delhi in partial fulfillment of the requirements for the award of the **Post- Graduate Diploma in Health and Hospital Management.**

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Dr. Manish Priyadarshi
Designation
IIHMR, New Delhi

Dr. Ashwani Aggarwal
Principal Consultant,
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INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH,

NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled, "**Market Review for Business Expansion Opportunities in Indian Dialysis Industry**", and submitted by **Dr. Arpita Mehta**, **Enrollment No. PG/15/016**, under the supervision of **Dr. Manish Priyadarshi** for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from February 2017 to May 2017 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Arpita Mehta

Signature

FEEDBACK FORM

Name of the Student: Dr. Arpita Mehta

Dissertation Organization: Price Waterhouse Coopers Pvt. Ltd

Area of Dissertation: Market Review for Business Expansion Opportunities in Indian Dialysis Industry

Attendance: Satisfactory

Objectives achieved: Satisfactory

Deliverables: Report delivered on market size, Key players, Market segments, Growth drivers and barriers, Historical trends in market evolution, Expected changes in future

Strengths: Arpita is diligent in her research and output. Her work is mostly on time and is error free. Further her commitment is impeccable and she has displayed it repeatedly in the recently concluded project on commercial due diligence for a potential investor in dialysis market in India. She has a nice grasp on basic fundamentals of Market Analysis and has displayed an admirable attitude to constantly learn new things and improve upon her skill sets. Further she is free from any of the biases and likes to frame her opinion basis available facts and data points.

Suggestions for Improvement: Arpita is encouraged to improve upon her presentation skills. She is expected to increase her work areas from specific task to a workstream management, something which will learn as she spends more time on different assignments. Suggestions for Institute (course curriculum, industry interaction, placement, alumni): It will be great if institute can act as a forum to connect with alumni working in the new organization for the new joinees

Akanksha Aggarwal

DR. AKANKSHA AGGARWAL
PRINCIPAL CONSULTANT

Signature of the Officer-in-Charge/ Organization Mentor (Dissertation)

Date: 12. MAY. 2017

Place: GURGAON

Abstract

Demand for dialysis is growing at a rate of 31 percent in India, compared to eight percent globally. India's high rates of diabetes and hypertension, as well as increased awareness of CKD and treatment options, have contributed to rapid growth in demand for dialysis. Despite the importance of dialysis, more than 90 percent of the 230,000 Indians newly diagnosed with CKD each year die within months due to lack of treatment.

Services are fragmented and largely concentrated in big cities. Also, high prices and the need for frequent treatments make dialysis a financial burden for many patients and unaffordable for others. A kidney transplant is a permanent solution, but availability is extremely limited due to stringent regulation, low kidney donation rates, and poor infrastructure in the country. Moreover, kidney transplants can fail. This makes dialysis a critical alternative for people living with CKD.

Yet dialysis providers have shied away from expanding services as they struggle to make clinics profitable in a low-margin industry. Industry-wide operational inefficiencies, often related to equipment deployment and organizational structure, keep costs high. A shortage of trained nephrologists, nurses, and technical staff has also constrained the expansion of dialysis services. Reaching patients in lower income brackets presents a particular challenge given the reluctance of providers to reduce prices in the face of tight profit margins. All of these challenges have deterred new entrants into the dialysis market, widening the gap between the supply and demand for services.

The current dialysis market size in India is about Rs.2774 Crores (414 million USD) and it is growing at about 15 per cent, annually. In countries like US, hospitals typically only do acute

dialysis or initiation of dialysis after which patients are discharged to standalone centers for long-term chronic dialysis. This is primarily because it is neither cost effective to provide dialysis within a hospital, nor is it a core competency for hospitals since their bandwidth can be spent more effectively on high-end services and in-patient care. All this attribute towards the immense scope in this industry.

However, it is a challenge to provide quality treatment at prices that are affordable to patients across the length and breadth of India. One large challenge is the massive shortage of skilled talent—right from technicians, to nephrologists—in the dialysis sector. We have only about 1300 nephrologists for a billion plus people. The important determinants of success for a dialysis center are a high quality team consisting of nephrologists, clinical team, operations team, having infrastructure cost in-line with revenue per treatment and a strong patient flow to achieve utilization. The need for high quality kidney care is growing across India with limited availability of services in tier 2 and 3 cities in India

The demand for dialysis and transplantation is increasing constantly. The Indian government has included care for kidney disease in its budget 2016, and has currently allocated around Rs.154 Crores (23 million USD) across the country for providing dialysis in all districts of India through the PPP mode. The centers will be managed by the private sector, and the government will reimburse these centers' costs at a predetermined rate.

With the increasing demand for dialysis and increased government's focus in providing these services, the future of this industry has also been projected in this review. The market has been projected to reach around Rs.13400 Crores (2 billion USD) by 2025.

Acknowledgements

I would like to express my deepest appreciation to all those who provided me the opportunity to complete this report. A special gratitude to the healthcare team at PricewaterhouseCoopers Pvt. Ltd., whose contribution in stimulating suggestions and encouragement, helped me to coordinate my project especially in writing this report & improved my presentation skills thanks to their comment and advices.

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Finally, an honorable mention goes to my family and friends for their understanding and supporting me in completing this project.

Thank You

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List of abbreviations

- ARPT : Average Revenue Per Treatment
- BOT : Built Operate and Transfer
- BPL : Below Poverty Line
- CAGR : Compound Annual Growth Rate
- CKD : Chronic Kidney Disease
- CVD : Countervailing Duty
- DM : Doctorate of Medicine
- DNB : Diplomate of National Board
- EBITDA : Earnings Before Interest, Taxes, Depreciation and Amortization
- EPO : Erythropoietin
- ESRD : End Stage Renal Disease
- FY : Financial Year
- HD : Haemodialysis
- NABH : National Accreditation Board for Hospitals & Healthcare Providers
- NABL : National Accreditation Board for Testing and Calibration Laboratories
- NDP : National Dialysis Program
- NHM : National Health Mission
- PD : Peritoneal Dialysis
- PMP : Per Million Population
- PPM : Patients Per Million
- PPP : Public Private Partnership
- RO : Reverse Osmosis
- SAD : Special Additional Duty
- SEEK : Screening and Early Evaluation of Kidney Disease
- USD : United State Dollar

List of appendices

PART A INTERNSHIP REPORT

Introduction to organization

A.1 About PwC

PricewaterhouseCoopers ("PricewaterhouseCoopers" refers to the network of member firms of PricewaterhouseCoopers International Limited, each of which is a separate and independent legal entity) network provide industry-focused assurance, tax and advisory services to build public trust and enhance value for its clients and their stakeholders constituting the world's largest provider of professional services.

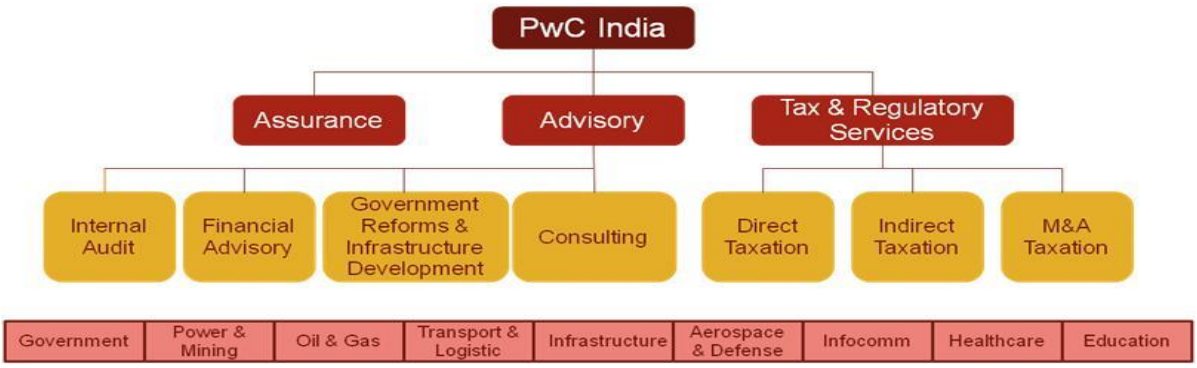
With offices in 157 countries and more than 208,109 people, we are among the leading professional services networks in the world. We help organizations and individuals create the value they're looking for, by delivering quality in assurance, tax and advisory services. PwC network firms provided services to 418 companies in the fortune Global 500 and 443 in FT global 500. PwC network firm registered a gross revenue of Rs.237200 Crores (35.4 billion USD) as on 30 June 2015.Their clients belong to industries like Aerospace and defense, automotive, chemicals, education, entertainment, financial services, healthcare, industrial manufacturing, oil and gas, power and mining, technology and telecom.

A.2 PricewaterhouseCoopers (PwC) in India

PricewaterhouseCoopers Private Limited (India) was incorporated on 26th March 1983. It is one of the largest providers of consulting and advisory services in India, giving services to the private and the public sector and various governments, with a strong team of more than 6000 professionals, having diverse expertise in economics, accounting and financial

management, sociology, information technology, education and training, and various industry segments.

PwC India is a member of the worldwide network of PricewaterhouseCoopers firms. PwC in India has three distinct lines of service– Assurance, Tax & Regulatory Services and Advisory Services. Complementing our depth of industry expertise and breadth of skills is our sound knowledge of the local business environment in India. In India, PwC has offices in Ahmedabad, Bangalore, Chennai, Delhi-NCR, Hyderabad, Kolkata, Mumbai and Pune. The diagram below summarizes PwC India's key service offerings:



A.3 PwC's Global Health Practice

PricewaterhouseCoopers' Healthcare Advisory Services practice focuses exclusively on the health and non-profit sectors, and provides a broad range of integrated business advisory services for health institutions, both under the public sector and private sector domain. This practice has over **3,500 health industry professionals** including **physicians, nurses, information system specialists, health policy analysts, actuaries, financial advisors, and data analysts.**

We currently work with more than 3,000 healthcare organisations around the world representing the entire healthcare delivery spectrum: **integrated delivery systems, hospitals, academic medical centres, research institutes, physician organisations, and pay-for and managed care organisations, employers, acute and sub-acute care sites, home health agencies, medical device and diagnostic and life sciences.** Our engagements are directed at outcomes that provide strategic guidance, policy change, preserve revenues, reduce costs, mitigate compliance issues, identify and reduce risks, facilitate business combinations that deliver competitive advantage and deliver socially committed delivery in an efficient manner. PwC has deep experience working with leading healthcare organisations around the globe, including the following regions:

- **India and Bangladesh**: Ministry of Health and Family Welfare, Government of India; Ministry of Health, Government of Bangladesh; The World Bank, International Finance Corporation (IFC); United Nations Population Fund (UNNFPA); United States Agency for International Development (USAID); Department for International Development (DFID); Department of Health and Family Welfare (DOHFW) of various state governments in India; Apollo Hospitals; Max Healthcare; Fortis Escorts; Narayana Health; Columbia Asia

- **Asia Pacific**: Kohno Clinical Medicine Research Institute, Japan; Healthcare Organization (Caress Sapporo), Japan; Makati Medical Centre, Philippines; Phyathai Hospital, Thailand; Bangkok Dusit Medical Services, Thailand; Hong Kong Hospital Authority; Hong Kong

- **Middle East**: Hamad Medical Corporation, Qatar; General Authority for Health Services, Abu Dhabi; Dubai Healthcare City; Ministry of Health, Government of Libya
- **South America:** Leading pharmaceutical and hospitals in Argentina and Brazil; National Cancer Institute and National Insurance Authority in Costa Rica

A.4 PwC's India Health Practice

PwC's Health Industries Advisory is a leading advisor to healthcare organizations, including payers, providers, health sciences, biotech/medical devices and pharmaceutical organizations in the public, private and academic sectors. With a thorough understanding of the needs and issues of each segment, as well as the complex interrelationships of these sectors, we are able to help our clients address issues and take advantage of new and existing opportunities. The practice has extensive experience in growth and strategy consulting including Greenfield builds, expansions, and new market entry and public-private partnerships.

We have worked in most of the regions and town types and have assessed their healthcare delivery environment for standalone strategy assignments as well as due diligences for investment companies. Our healthcare team comprises of Physicians and Managers with hospital and health management experience which strengthens our client delivery process. We work with other horizontal teams specializing in various roles like strategy, operations, finance effectiveness and technology. We share our deep commitment to improving global health and have shown this through investment in our people and dedication to healthcare.

With engagements in every sector of the healthcare industry, PwC's healthcare practice at India has earned the trust and confidence of governments and healthcare organizations. We have helped governments implement major health reforms and public health policy initiatives.

We have helped private enterprises implement strategies and solutions to achieve their performance objectives.

Scope of services:

a) **For payors:** Public and private payers need to prepare themselves for the following:
   - Operate in a competitive market
   - Develop strategies to decelerate rising medical costs
   - Maximize return on IT investment
   - Simplify administrative practices. E.g. Transition from one coding system to another, such as from ICD-9 to ICD-10.
   - Introduce innovative new products
   - Develop end-to-end management of members overall health.
   - Work collaboratively with employers, members and providers for mutual benefit

b) **For providers:** Providers need to adapt their services and business processes to keep both patients and their bottom lines healthy. We can help providers in many ways:
   - Maximize benefits and return on investment by adopting health IT
   - Enhance revenue and accelerate cash flow

- Capture a bigger share of a competitive market where boundaries between providers and retail businesses are becoming blurred
- Minimize risk and reduce the cost of regulatory compliance
- Leverage scientific advances to offer personalized and preventive medicine
- Explore mergers and acquisitions to expand service offerings, build scale and improve financial performance

c) **For new entrants**: The healthcare field is no longer limited to traditional providers such as hospitals and physicians. Increasingly, makers of specialty foods and nutritional supplements, manufacturers of fitness apparel, telecommunications and technology companies, retailers of consumer goods, wellness clinics, fitness centers, health spas, financial services companies, etc. are involved in providing products and services. They sometimes supply it in competition with traditional providers, other times in partnership. Both traditional players and new market entrants need to understand the complex market forces of the industry. They need to anticipate trends and capitalize on consumer demands and regulatory reforms that enable rapid change.

d) **For private investors**: Without any aid, neither the public nor the private sector can afford the entire financial burden of providing healthcare. Increasingly, healthcare systems are turning to public-private partnerships (PPPs). Traditionally, PPPs financed the building of hospitals, clinics and other infrastructure. We estimate that

OECD and BRIC nations will spend around Rs.24120000 Crores (3.6 trillion USD) on healthcare infrastructure between 2010 and 2020. Although this is a sizeable opportunity, healthcare spending, excluding infrastructure, will total more than Rs.456270000 Crores (68.1 trillion USD) or 95% of health costs. PPPs are emerging as a new and compelling model for funding not just infrastructure but also business operations and care delivery needs.

PART B DISSERTATION REPORT

Chapter 1 Introduction

Chronic diseases have become a major public health problem. Chronic diseases are a leading cause of morbidity and mortality in India and other low- and middle-income countries. The chronic diseases account for 60% of all deaths worldwide. Eighty percentage of chronic disease deaths worldwide occur in low- and middle-income countries. (1) In India, the projected number of deaths due to chronic disease was around 5.21 million in 2008 and is expected to rise to 7.63 million in 2020 (66.7% of all deaths) (2)

Kidneys are significant organs that contribute to one's overall well-being. But when kidneys function at only below 10 to 15 percent of their normal capacity, they cannot effectively do their job, such as remove waste or excess fluid from your blood.

The burden of Chronic Kidney Disease (CKD) is increasing in alarming proportion all over the world. In India due to lack of financial resources, trained manpower & infrastructure leads to severe strain on existing health policies in the light of the increasing burden of CKD. End stage renal disease (ESRD) is the last stage (stage five) of CKD. When CKD, polycystic kidney disease (PKD) or other kidney diseases develop into ESRD, dialysis or a kidney transplant becomes necessary to live.

CKD is a worldwide public health problem, both for the number of patients and cost of treatment involved. Globally, CKD is the 12th cause of death and the 17th cause of disability, respectively. This is an underestimate as patients with CKD are more likely to die of cardiovascular disease (CVD) than to reach ESRD. Approximately 30% of patients with diabetes mellitus (DM) have diabetic nephropathy and with the growing number of DM patients and aging population there is likely a parallel increase in CKD incidence.

Dialysis is one of the first technological innovations in medicine - and the only treatment that does not involve transplant, and yet allows a patient with end stage organ failure to live long, healthy and productive lives. Currently, about 2.4 million people are alive on dialysis worldwide.

Dialysis removes the waste chemicals that accumulate in the blood because the failed kidneys are unable to excrete them. It can be done in two ways: hemodialysis in which the blood is taken out of the body and passed through a machine, and peritoneal dialysis, in which a natural internal membrane lining the abdomen is used to clear the blood. The first one is typically done at dialysis facilities, whereas the second one is done at home. Since the "waste" accumulation is continuous, dialysis must be repeated at regular intervals. This is critical, since the long-term and repetitive nature of this treatment has major health and economic implications.

In India, dialysis is reserved for the affluent and insured population. Everyone else faces crippling long term expenditure and descent into deep poverty. It is estimated that about 200,000 new patients develop end-stage kidney failure every year in India. Even though

about 70-80% of them actually start dialysis, resource limitations force about two-thirds of the starters to withdraw and be condemned to death. Most of these patients are young, in the prime of their lives - family breadwinners or homemakers. Losing them has devastating impact not only on the families but brings down the productivity of entire society and reduces the national income.

1.1 Rationale

As the size of the middle class has grown, the number of people seeking - and staying on - dialysis is increasing. Dialysis centers, till recently the preserve of large cities, are opening regularly even in smaller cities, thus bringing the treatment close to patients' homes. Estimates put the number of patients on dialysis in India currently at about 100,000. India’s demand for dialysis is growing at a rate of 31 percent, compared to 6 percent in the US and 8 percent in the rest of the world owing to the increased burden of non-communicable diseases.

Patients on dialysis have complications related to many other organ systems - the main ones being cardiovascular disease, lack of production of red blood cells, and abnormal bone health. All this requires regular monitoring, ideally by nephrologists, of whom there are only about 1600 in the entire country (just about 1.3 for every million Indian). Similarly, the number of trained dialysis technicians and nurses is woefully small.

Also, with the increased emphasis from the government in form of the National Dialysis Program, service providers have an opportunity to expand in the PPP segment too. The demand supply gap will definitely widen in future posing a huge potential highlighting a large unmet need, and therefore an opportunity for business expansion in the Indian market.

1.2 Objective

- To provide detailed analysis of the current scenario in the Indian dialysis market
- To provide insights about the competitive landscape in the Indian dialysis industry
- To provide country level analysis of the market with respect to the current demand supply gap and the expected trends in future
- To study the role of government in dialysis and the impact of National Dialysis Program in the market
- To project the future scope of the Indian Dialysis Market

Chapter 2 Literature review

2.1 Disease burden

Prevalence of chronic kidney disease: In the absence of registries or data banks similar to the United States Renal Data System (USRDS) in the U.S., it is difficult to get accurate data on kidney disease. However, studies done in some population groups in India give us insight into the problem.

A study done in a southern Indian village by Mani showed that about 0.09% of the population had a glomerular filtration rate (GFR) of less than 15 mL/min, or Stage 5 CKD. (3)

A population-based study by Agarwal et al, in which 4,700 adults were screened in New Delhi, suggested that 0.78% of the population in India had some form of kidney disease, and a study by the Screening and Early Evaluation of Kidney Disease (SEEK) group in India suggested that about 13% of the population studied had some form of kidney disease. (4) (5)

A very elegant study done in one of the central Indian towns of Bhopal by Modi and Jha suggested a crude incidence of end-stage renal disease of 151 per million and age-adjusted incidence of 232 per million. (6)

This is the closest estimate we would have of the incidence of ESRD in the general population, because all residents of this town had health insurance. What is also interesting to note is that the average age of the ESRD population in India is 47 years, much younger than the data from the United States Renal Data System (USRDS), and that diabetes is present in 44% of the population of ESRD patients in India, which is similar to the rate in the

developed world. There is also evidence that, because of lack of medical facilities, poor control of risk factors, and delayed referral to nephrologists, there is a much more rapid progression of CKD in the Indian population than in developed countries.

The approximate prevalence of ESRD is 800 per million population (pmp), and the incidence of end-stage renal disease (ESRD) is 150-200 pmp. **(7)**

Gravity of the end-stage renal disease burden: A very conservative estimate of the ESRD burden, based on a population of 1.1 billion, is that 1,650,000 to 2,200,000 people develop ESRD in India annually, of whom only 10% or less receive treatment. The rest die every year, which means that approximately 150,000 to 200,000 people die of ESRD in India annually. This does not account for the deaths due to cardiovascular disease related to CKD. The total deaths from ESRD alone are far more numerous than those caused by any natural calamity known.

Etiology of ESRD in India: The spectrum of causes of ESRD in India is changing. Though chronic glomerulonephritis and chronic interstitial nephritis were deemed to be important causes of ESRD in the past, now diabetes has emerged as the most important cause of ESRD, accounting for 30-44% of new cases (Table 2.1) (6) (8) This is because of an increased prevalence of diabetes in India, as well as increased awareness and detection of renal disease in the diabetic population. The rise in diabetes is consistent with the worldwide rise in diabetes as a contributor to ESRD.

Table 2.1.1: Etiology of CKD

Disease	*Percentage*
Diabetic Nephropathy	*31.29*
Chronic interstitial nephritis	*19.69*
Chronic glomerulonephritis	*17.77*
Arteriolar nephrosclerosis	*11.76*
Chronic pyelonephritis	*10.49*
Focal glomerulosclerosis	*3.89*
Polycystic kidney disease	*2.41*

2.2 Treatment of ESRD in India

CKD is a devastating medical, social, and economic problem for patients and their families in developing countries like India, where there is a large disparity in the internal distribution of wealth. Much of the huge population does not have access to basic amenities like sanitation and safe drinking water, let alone basic health care. Because even the most essential and elementary health care is unavailable, there is almost no opportunity for ESRD treatment for most Indians. The vast majority of patients with ESRD in developing countries are not accepted for any renal replacement therapy at all. The acceptance rate in India is only 3-5 per million population. (9)

For ESRD patients in economically advanced countries, the focus now is on improving quality of life and increasing survival. In marked contrast, developing countries are grappling with short-term patient survival and the enormous cost of therapy, which limits continuation of treatment for the majority of patients with ESRD. Most of the developing world has a 2-tier health care delivery system. In the government-run nonprofit hospitals, patients do not have to pay for medical advice, basic examinations, or treatment, but they must pay for disposables and drugs. However, in many private hospitals, patients do have to pay for any services. Figure 2.1 gives figures depicting the presence of nephrologists in India compared to other countries, demonstrating a shortage in the country (10). It is estimated that there are about 1.6 HD units per million people, and about 40,000 people are currently on HD in our country (11).

The few patients who seek dialysis usually come late, critically ill and with no permanent vascular access. The attrition rate is very high.

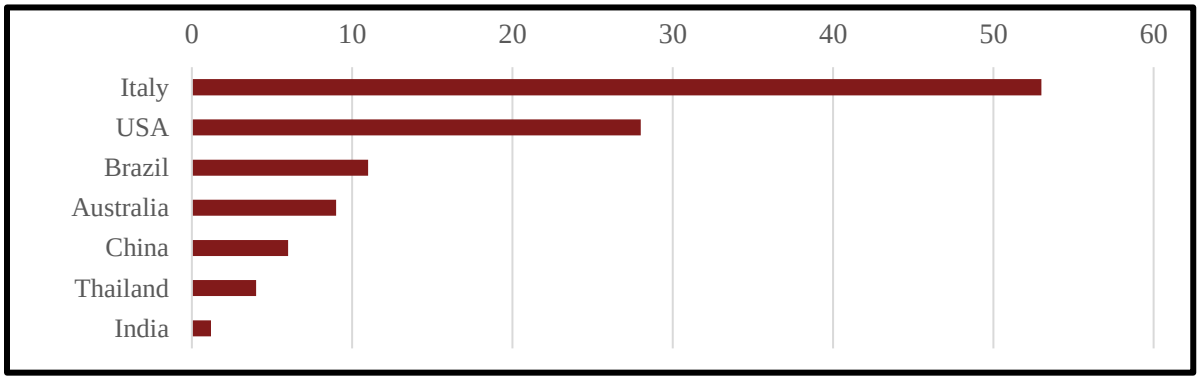


Figure 2.1: Nephrologist per million population

For the treatment of any disease, availability and affordability are two important issues. There is lack of adequate number of nephrologists (currently ≈ 1,000), hemodialysis (HD) units and the cost of treatment makes the treatment inaccessible for most. There is also unequal

distribution in the availability of the nephrology services with only 9% and 2.5% of the nephrologist in the East and Central India, respectively (7)

2.2.1 Hemodialysis

Most patients with ESRD are begun on HD as opposed to other modalities. Only a small proportion (<0.5%), usually those who are older, more affluent, and unsuitable for transplantation, start continuous ambulatory peritoneal dialysis (CAPD). Of the patients who begin HD, about 60% are lost to follow-up within 3 months. Presumably these patients drop out of therapy because they realize that HD is not a cure and has to be performed over a long period, and the high cost of hemodialysis will impoverish them. Approximately 9-13% of patients die within 1 year of the beginning of treatment. Between 17% and 23% of patients undergo renal transplantation after being on dialysis for 2-3 months for pre-transplant stabilization. Although about 4% of patients remain on maintenance HD, very few stay on it longer than 24 months. Only 4% of patients can pay for renal replacement therapy from their pooled family resources; the other 63% take help from their employers or accept charity, 30% sell property and jewelry, and 20% take out loans (12) (13).

In India, the prescription for HD typically is empiric. Data on the adequacy of such dialysis schedules are not available. Rao et al reported a short study indicating that Kt/V was >1 in about 50% of the HD sessions studied (12). Many patients are on HD twice or even once a week or receive only emergency dialysis for pulmonary edema. Most patients continue to suffer from uremic symptoms on such dialysis schedules and long-term survivors are few and

far between (13). There has been a significant improvement in the standards of HD in the recent past in some select centers (14). In most Indian centers, water treatment, if any, consists only of deionization. Often, water analyses are not performed before the required water treatment is decided upon. Very few centers have proper water treatment system with pre-filters, UV, and reverse osmosis. Water testing facilities do not exist everywhere. Water quality is tested infrequently or never. In the South Indian states, government sponsored programs like Rajiv Arogyasri in Andhra Pradesh (AP) and Chief Ministers' Health Insurance Scheme25 in Tamil Nadu (TN) provide for free dialysis and transplantation for the poor. The government pays the private hospitals via a health insurance company. However, the only way equity of therapy, accessibility and cost can come down in the long run is by improving the infrastructure in the government hospitals. Few nongovernment organizations (NGOs) like the Tanker Foundation in TN and Kerala offer subsidized treatment for the poor.

2.2.2 Continuous ambulatory peritoneal dialysis (CAPD)

Only a very small population (<0.5%) of patients on renal replacement therapy are on continuous ambulatory peritoneal dialysis (CAPD). Mostly these are older, more affluent, and unsuitable for transplantation. Unfortunately, CAPD is more expensive than HD in India and the dropout and infection rates are high. Most patients receive

3 empiric 2-liter exchanges per day. (15)

2.2.3 Renal transplantation

In the absence of adequate dialysis facilities, renal transplantation remains the only hope of survival for ESRD patients in developing nations. Utilization of cadaveric kidneys is poorly

organized in Asian countries. Most of these countries do not have organ procurement organizations, with the possible exceptions of Singapore and Hong Kong. In India, despite the organ transplant bill having been passed in 1994, no national organ sharing network has been established. With very little cadaver transplant activity in the country, the onus of procurement and transplantation depend on the initiative of the individual transplant physician and the crucial role of cooperating intensive care units. Most of the 3,000 or so transplantations in India done per year are with organs from living relatives (30-40%) or living people unrelated to the patients (50-60%). Cadaver transplants account for a very small percentage of the transplants performed. The cost of maintenance immunosuppression is a problem and infections remain a major problem in the transplant group. (16)

2.3 Finances of renal replacement therapy

The cost of an HD session in India ranges from Rs. 1350 (USD 20) to Rs.2700 (USD 40), including the procedure costs and the costs of disposables (dialyzer, blood lines, concentrate, etc.). Many hospitals and satellite dialysis clinics do not make money from HD and can incur losses. The cost of establishing an arteriovenous fistula ranges from Rs.1000 (USD 15) in government hospitals to Rs.10000 (USD 150) in private hospitals. The cost of erythropoietin is approximately Rs.27000 (USD 400) per month. As a consequence, only 30% of Indian hemodialysis patients receive erythropoietin therapy. In India, erythropoietin costs are as much twice as the cost of dialysis. The cost of CAPD for 3-4 exchanges of the double bag system is between Rs.30000 (USD 450) and Rs.40000 (USD 600) per month. The cost of

transplantation varies with the immunosuppression and the procedure costs vary between Rs.1 Lakh (USD 1,520) and Rs. 3.5 Lakh (USD 5,000) in different centers.

Financial burden of ESRD in India

India has a population of 1.3 billion and it is growing. The per capita annual income is about Rs.35510 (USD 530) and about 30% of the population lives on less than Rs.7370 (USD 110) per year. It costs anywhere between Rs.3 Lakh (USD 4,440) and Rs.6 Lakh (USD 8,880) per year for any kind of renal replacement therapy, and this is obviously unaffordable for the vast majority of people in India. There is no health insurance for renal replacement therapy in India, and for most patients the cost is met through charity, family, friends, and philanthropic organizations.

Taking a very conservative approach, if all patients with ESRD were to be treated, at least 1 million patients would be in the ESRD program over a period of time. At an average cost of Rs.4.5 Lakh (USD 6,600) per year for renal replacement therapy, the cost burden would be over Rs.43550 Crores (USD 6.5 billion) per year, while the health care budget for all of India is about Rs.23450 (USD 3.5 billion). Obviously, this is a cost the country cannot afford.

Chapter 3 Methodology

This review is a Descriptive study carried out on dialysis service providers and beneficiaries in India**.** The research methodology consists of an ideal mixture of primary and secondary methods of data collection. Key steps involved in the process are listed below:

Information procurement: This stage involved the procurement of market data or related information via different sources & methodologies

- Primary Research: Primary interviews with nephrologists, equipment manufacturers and distributors. Interviews were conducted telephonically and by using a checklist as a tool.
- Secondary Sources: Included government statistics published by organizations like WHO, NGOs, World Bank etc., Company filings, Investor documents etc.

Information analysis: This step involved the analysis & mapping of all the information procured from the previous step. It also encompasses the analysis of data discrepancies observed across various data sources.

Market formulation: The final step entails the placement of data points at appropriate market spaces in an attempt to deduce viable conclusions. The inputs from subject matter experts also supported the formulation of market sizing in this step.

Figure 3.1: Information Procurement

The data collection technique used for primary data collection was by the use of a semi-structured interview in order to explore the areas of concern. A checklist was used as a data collection tool to conduct interviews with industry experts.

3.1 Current Scenario of Indian Dialysis Market

3.1.1 Market size estimation

The Indian dialysis market is currently valued atRs.2774 Crores (414 Million USD) and is in its growth phase. Dialysis procedure involves usage of dialyzer machine, dialysates, and other consumables for the removal of wastes from patients. These dialysis devices are used in the

treatment of kidney failure. The market has evolved in developed countries and has a great potential for growth in developing countries like India. The vendors are focusing on increasing the dialysis centers, advanced treatment modes, and incorporating novel technologies in renal dialysis services, to improve the patient's quality of life.

Dialysis service is provided by both the government and private institutions. For the purpose of estimating the current market size, dialysis machines in the country are segregated in the following heads:

- Government sector- The machines available in the government hospitals .Their maintenance is solely the responsibility of the government. This segment excludes the machines under the PPP arrangement.
- Public Private Partnership- The dialysis service is provided usually by the private provider whereas the space and basic amenities for operations like water & electricity is provided by the public partner (government).Currently, includes PPP of two private players.
- Private Hospitals – This includes hospitals operated under the private ownership who have their own in-house dialysis services.
- Organized Dialysis Service Providers- This includes stand-alone dialysis service providers who provide dialysis in a hospital (outsourced) or their exclusive centers.

Table 3.1.1: Current Market Estimation- Sources

Market Size Estimation	Sources
Estimated the total machines in market	Industry sources
Identifying the market segments	Primary/secondary
Estimated patients in different segments (Volumes)	Secondary sources (assuming 70% utilization*300 working days*3 sessions/week)
Estimated no. of machines in different market segment	Primary/secondary
Estimated the number of machines in different cities	Industry sources
Estimated the ARPT	Primary/secondary
Estimated the HD market	Volumes*ARPT
Estimated PD patients	HD patients/90/10
Monthly cost of PD	Secondary sources
Estimated the PD market	PD patients*Monthly cost of PD*12
Total Dialysis market size	HD market + PD market

Segment	No. of machines	Source
Government	3,841	Industry sources (20%)
PPP	896	Secondary research
Private	14,272	Industry sources
Organized players	2,043	Secondary research
Total	21,052	Industry sources

Table 3.1.2: Method of Market Estimation

	2016	Method of Estimation
India Population (Billion)	1.33	Literature review
ESRD Prevalence	0.08%	Literature review
Number of ESRD patients	1,061,600	Population*10^9*ESRD prevalence
Maximum Sessions per HD patient	3	3
Total Sessions required	165,609,600	Number of ESRD patients* Maximum Sessions per HD patient*52 weeks
Machines in the market	21,052	Industry Sources
Total Sessions Possible	18,946,800	Machines in the market*3*300
No. of Sessions per Patient	2	Literature review
Utilization	70%	Industry sources
Total sessions conducted	13,262,760	Utilization*Total Sessions Possible
Number of patients on HD	127,527	Total sessions conducted/52/No. of sessions per patient
% of HD patients	90%	Industry sources
% of PD patients	10%	Industry sources
No. of patients on PD	14,170	Number of patients on HD/% of HD patients*% of PD patients

ESRD patients on Dialysis (HD+PD)	13%	Literature review
Total HD Market Size (only Dialysis) – Mn USD	301	The total number of patients on HD was split in the same ratio as the number of machines in 4 segments*revenue per treatment in each segment
Total HD Market Size (Including EPO and Lab) – Mn USD	361	20% mark up for pharma(including EPO), Consultations and investigations done at center
Monthly cost of HD Per patient	197	Total HD Market Size (only Dialysis) Mn USD *10^6/ Number of patients on HD/12
Cost of PD as a % HD cost (PD Multiplier)	1.30	Industry sources
Monthly cost of PD Per patient	256	Monthly cost of HD Per patient* Cost of PD as a % HD cost (PD Multiplier)
Total PD Market Size (Only PD) – Mn USD	44	Monthly cost of PD Per patient* No. of patients on PD*12/10^6
Total PD Market Size (Including EPO and Lab) – Mn USD	52	20% mark up for pharma(including EPO), Consultations and investigations done at center
Total Dialysis Market (HD, PD, EPO and Lab)-Mn USD	414	Total HD Market Size (only Dialysis) Mn USD+ Total PD Market Size (Including EPO and Lab) Mn USD
ARPT (USD) - Without EPO and Lab	22.7	Total HD Market Size (only Dialysis) Mn USD*10^6/ Total sessions conducted

Source: PwC Analysis

3.2 Competitive Landscape of the Dialysis Service providers

The insights about the current providers in the dialysis market was obtained through the secondary method of data collection. Relevant information was reviewed and validated in the primary interviews with industry experts like nephrologists and equipment manufacturers of these service providers. Documents like company websites, annual reports, financial documents, etc. were referred to while collecting this data.

3.3 Supply Demand Dynamics

The supply demand gap of the dialysis services in top 30 cities of India by population was also considered while understanding the current market and projecting the future scope of the market in India.

3.3.1 Calculating demand for machines

Assumption: The demand supply deficit has been calculated assuming using a prevalence of ESRD as 800 pmp and number of sessions required per patient in a week as 2.

- Total number of patients requiring dialysis= Population (2016)*ESRD prevalence
- Total number of sessions needed= Total number of patients requiring dialysis*2*52
- Total number of machines needed= Total number of sessions needed/3/300/0.7
- Total working days in a year – 300
- Machines are assumed to be operational at their peak utilization of 70%

3.3.2 Supply of machines

The supply of dialysis machines available per million population was mapped state wise across the country from the data providing details about the number of machines in all cities of India which was obtained in the primary research to identify the areas saturated with these services.

3.3.3 Supply of nephrologists

The yearly supply of nephrologists was also studied as a critical factor in understanding the supply of dialysis services in the country.

The deficit was then calculated by subtracting the supply of machines from the number of machines needed (demand) and was plotted against the per capita income of the respective cities.

3.4 Role of PPP and Government initiatives

The insights about the role of government in the dialysis market was obtained through the secondary method of data collection. Relevant information was reviewed and validated in the primary interviews with industry experts from the leading dialysis equipment manufacturing companies like Fresenius and B.Braun.

3.5 Future Projections of the Indian dialysis industry (2025)

The future of Indian dialysis industry was calculated based on the following assumptions:

- ESRD prevalence increases from the current 0.08% to 0.11% (at a CAGR of 2%) in the most realistic case
- The percentage split of Hemodialysis : Peritoneal dialysis remains as 90:10
- Growth rate of machines

  The number of machines continues to grow at the current rate of 15% till 2020. It is assumed to dip to a rate of 12.5% from 2020 to 2025; 10% from 2025 to 2030 and at

7.5% through 2030 to 2036. (Source: Industry sources revealed that the growth will definitely dip owing to the limited number nephrologists after a time and also the affordability factors in Tier 2 & Tier 3 cities come in play)

- The share of machines in the PPP sector is assumed to increase from the current 4% to 15% owing to the government's focus on providing dialysis services in all districts across the country.
- The share of machines in the private sector is assumed to decline from the current 68% to 55% owing to the increased share of machines in the PPP sector.
- The share of machines in the government sector is assumed to decrease from the current 18% to 8% owing to the government's focus on providing dialysis services in all districts across the country.
- The share of machines in the organized players sector is assumed to increase from the current 10% to 22% owing to the increased prevalence of ESRD and growing awareness among people.
- The number of sessions per week is assumed to increase to 2.2 from the current 2 in the future.
- The price increase per session is assumed to be 3% in PPP sector, 5% in private sector, 3% in government sector and 5% in the organized player segment. (Source: The price increase for all these sectors was assumed to be 3% for government and 5% for the private sector by obtaining the prices for dialysis services in these sectors over a period of 2-3 years, as the data could be made available.

Table 3.5.1: Future Market Estimation

	2016	Future Assumptions
India Population (Billion)	1.33	Growth rate 1.2%
ESRD Prevalence	0.08%	Growth rate 2%
Number of ESRD patients	1,061,600	Population*10^9*ESRD prevalence
Maximum Sessions per HD patient	3	3
Total Sessions required	165,609,600	Number of ESRD patients* Maximum Sessions per HD patient*52 weeks
Machines in the market	21,052	Refer Assumptions
Total Sessions Possible	18,946,800	Machines in the market*3*300
No. of Sessions per Patient	2	2.2
Utilization	70%	77%
Total sessions conducted	13,262,760	Utilization*Total Sessions Possible
Number of patients on HD	127,527	Total sessions conducted/52/No. of sessions per patient
% of HD patients	90%	Refer Assumptions
% of PD patients	10%	Refer Assumptions
No. of patients on PD	14,170	Number of patients on HD/% of HD patients*% of PD patients

ESRD patients on Dialysis (HD+PD)	13%	(Number of patients on HD+ No. of patients on PD)/ Number of ESRD patients
Total HD Market Size (only Dialysis) – Mn USD	301	The total number of patients on HD was split in the same ratio as the number of machines in 4 segments*revenue per treatment in each segment
Total HD Market Size (Including EPO and Lab) – Mn USD	361	20% mark up for pharma(including EPO), Consultations and investigations done at center
Monthly cost of HD Per patient	197	Total HD Market Size (only Dialysis) – Mn USD *10^6/ Number of patients on HD/12
Cost of PD as a % HD cost (PD Multiplier)	1.30	Industry Sources
Monthly cost of PD Per patient	256	Monthly cost of HD Per patient* Cost of PD as a % HD cost (PD Multiplier)
Total PD Market Size (Only PD) – Mn USD	44	Monthly cost of PD Per patient* No. of patients on PD*12/10^6
Total PD Market Size (Including EPO and Lab) – Mn USD	52	20% mark up for pharma(including EPO), Consultations and investigations done at center
Total Dialysis Market (HD, PD, EPO and Lab)-Mn USD	414	Total HD Market Size (only Dialysis) – Mn USD+ Total PD Market Size (Including EPO and Lab) – Mn USD
ARPT (USD) - Without EPO and Lab	22.7	Total HD Market Size (only Dialysis) – Mn USD*10^6/ Total sessions conducted

The utilization of machines is dependent on the number of patients who are undergoing dialysis and also the average number of sessions a patient undergoes.

	2016	2025
Sessions/week	2	2.2 (assumed)
Utilization	70%	77%

The utilization of dialysis machines is dependent on the both the number of patients who are taking dialysis (currently, ~1, 27,000) and also on the average number of sessions (currently, 2) a patient undergoes. The utilization for 2025 is calculated using simple unitary method.

Chapter 4 Results and Discussion

4.1 Current Scenario of Indian Dialysis Market

In India, the ESRD prevalence is 0.08% (800 pmp), of which only about 142,500 patients manage to undergo dialysis. Patients undergoing hemodialysis are 125,000 and the remaining 17,500 undergo peritoneal dialysis in the ratio 90:10 as validated by several primary interviews. The remaining 7500 undergo kidney transplants. (17)

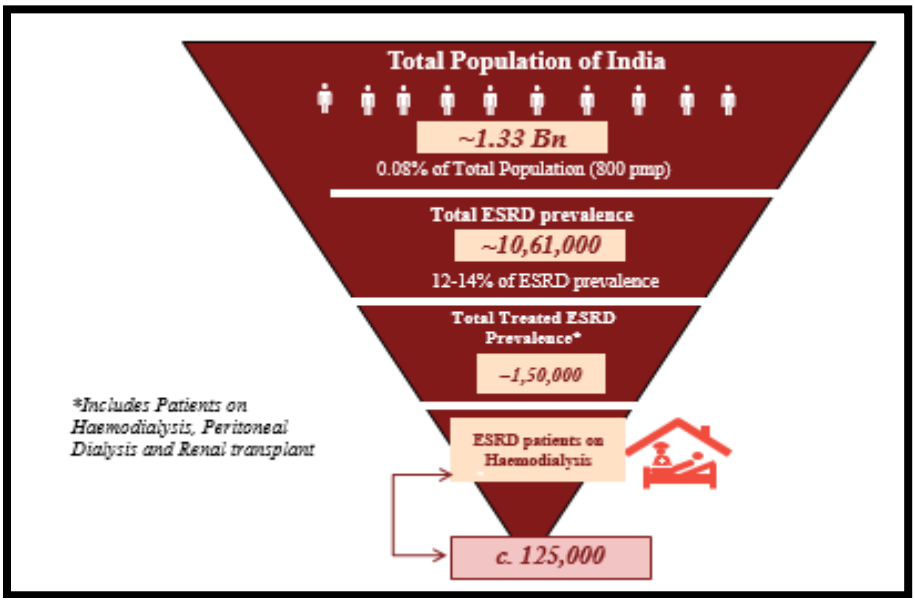
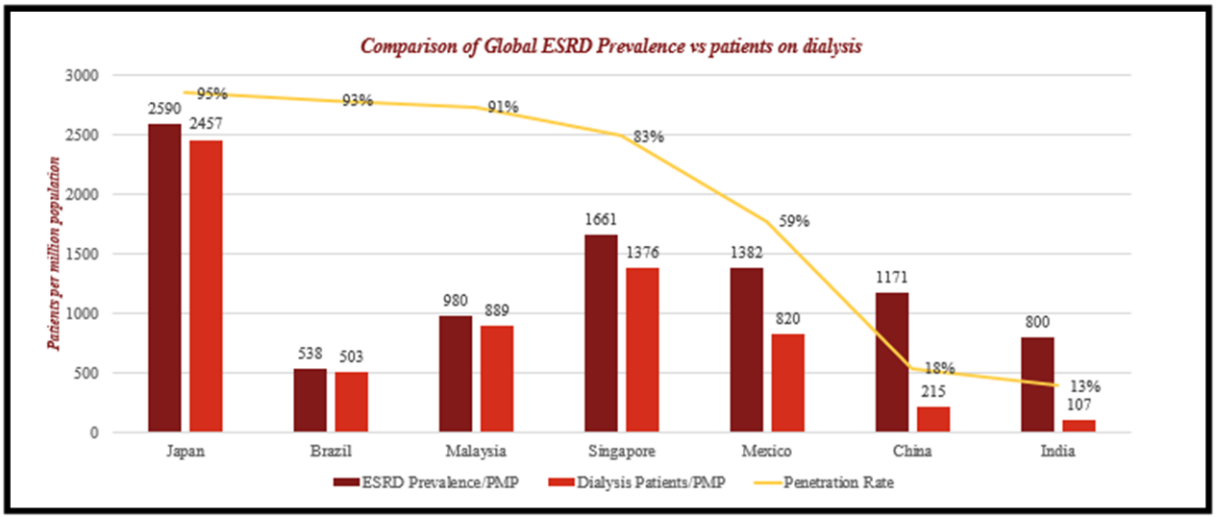


Figure 4.1.1: Patients undergoing dialysis

India with 13 % ESRD patients undergoing dialysis, both hemodialysis and peritoneal dialysis has one of the lowest penetration rate whereas countries like Japan have a penetration rate of up to 95%.



(Includes Patients on HD & PD) *Source: bmcnephrol.biomedcentral.com, vision-fmc.com, msn.orgnrdo.gov.sg*

Figure 4.1.2: Dialysis Penetration Rate

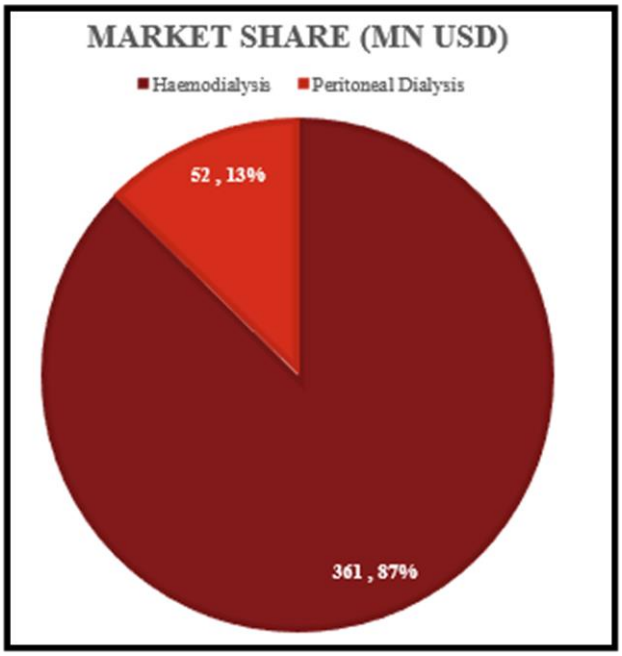
Due to poor compliance issues, dialysis patients in India undertake only 2 sessions per week against the recommended 3 sessions.

Table 4.1.1: Current and future trends in dialysis

	Current Trends	Future Trends
High Prevalence	More than 13 million existing ESRD patients with 220,000 new patients added annually	Patient load is expected to increase with increasing burden of ESRD risk factors (Diabetes Mellitus & Hypertension)
Low diagnosis and treatment rate	Approx. 12-14% patients diagnosed and receive some form of treatment (18)	Treatment rate is expected to rise with increasing healthcare affordability* and accessibility
Low dialysis penetration	Only 10-12% patients undergo Dialysis. (16 dialysis machines ppm) (18)	Penetration rate expected to improve further with expected growth in dialysis centers
Poor compliance	Only affluent and insured patients take 3 sessions per week	Compliance is likely to improve with increasing affordability and inclusion of dialysis in some of the insurance plans

**Average monthly per capita household out of pocket medical expenditure was ~146 INR in urban areas and ~95 INR in rural areas (2011-12 estimates, National Health Profile 2016*

The current Indian dialysis market (2016) is valued at Rs.2774 Crores (414 million USD) with Hemodialysis having around 90% market share.



Source: Jeloka et al, Indian Journal of Nephrology, 2012
Monthly cost of 3 PD session per day is ~1.5x the monthly cost of 2 HD sessions per week.

Figure 4.1.3: Market Share of HD

Valued at Rs.2419 Crores (361 million USD), the Indian Haemodialysis market has grown at a CAGR of 15% over the last five years and is expected to continue growing at the same rate over next five years.

Table 4.1.2: Current HD Market in India

Service Providers	Dialysis Machines		Patients on Dialysis^^^	Revenue per treatment (USD)^^^	Revenue (in USD million)^^	
	Number	Percentage			Number	Percentage
Government Sector*	3,800	18%	23,000	9-10	26	7%
Public Private Partnership**	900	4%	5,400	14-17	10.9	3%
Private Hospitals^!	14,300	69%	87,000	25-28	289.9	80%
Organized Dialysis Service Providers***	2,000	9%	11,500	22-25	34.6	10%
Total	21,100	100%	1,27,000	NA	361	100%
Growth Rate (For last 5 years)	~15% CAGR		~15% CAGR	~4.5% CAGR	~19.5% CAGR	

*Excluding PPP, ^^Conversion Rate: 1 USD = 67 INR,20% mark up for pharma(including EPO), Consultations and investigations done

**Includes PPP of B Braun and Nephroplus ^^^ Numbers rounded off ^Does not include organized players

*** In Hospital or standalone

Growth drivers for dialysis market in India:

- Increasing affordability
    - Average per capita healthcare expenditure grew almost four times between 2004 and 2014
    - Percentage of households with income between Rs.850-4500 (13-67 USD)/day expected to double from 25% in 2015 to 46 % in 2025; middle class constitutes 20% (267 million) people in 2016 and is expected to reach 32% (475 million) by 2030 (19)

- Government initiatives
    - National Dialysis Program (Lowering of excise duties and Rs.151.4 Crores (22.6 Mn USD) allocated for setting up dialysis centers in each district in PPP model)
    - Movement of government from being a Provider to Payor

- Sector organization
    - Increased participation from organized players (with economies of scale and lowered COGS, improved operation, lower infection rate, lower seroconversion rate)

With around 80% of machines are in the private sector; organized dialysis service providers are expected to play a major role in meeting the future demand of dialysis.

Private hospitals are expected to partner with these chains to provide dialysis services to their inpatients and outpatients.

4.2 Competitive Landscape

There are around 6 key dialysis service providers in the organised sector. Based on their number of machines, number of centres and the volumes of patients they cater to, they were included in the study to understand the current market scenario.

Table 4.2.1: Competitive Landscape

	Apex	**Nephroplus**	**DCDC**	**B.Braun**	**DaVita**	**Sparsh**
Year Of Inception	2008	2009	2009	2009	2009	2010*
Overview	Founded by 5 nephrologists	Founded by Vikram Vuppala, S. GudiBanda and K. Shah	Founded by Mr. Aseem Garg	Equipment Manufacturer Company in PPP Model	Partnership between DaVita Inc. and NephroLife Care (India) Pvt. Ltd.	Founded by Gaurav Porwal and Saurav Panda
Number Of Centres	46	96	67	35	19	55
Sessions per month	27,000	52,000	14,000	24,000	12,500	18,000
Price per session (USD)	20-21	24	19	16	31	19-21
Dialysis machines	450	973	397	400	250	369
Revenue(FY16)	6.6 Mn USD	9.6 Mn USD	2.6 Mn USD	4.6 Mn USD	3.6 Mn USD	2.9 Mn USD
EBITDA	21%	3%	12%	-	-50%	14%

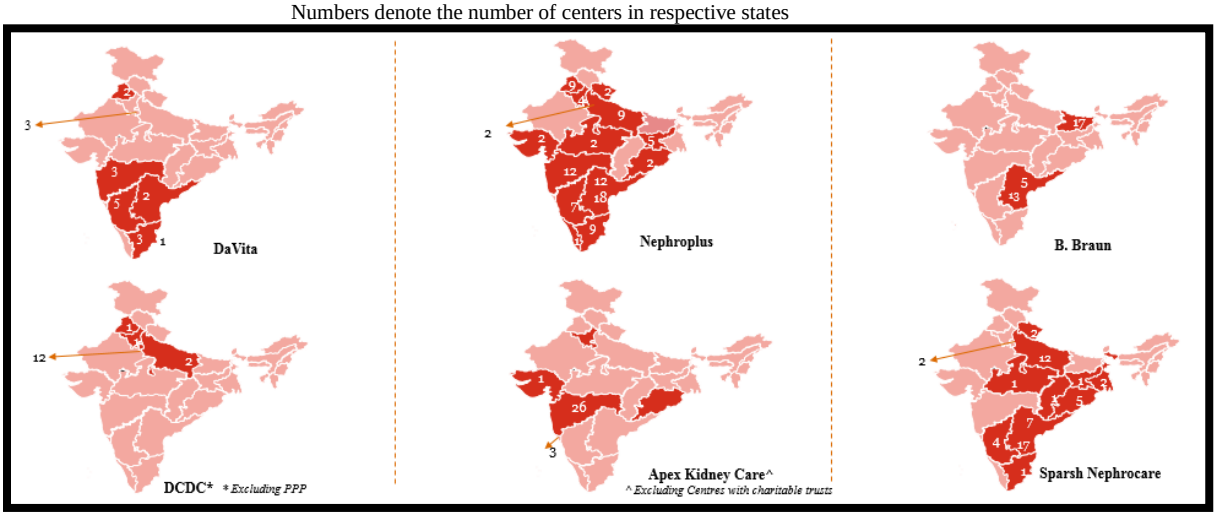
Source: Industry Reports and Discussions, MCA

* Fresenius Medical care has bought 85% stake in Sparsh in 2016

Geographic Presence

Nephroplus and Sparsh are two pan India players with 96 and 55 centers respectively. DaVita is concentrated in the south, DCDC in the north and Apex caters mainly in the state of Maharashtra.

Numbers denote the number of centers in respective states



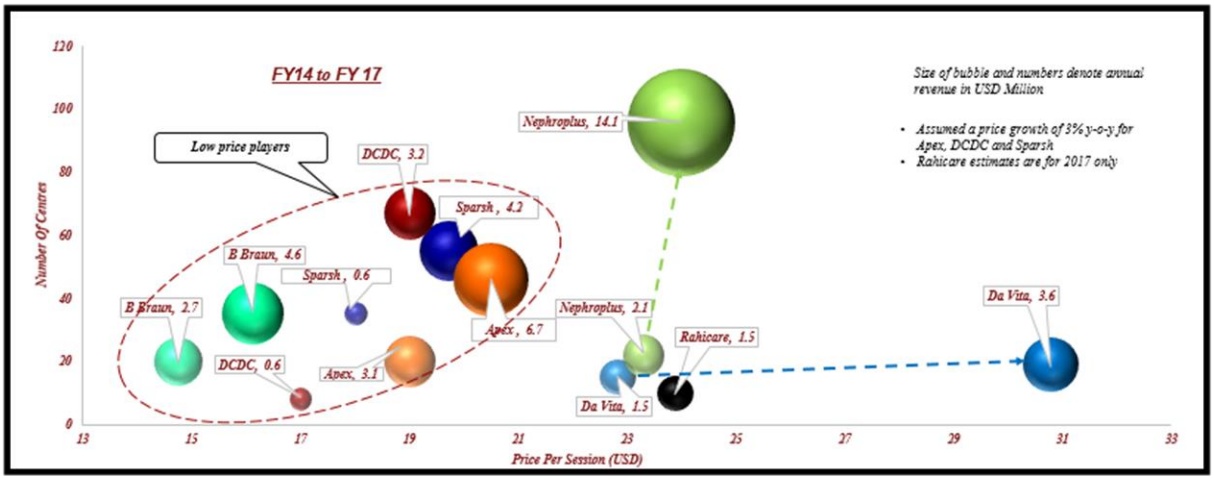
Source: PwC Analysis

Figure 4.2.1: Geographic Presence of Organized Players

B.Braun has all of its 35 centres operational under the PPP mode with the government of Andhra Pradesh, Telangana & Bihar. The government pays Rs1200/- per each dialysis out of which Rs.1080/- (about USD 23) is paid to B. Braun and Rs.120 is paid to the respective hospital/medical college. Under the project the government also mobilizes patients, whereas the government hospitals provide space, uninterrupted power supply, water supply, clinical nephrologist, clinical responsibility for the patients, as 90% of staff are hired within the state-run hospitals. This project, therefore, considered as cost-effective.

Rahicare, with around 10 centres in the north India region also provides dialysis services. However, no substantial information was available in the public domain.

Nephroplus is the largest player with a revenue of Rs.94.5 Crores (14.1 million USD) (FY 17), while DaVita commands the highest price premium.



Source: PwC Analysis

Figure 4.2.2: Comparative positioning of the organized players through FY14-17

The graph shows the market position of various organised dialysis service providers in terms of the number of centres and their average price per session from FY14-17. The size of the bubble represents their annual revenue.

Nephroplus has 37% of the total revenue amongst the top 7 Organized Dialysis Service Providers.

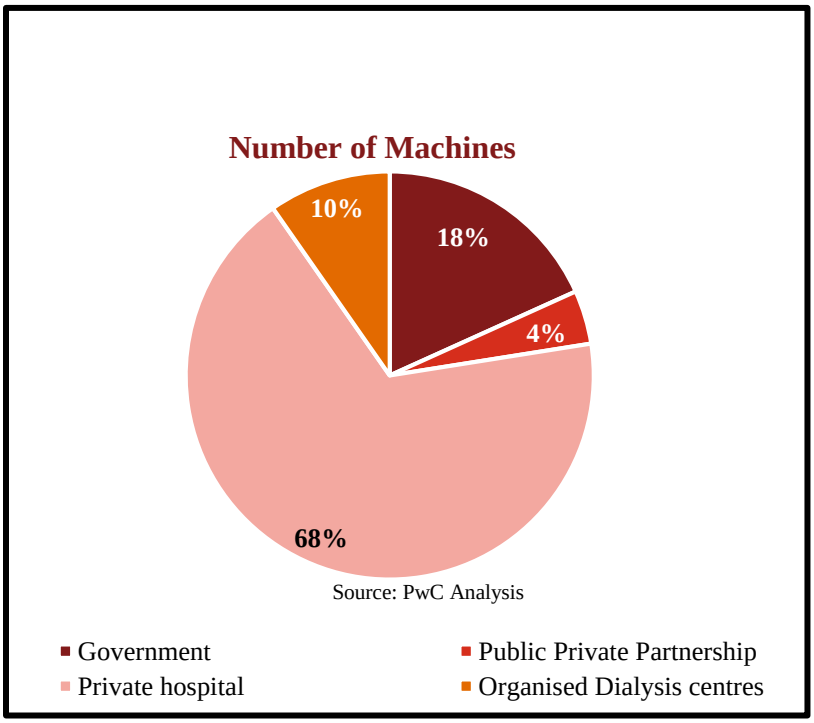


Figure 4.2.3: Overview of the total dialysis market

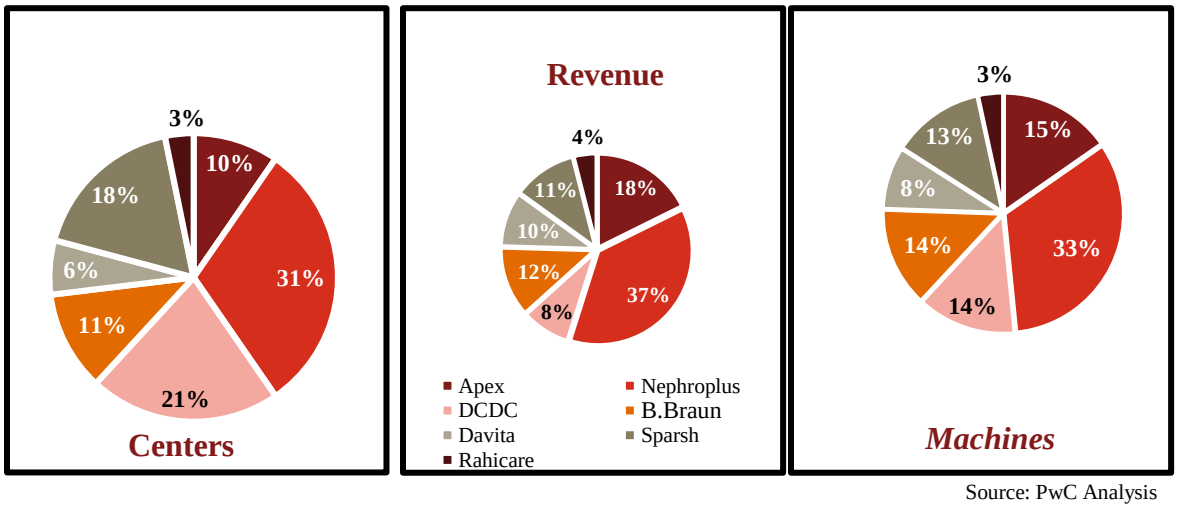
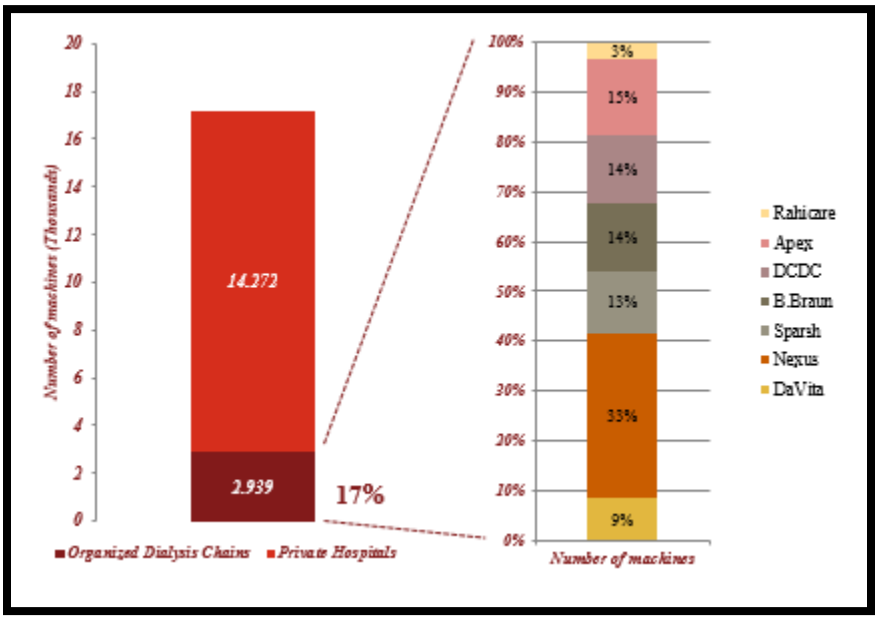


Figure 4.2.4: Overview of the organised dialysis market

Organised dialysis centres comprise 17% of the total private player market, with Nephroplus alone having more than one-third of this share.



Source: PwC Analysis

Figure 4.2.5: Share of the organised players in total private player market

A similar comparison of the dialysis services in leading hospitals of the country was also done.

Table 4.2.2: Comparison of Dialysis services in leading hospitals

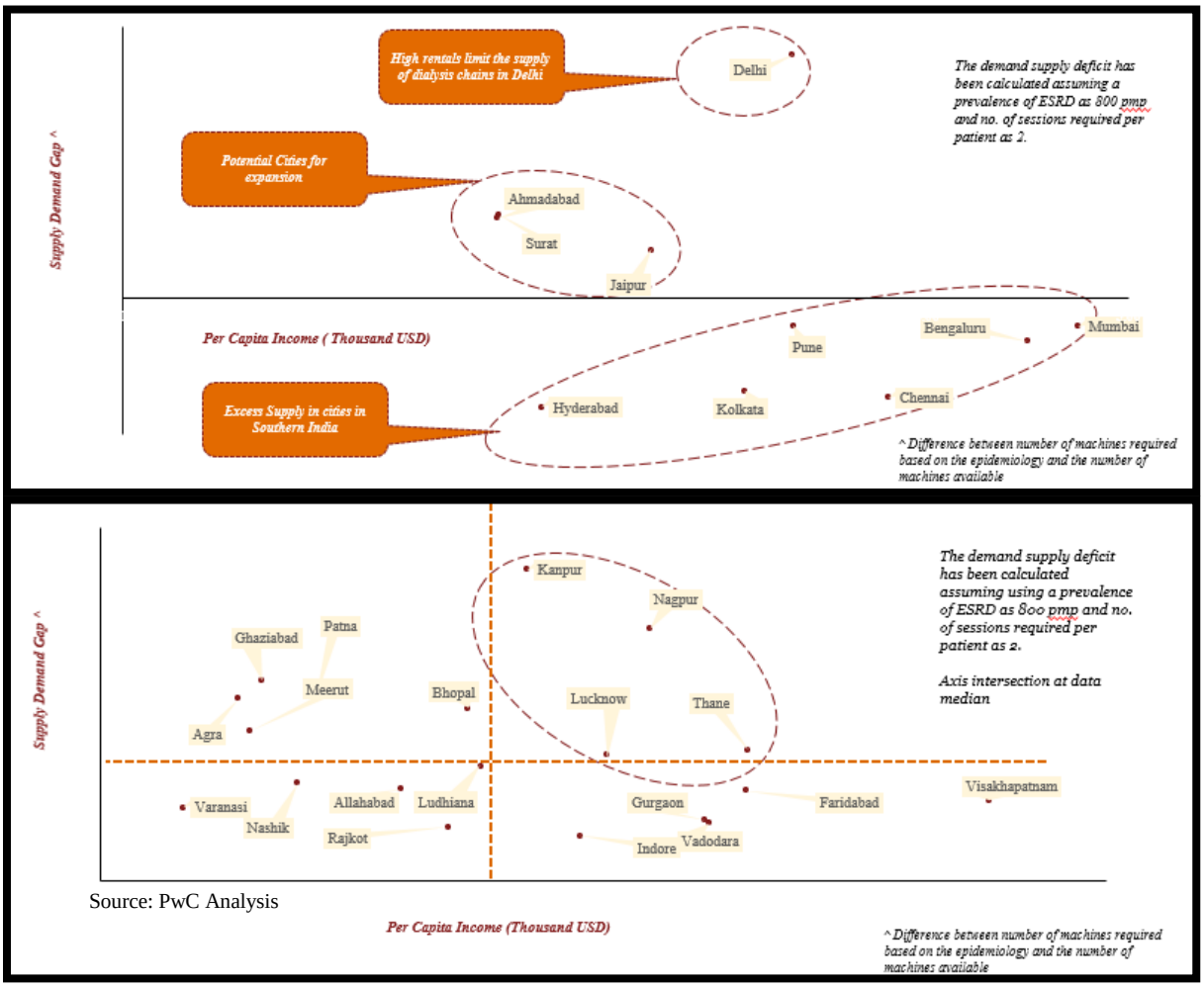
	Apollo	Columbia Asia	Fortis Hospital	Manipal Hospital	Max Hospital
Year of inception	1983	2005	2001	1991	1985
Current Bed Strength	~8200	~1000	~4000	~2000	~2,200
Dialysis cost (single use) in USD	44-66	36-49	32-49	23-38	32-52
Dialysis cost (reuse) in USD	24-39	25-39	25-40	19-28	24-27
Sessions per month	20,0000	3,500	14,500	11,000	12.000
Number of machines	250	50	200	150	150

Source: PwC Analysis

4.3 Supply Demand Dynamics

a) Demand – Supply Deficit vs. per capita income

- Among the top 30 cities of India (by population), cities like Hyderabad, Pune, Kolkata, Chennai, Bengaluru and Mumbai revealed an excess supply of dialysis machines (negative demand supply deficit).
- Delhi showed the highest demand supply deficit with respect to dialysis services owing to high rentals and wafer thin margins in this industry.
- Ahmedabad, Surat, Jaipur, Kanpur, Nagpur, Lucknow and Thane were seen as potential cities for expansion.



Source: PwC Analysis

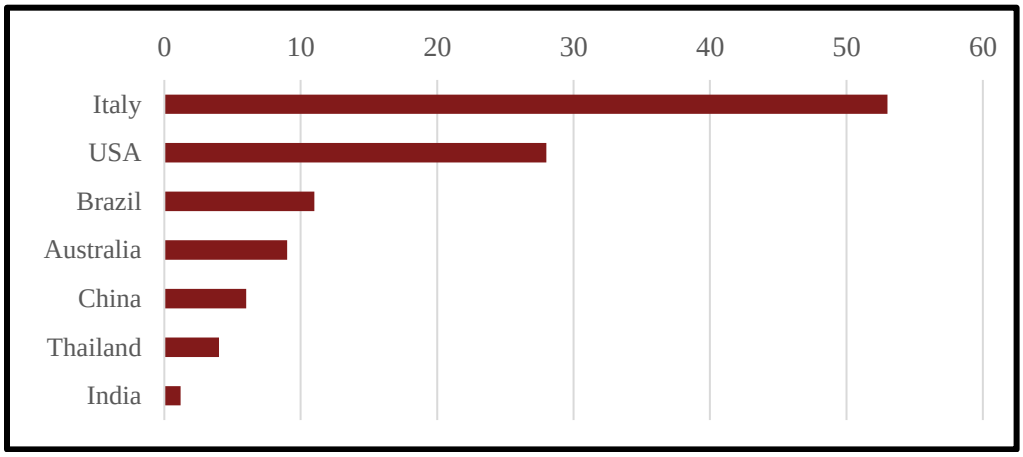
Figure 4.3.1: Demand-supply deficit in top 30 cities of India

b) Supply of nephrologists

It also surfaced as a significant factor in projecting the current and future of dialysis in the country. The limited number of nephrologist in the country limits the availability of dialysis services in the country. At present, there are about 1300 nephrologist in the country which amounts to around 1 nephrologist per million population. Developed countries like USA and Italy have 28 and 53 nephrologists, respectively, per million

population. Countries like Brazil and China are also ahead of India with 11 and 6 nephrologists, respectively, per million population.

It was found during the secondary research that around 162 nephrologists are added every year. Assuming additional increase of 40 nephrology seats and 5% drop out every 5th year, the number of nephrologist per million is expected to improve to 3 in the next 20 years.



Source: Sharif et al, The global Nephrology Workforce; Emerging threats and potential solution, 2014

Figure 4.3.2: Nephrologist per million population

4.4 Role of PPP and Government initiatives

PPP scenario in India:

- Operating model:
    - Service Provider provide medical human resource, dialysis machine along with RO water plant infrastructure, dialyzer and consumables
    - Payor Government provide space in District Hospitals, Drugs, Power, water supply and pay for the cost of dialysis for the poor patients

- Financial Model:
    - 100 % of the service procedure fees for patients from below poverty line (BPL) is covered by the government.
    - However, non BPL patients gets the treatment at the same rates as paid by the Government for the BPL patient
    - RSBY covers dialysis up to its maximum coverage. The additional resources required are provided under the National Health Mission

- Benefits to the government:
    - Increases supply
    - Reduced financial burden as there is less capital involved
    - Improved operational efficiency
    - Increased Quality of care to the patients by the private players
- Prevailing Players:
    - Nephroplus in Andhra Pradesh , Tamil Nadu ,Telangana & Karnataka
    - DCDC In Delhi And Madhya Pradesh
    - B.Braun in Andhra Pradesh ,Telangana & Bihar
    - Heritage Hospital in Uttar Pradesh
    - Soni Hospital in Rajasthan

In most of the RFP's for PPP in dialysis the provider is required to provide dialysis machines and other basic infrastructure. Role of public partner is limited to supply of space, water and electricity.

Table 4.4.1: RFP's For PPP

		PPP (Bangalore, Himachal Pradesh)		PPP (Madhya Pradesh)		PPP (Rajasthan)		PPP (Haryana)	
S.no.	Services	Player	Hospital	Player	Hospital	Player	Hospital	Player	Hospital
1	Dialysis Machines	✓		✓		✓		✓	
2	RO plant	✓		✓		✓		✓	
3	Bedside monitors	✓		✓		✓		✓	
4	Emergency services	✓			✓	✓		✓	
5	Air conditioners	✓		✓		✓		✓	
6	IT & Communications	✓		✓		✓		✓	
7	Housekeeping	✓		✓		✓		✓	
8	Consumables	✓		✓		✓		✓	
9	Inventory management	✓		✓		✓		✓	
10	Linen	✓			✓	✓			
11	Manpower/HR	✓		✓		✓		✓	
12	Gas supply		✓		✓		✓		
13	Security	✓				✓			
14	Medical Records Department	✓		✓		✓			
15	Electricity		✓		✓		✓		✓
16	Water		✓		✓		✓		✓
17	Space		✓		✓		✓		✓
18	Laundry		✓			✓			✓
19	Sterilization		✓		✓				
20	Biomedical waste disposal	✓			✓				✓
21	Power Backup	✓		✓		✓			

Source: esic.nic.in, health.mp.gov.in,eproc.rajasthan.gov.in haryanahealth.nic.in

Drivers for PPP in India:

- Government initiatives:
  - Government is gradually moving from a being a provider to a payor for dialysis
  - According to the National Dialysis Services Programme was announced in the Union Budget 2016-2017, funds will be made available under the National Health Mission, to provide dialysis services in all district hospitals

- Certain parts of dialysis equipment have been exempted from basic customs duty, excise/CVD and SAD

Barriers for PPP in India:

- Low Realization & Payment Risks:
  - Low average realization per treatment
  - Payment risk. Inordinate delays up to 12 months
  - Service provider can only raise invoice only after a minimum of 12 cycles

Table 4.4.2: PPP Centers in India

Player	State	No. Of Centres	No. Of Machines	Avg. Machines per centre	Year of award of PPP	Rate per treatment (INR)
B.Braun	Telangana	5	69	13	2012	1000
	Bihar	17	160	9	2014	1080
	Andhra Pradesh	13	171	14	2010	1000
Nephroplus	Andhra Pradesh	12	118	10	2012	950
	Tamil Nadu	1	15	15	2014	1280
	Karnataka	1	25	25	2016	750
	Telangana	2	37	18	2012	1280
DCDC	Delhi	3	40	13	2013	1080
	Madhya Pradesh	1	2	2	2016	450
Apollo	Tamil Nadu	1	9	9	2010	1280
Rahicare	Uttarakhand	1	17	17	2010	1000
Heritage Hospital	U.P	2	14	7	2015	NA
Soni Hospital	Rajasthan	1	NA	NA	NA	NA

Source: PwC Analysis

PPP in Andhra Pradesh & Telangana:

- Signed MOU with B. Braun to open 11 dialysis centres in eleven tertiary care state-run hospitals.

- B.Braun to establish and operate dialysis centres on a Build Operate and Transfer (BOT) basis for a period of seven years.
- The objective is to serve 1000 patients per month with help of 111 dialysis machines and replicate the model in other parts of the country.
- The dialysis is provided free of cost to the patients. While the government pays Rs.1200 per each dialysis out of which Rs.1080 is paid to B.Braun and balance goes to the respective Medical College.

PPP in Bihar:

- Round-the-clock services are being provided at The Hem-Dialysis Centers in partnership with B. Braun Medical India at subsidized rates.
- There is an agreement for setting up 24 dialysis centers under PPP model, out of which 17 are already operational (13 district hospitals and four medical colleges located in 17 districts).
- The cost of dialysis sessions at these centers has been fixed at Rs.1500 per session.

National Dialysis Programme

Pursuant to announcement in Union Budget 2016-17 regarding starting of 'National Dialysis Programme' under NHM, the Pradhan Mantri National Dialysis Programme was rolled out in 2016. The State/UT wise approvals accorded under National Health Mission (NHM) based on proposals received from the States/UT in 2016-17 (up to December, 2016) for provision of free dialysis services to the poor is placed below:

Table 4.4.3: Amount approved under NDP

S.no.	State	Amount approved under NDP (in Lakh INR)	No. of proposed/approved dialysis centres*
1	Bihar	2000	24
2	Karnataka	2000	27
3	Madhya Pradesh	1874.64	48
4	Andhra Pradesh	1170	Info. not available
5	Uttar Pradesh	1051.2	57
6	West Bengal	737	Info. not available
7	Maharashtra	673.41	23
8	Jharkhand	630	8
9	Chhattisgarh	600	Info. not available
10	Rajasthan	500	Info. not available
11	Goa	499	-
12	Tamil Nadu	425.99	31
13	Haryana	400	14
14	Uttarakhand	400	6
15	Assam	360	Info. not available
16	Gujarat	300	Info. not available
17	Delhi	300	Info. not available
18	Jammu & Kashmir	200	Info. not available
19	Odisha	200	Info. not available
20	Tripura	192	5
21	Telangana	140	14
22	Manipur	115.2	3
23	Arunachal Pradesh	100	Info. not available
24	Himachal Pradesh	100	Info. not available
25	Meghalaya	100	Info. not available
26	Punjab	100	21
27	Nagaland	46.74	Info. not available
28	Kerala	40	Info. not available
29	Sikkim	25	Info. not available
	Total	15280.2	281

* Information not mentioned in publicly available secondary domain

Around Rs.15280 Lakh has been allocated to 27 states/UT for setting up new PPP centers under the national dialysis programme.

As per the guidelines, the private partner is to provide medical human resource, dialysis machine along with Reverse Osmosis (RO) water plant infrastructure, dialyzer and

consumables, while the space, power, and water supply within District Hospitals is to be provided by the State Government.

Immediately after announcement in Union Budget 2016-17, based on study of relevant models on dialysis services being operated under PPP mode in States and consultation with experts in this field as well as private service providers, the guidelines including model Request for Proposal (RFP) were developed and released on 7th April 2016 itself. Thereafter all States were requested to incorporate proposal in their NHM Programme Implementation Plans. A total of 400 proposals were submitted out of which 270 have been accepted. Around 1500-1800 machines are likely to be added under this programme.

4.5 Future projections

The dialysis market is expected to grow at a steady pace. The market is driven by the increasing incidence of chronic kidney diseases, diabetes, and hypertension, mostly among the older population. The number of individuals with various kidney disorders is increasing at a high rate due to their lifestyle and food habits.

Challenges for the dialysis market in India

- Presence of substantial uninsured population especially in low-income countries
- Low penetration rate of home-based PD products and services owing to its high cost
- Low awareness about kidney diseases and their treatment modalities

Growth Drivers

- Increasing prevalence/incidence of kidney disorders

  ESRD is the last stage of chronic kidney disease. The common causes of ESRD are diabetes and hypertension. As a result, there is a huge demand for dialysis in the market. According to the IDF, more than 300 million people live with diabetes worldwide. Also, according to WHF, nearly 970 million people worldwide have elevated blood pressure. The number of individuals treated for ESRD worldwide was estimated to be about 3,400,000 at the end of 2014 and is expected to grow at a rate of 6% every year.

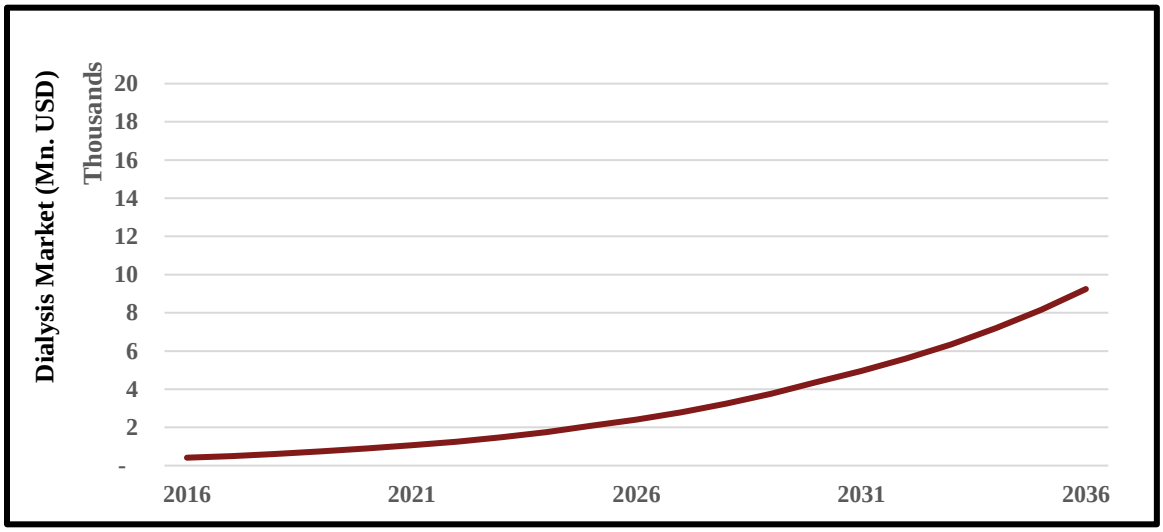
- Increase in aging population

  According to multiple research studies, in 2014, estimated that the number of people aged 60 years and above would reach 2 billion by 2050. More than 22% of the world's population will be over 65 years of age by 2030. The older population is more susceptible to chronic diseases such as CKD and other kidney related disorders, as they are more prone to chronic illnesses. Nearly one-third of the aging population over the age of 65 years is affected by diabetes and hypertension. The increase in the aging population is one of the primary contributors to the market growth of peritoneal dialysis. The older people are more susceptible to kidney-related disorders especially ESRD, owing to gradual loss of immunity power.

- Expanding middle-class group, increasing number of insured population, and growing awareness levels
- Entry/Expansion activities of dialysis service providers

- Increase in public and private investments to modernize and improve healthcare infrastructure
- Government initiatives through PPP

In the most realistic case, the total dialysis market size including the 20% markup for lab investigations and erythropoietin is derived to be around Rs.13400 Crores (2.079 billion USD) by 2025 against the current size of Rs.2774 Crores (414 million USD). The market is observed to be growing by a CAGR of 20% till 2025.



Source: PwC analysis

Figure 4.5.1: Indian Dialysis Market-Future

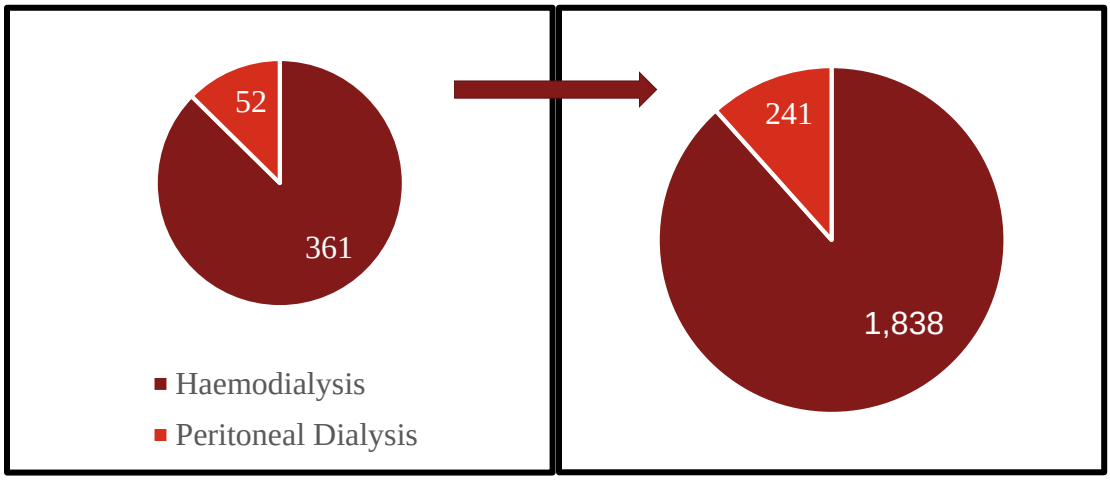
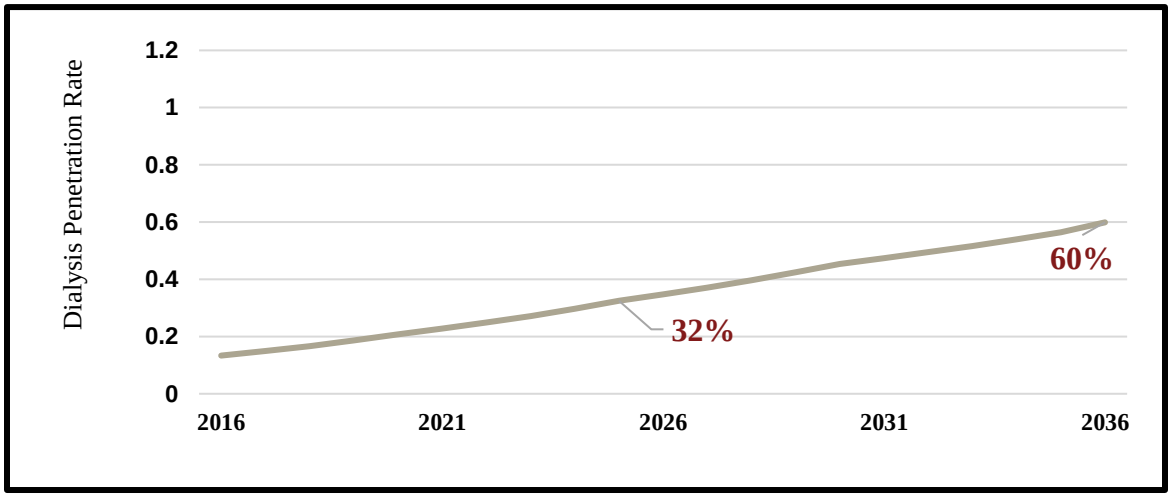


Figure 4.5.2: Share of HD & PD in future

The dialysis penetration rate is seen to grow to 32% by 2025 from a meagre 13% currently.

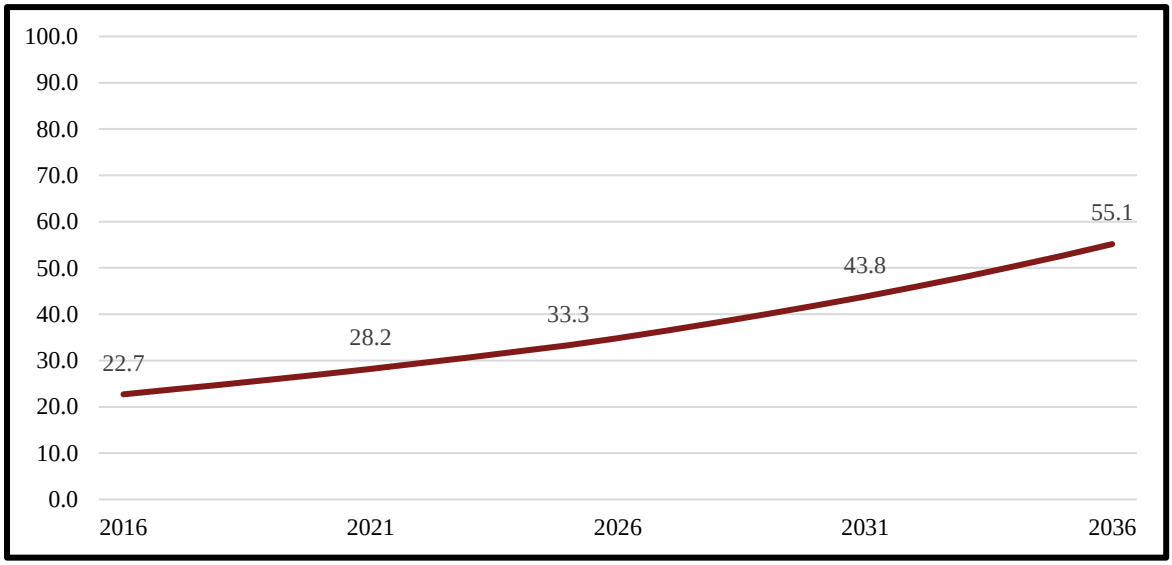
{Patients on dialysis= Total patients undergoing dialysis (HD+PD)/Number of ESRD patients}



Source: PwC analysis

Figure 4.5.3: Dialysis Penetration Rate- Future

With the use of the above mentioned assumptions, the average revenue per treatment is projected to increase from Rs.1500 (23 USD) to Rs.2200 (33 USD) in 2025 with a CAGR of 4%. {ARPT= Total HD market size (dialysis only)/total sessions conducted}



Source: PwC analysis

Figure 4.5.4: Average ARPT

The number of machines in the dialysis market increase from the current 21,052 to 36,820 till 2020 (increasing at the rate of 15%) and grows to 66,351 by 2025.

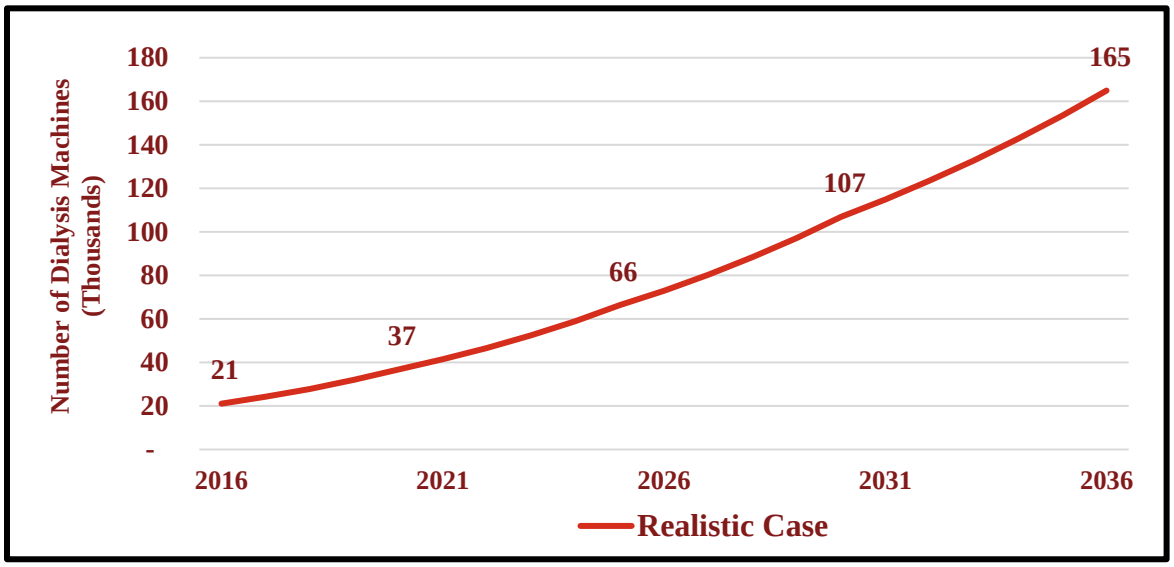


Figure 4.5.5: Number of machines- Future

Share of machines

The share of machines in both private hospitals and the government hospitals is expected to decline due to the outsourcing of the dialysis services by private hospitals to the organized chains and investment by government in this industry via PPP model.

	2016	2025
PPP	4%	15%
Private	68%	55%
Government	18%	8%
Organized Dialysis Service Provider	10%	22%

It can thus be said that the PPP and the organised dialysis service providers will increase at the cost both the private and government hospitals.

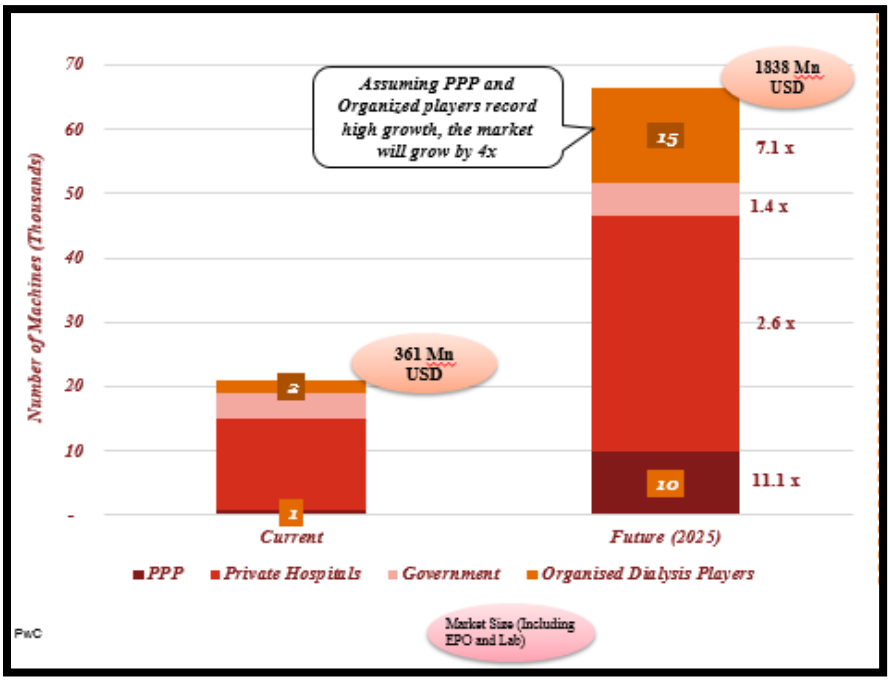


Table 4.5.1: Future Projections

	2016	2025
India Population (Billion)	1.33	1.48
ESRD Prevalence	0.08%	0.09%
Number of ESRD patients	1,061,600	1,374,350
Maximum Sessions per HD patient	3	3
Total Sessions required	165,609,600	1,374,350
Machines in the market	21,052	66,351
Total Sessions Possible	18,946,800	59,715,881
No. of Sessions per Patient	2	2.2
Utilization	70%	77%
Total sessions conducted	13,262,760	45,981,228
Number of patients on HD	127,527	401,934
% of HD patients	90%	90%
% of PD patients	10%	10%
No. of patients on PD	14,170	44,659
ESRD patients on Dialysis (HD+PD)	13%	32%
Total HD Market Size (only Dialysis)	301 Mn USD Rs.2017 Crores	1,532 Mn USD Rs.10264.4 Crores
Total HD Market Size (Including EPO and Lab)	361 Mn USD Rs.2419 Crores	1,838 Mn USD Rs.12314.6 Crores
Yearly cost of HD Per patient	197	318
Cost of PD as a % HD cost (PD Multiplier)	1.30	1.18
Yearly cost of PD Per patient	256	375
Total PD Market Size (Only PD)	44 Mn USD Rs.295 Crores	201 Mn USD Rs.1347 Crores

Total PD Market Size (Including EPO and Lab)	52 Mn USD Rs.348 Crores	241 Mn USD Rs.1615 Crores
Total Dialysis Market (HD, PD, EPO and Lab)	414 Mn USD Rs.2774	2,079 Mn USD Rs.13929 Crores
ARPT (INR) - Without EPO and Lab	Rs.1521	Rs.2230

Source: PwC Analysis

Chapter 5 Conclusion

This review has shown that there is a strong national demand for dialysis driven by increasing dialysis patient population and rise in new cases of acute kidney injury. Significant opportunities exist to elevate the standard of care and provide cost-effective renal treatment especially after the government's thrust in providing dialysis services for all. Furthermore, growth in aging population, low preference of patients for kidney transplantation, technological advancements, and substantial government healthcare expenditure on the treatment of ESRD are propelling the growth of the products and services of Hemodialysis Market &Peritoneal Dialysis Market. Evolution of new dialysis modalities (such as home hemodialysis and nocturnal dialysis) represent high growth opportunities for market players.

With the current market being valued at Rs.2774 Crores (414 million USD), it is seen to reach a Rs.13400 Crores (2 billion USD) mark by 2025, growing at a CAGR of 20%.The demand factors for this service are shown to be continually increasing and the risks involving the government's role is also very minimal.

All these factors pose an ideal investment opportunity in the Indian dialysis industry. Market is projected to become consolidated as opposed to the current fragmented form. PPP and organized dialysis service providers are expected to grow at the cost of both government and private hospitals

To conclude, the demand for dialysis services in India is huge and players need to innovate and come up with business models to cater to this opportunity. Volumes can be really large in the lower and middle income groups. However Government empanelments are critical to service that segment. A lot of PPP models have also been started in this segment especially in North India. Players should be open to collaborate with other hospitals. There can be business models where a dialysis care specialist operates out of Hospitals and offers them a revenue share. Sparsh has done that. As the size of the middle class and people with disposable income goes up, the number of people seeking and staying on dialysis will keep growing. Entry of dialysis chains, like Nephroplus, DaVita and Fresenius is likely to bring operational as well as clinical improvement through establishment of quality measures, uniform protocol-driven practices and accountability. Overall, these are interesting times for this industry and a focused player can clearly create a double bottom line impact, by serving the society and at the same time reward its shareholders.

Chapter 6 Recommendations

- Private Hospitals- The profitability of running a dialysis unit is dependent on volumes and possesses wafer thin margins. It is recommended for private hospitals to outsource the dialysis services to the organized players for a hassle free operation along with a steady source of revenue.
- Organized dialysis service providers- The future market poses an excellent investment opportunity supported by increasing demand for dialysis and the government initiatives under the National dialysis programme.
- Expansion by organized players can be either in

  a) Greenfield/Brownfield – It is recommended to start with a minimum of 10 machines so as to make it profitable.

  - Advisable not to engage in long term contracts

  b) PPP- Defined payment mechanisms, terms for tariff revision, minimum assured revenue and a defined exit clause.
- Within the growing market for HD, some niches should attract investors. One is the provision of home HD services. Another one is the development of 'holiday dialysis' centers in major tourist destinations.
- Innovation is of course another growth opportunity. Improvements in dialysis products have increased the survival rate of patients with ESRD and also account for the growing numbers of dialyzed patients; dialysis has advanced with increased blood and dialysate flow rates due to technology crossover from water treatment technology and better membranes and filters, ssometimes perfected with nanotechnology.

Chapter 7 Supplementary

7.1 Bibliography

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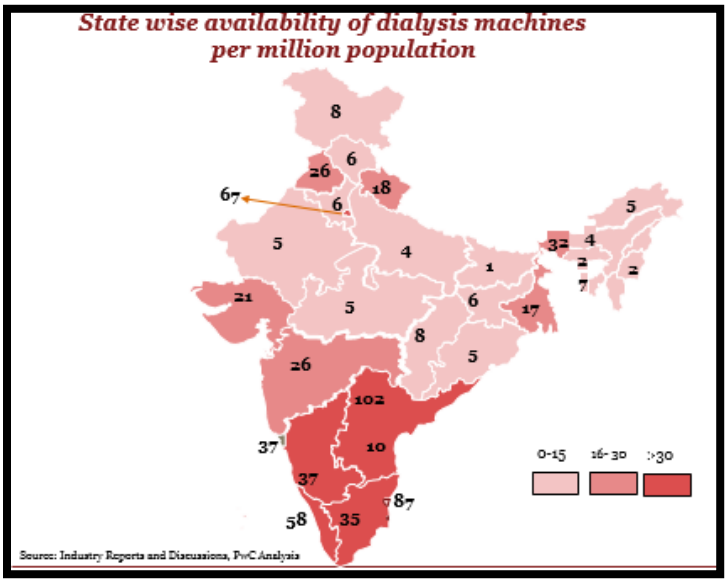
7.2 Appendices

Appendix 1: Availability of dialysis machines in India



Appendix 2: The Demand-Supply deficit in top 30 cities (by population) of India

City	Population	Per Capita Income	Demand	Supply	Deficit
Delhi	18,241,234	223,295	1874		
Mumbai	13,059,065	318,254	1341		
Bengaluru	10,250,330	301,314	1053		
Ahmadabad	6,353,339	124,844	653		
Surat	5,420,548	125,430	557		
Chennai	4,912,696	255,274	505		
Kolkata	4,632,859	207,383	476		
Hyderabad	4,156,099	139,931	427		
Pune	3,451,324	223,507	355		
Jaipur	3,420,231	176,061	351		
Lucknow	3,150,759	168,421	324		
Kanpur	2,943,472	152,287	302		
Nagpur	2,611,813	176,984	268		
Indore	2,259,426	162,844	232		
Thane	2,135,053	196,516	219		
Bhopal	1,989,953	140,625	204		
Vadodara	1,938,131	188,770	199		
Visakhapatnam	1,927,767	244,624	198		
Ghaziabad	1,927,767	99,250	198		
Patna	1,834,488	110,096	188		
Ludhiana	1,751,573	143,076	180		
Agra	1,751,573	94,675	180		
Nashik	1,699,751	106,340	175		
Faridabad	1,596,108	196,104	164		
Rajkot	1,492,465	136,568	153		
Meerut	1,440,643	97,122	148		
Gurgaon	1,357,728	187,786	139		
Navi Mumbai	1,337,000	333,333	137		
Varanasi	1,274,813	83,740	131		
Allahabad	1,264,449	127,049	130		

Appendix 3: Supply of Nephrologists

Supply Of Nephrologists		**DM Nephrology**		**DNB Nephrology**	
Zone	State	Institutes	Seats	Institutes	Seats
North	Punjab	3	11	-	-
	Delhi	2	15	4	9
	Rajasthan	2	5	-	-
	UP	2	8	-	-
	Haryana	-	-	2	4
South	Andhra Pradesh	3	7	-	-
	Karnataka	5	9	1	4
	Kerala	5	10	2	3
	Puducherry	1	2	-	-
	Tamil Nadu	7	19	3	5
	Telangana	3	10	-	-
East	Assam	1	2	-	-
	Odisha	1	3	-	-
	West Bengal	1	6	2	2
West	Gujarat	1	4	1	3
Central	MP	1	1	-	-
	Maharashtra	5	8	4	5
Total		43	120	24	42

Appendix 4: Dialysis Charges in select hospitals of India

S.No	Name of Hospital	City	Tier	Reuse Dialysis (USD)	Single Use Dialysis (USD)
1	Medanta-The Medicity	Gurgaon	2	NA	47.8
2	Artemis Hospital	Gurgaon	2	43.0	51.8
3	Paras Hospitals	Gurgaon	2	35.1	41.8
4	QRG Central Hospital	Faridabad	2	26.9	43.3
5	AIMS	Faridabad	2	23.9	40.3
6	Shalby Hospital	Ahmedabad	1	22.4	36.6
7	P.D Hinduja National	Mumbai	1	29.9	57.8
8	Care Hospital	Hyderabad	1	28.4	44.8
9	Metro Hospital	Meerut	2	22.4	32.8
10	Paras Hospitals	Patna	2	35.1	41.8
11	Zydus Hospitals	Ahmedabad	1	17.9	32.8
12	National Hrudayalaya	Jaipur	2	16.4	29.9
13	Birla Hospital	Satna	3	32.8	44.8
14	Sahara Hospital	Lucknow	2	29.1	50.7
15	Seven Hills Hospital	Vishakhapatnam	2	17.9	24.6
16	Bansal Hospital	Bhopal	2	23.1	38.8
17	Aastha Kidney Hospital	Ludhiana	2	34.3	44.8
18	Care Hospital	Nagpur	2	21.6	39.6
19	Ramakrishna Hospital	Coimbatore	2	20.4	38.5
20	Preeti Hospital	Allahabad	2	19.4	35.1
21	Bharti Hospital	Sangali	2	17.2	35.8
22	HCG Hospital	Bhavnagar	2	14.2	20.9
23	Aryan Hospital	Gorakhpur	2	22.4	44.8
24	AMRI Hospital	Bhubaneshwar	2	26.9	35.8
25	Mangala Hospital	Mangalore	2	17.2	29.9
26	Columbia Asia Hospital	Kolkata	1	38.8	49.3
27	Columbia Asia Hospital	Pune	1	26.8	43.2
28	Columbia Asia Hospital	Patiala	3	26.9	35.8
29	Columbia Asia Hospital	Bengaluru	1	23.9	37.3
30	Columbia Asia Hospital	Gurgaon	2	33.6	43.3
31	Max Hospital	Greater Noida	2	29.1	36.6
32	Max Hospital	Saket	1	33.6	52.2

33	Max Hospital	Patparganj	1	26.9	37.3
34	Max Hospital	Vaishali	1	41.8	50.7
35	Max Hospital	Mohali	2	32.1	38.8
36	Max Hospital	Dehradun	2	29.9	41.8
37	Max Hospital	Bhatinda	3	24.0	31.9
38	Fortis Hospital	Delhi(Vasant Kunj)	1	NA	49.3
39	Fortis Hospital	Gurgaon	2	40.3	49.3
40	Fortis Hospital	Chennai	1	NA	32.1
41	Fortis Hospital	Mohali	2	30.0	41.8
42	Fortis Hospital	Faridabad	2	24.6	34.3
43	Apollo Hospitals	Chennai	1	38.8	46.3
44	Apollo Hospitals	Hyderabad	1	37.3	52.2
45	Apollo Hospitals	Ahmedabad	1	30.0	46.6
46	Apollo Hospitals	Navi Mumbai	1	25.4	58.2
47	Apollo Hospitals	Delhi	1	37.3	65.7
48	Manipal Hospitals	Jaipur	2	27.6	37.5
49	Manipal Hospitals	Mangalore	2	19.4	34.3
50	Manipal Hospitals	Salem	2	22.8	22.8
51	Manipal Hospitals	Goa	3	23.1	38.1
52	KVR Kidney Care	Vellore	3	20.1	26.9
53	Rathi Hospital	Sikar	3	29.9	41.8
54	Aster Aadhar Hospital	Kolhapur	3	15.7	27.6
55	Matrachaya Hospital	Roorkee	3	17.9	29.9
56	Premiere Kidney Hospital	Baroda	3	22.4	26.9
57	Sanjeevani Hospital	Sambalpur	3	22.4	41.8

Appendix 5: Comparison of how the dialysis charges have grown over the past few years across various hospitals in the country and CGHS centres

	Hospital	Year	Dialysis Charges (USD)	Year	Dialysis Charges (USD)	CAGR
1	Artemis, Gurgaon	2010	40.4	2016	42.8	1.0%
2	Max, Gurgaon	2010	34.3	2016	38.8	2.1%
3	Medanta, Gurgaon	2010	34.3	2016	40.3	2.7%
4	Paras, Gurgaon	2010	27.4	2017	38.8	5.1%
5	Batra Hospital, Delhi	2014	32.8	2017	41.8	8.4%
6	Columbia Asia, Delhi	2010	24.6	2016	33.6	5.3%
7	PSRI, Delhi	2015	33.6	2016	35.8	6.7%
8	Holy Family, Delhi	2013	23.9	2016	28.4	5.9%
9	Apollo, Hyderabad	2014	38.8	2016	43.3	5.6%
10	Apollo, Chennai	2014	39.6	2017	49.3	7.6%
11	Hinduja Hospital, Mumbai	2015	27.6	2017	29.9	4.0%
12	Nanavati, Mumbai	2014	20.9	2016	20.9	0.0%
13	Jupiter, Mumbai	2013	22.4	2016	28.4	8.2%
14	HN Hospital, Mumbai	2015	22.4	2016	22.4	0.0%

CGHS Prices

	Region	Year	Dialysis Charges (INR)	Year	Dialysis Charges (INR)	CAGR
1	Delhi	2010	1208	2015	1600	5.9%
2	Kolkata	2010	1208	2015	1466	3.9%
3	Ahmedabad	2010	1100	2015	1550	7.1%
4	Bangalore	2010	1208	2015	1450	3.7%
5	Chennai	2010	1208	2015	1600	5.9%

7.3 Checklist & Industry Insights

Checklist 1: Checklist for Nephrologist

S.no	**Question**
	Overview
1	Total number of dialysis centers in city along with total dialysis machines
2	Total number of nephrologist in city
3	Average volumes of dialysis per day (or per month) in city
4	Price points of dialysis per sitting
5	Growth in number of dialysis from last year
6	Your view about the demand supply deficit in the city
	Total no of dialysis machines in your center?
	How many nurses and technicians are there in each shift?
	Patient Mix
1	What is your current patient mix (e.g. out-of-pocket / corporate / insurance / government)?
2	How is this expected to change in the coming years?
3	What is the geographical drainage of the patients coming to your facility?
4	What percentage of patients are walk-in/referrals?
5	Which areas does the referral comes from?
6	What is the referral pattern in dialysis?
	How significant is insurance reimbursement for dialysis (Insurance reimbursements for dialysis (both social and private insurance schemes) projected?
	Operational
1	What is the peak and average occupancy of the center?
2	Are there any seasonal/ special trends noticed in the occupancy?
3	What is the total no of patients treated in a month?
4	How many total dialysis sessions are done in a month?
5	What is the dropout rate of the patients?
6	What is the number of new patients every month?
7	What is the adherence of the patients to the prescribed dialysis rate?
8	What is the average number of reuse/single use dialysis by center?
9	What is the mortality rate of the center?
10	How many patients generally requires blood transfusions?
	Quality Indicators
1	What is the downtime for equipment?
2	What tests are performed to check the water levels?
3	What is the Hand Hygiene compliance?
4	What is the House Keeping compliance?

Checklist 2: Checklist for Equipment Manufacturer

S.no	**Question**
1	Total number of dialysis centers in city/country along with total dialysis machines
2	No of machines in public/private /JV / standalone centers.
3	Total number of nephrologist in city/country
4	No of dialysis sessions happening per year.
5	What is the growth in number of dialysis from last year
6	What is the average monthly occupancy of a dialysis machine in a public and private sector?
7	What is the average cost of setting up a dialysis center?
8	What is the average cost of a dialysis machine?
9	How many cycles a dialysis machine can perform in a day?
10	What is the average cost of a reuse dialysis in a private and public sector?
11	How has this changes over the last five years?
12	What is the average landing cost of a reuse dialysis?
13	Your view about the demand supply deficit in the city
14	How is this expected to change in the coming years?
15	What is the average downtime of a dialysis machine?

Key Industry Insights:

Head, dialysis services division -Leading manufacturer	It is very important to select the state while doing a PPP contract. States like UP and Bihar have delayed payments with the time for reimbursements going up to 9 months
Vice President, Operations -Leading organized dialysis chain	Patients who belong to government schemes do 3 dialysis sessions/week whereas the middle class patients do 2 sessions/week. On an average a patient does 9-10 dialysis sessions/month
General Manager-Dialysis equipment and consumables distributor	The duty on dialyzers was abolished in Jan'16 that led to a savings of 23% in the cost. The same has been passed on by the manufacturers to the services providers
Project Director – Equipment manufacturer	Approx. 5000 machines are expected to be sold next year. It is higher than the usual average of 4000 machines as the PPP schemes are alone expected to account for demand for 1200 machines
Head–Leading equipment manufacturer	Equipment manufacturers are not interested in the PPP business going forward. Most of the bids are expected from the organized dialysis players
National Sales Manager -Leading dialysis equipment manufacturer	South India has stagnated and is growing at just around 7% as against North India which is growing at a CAGR of 14-15%
Project Director – Equipment manufacturer	Local hospital providers are bidding at low rates and winning contracts in some of the states like Rajasthan, UP. They have however started only 2-3 centers and have not been in a position to complete the contract requirements
Head, dialysis services division-Leading equipment manufacturer	Average price realization per treatment in the PPP business is around Rs.950-1000. The margins in this business are around Rs.100 per treatment
Head, dialysis services division-Leading manufacturer	Nephrologists should be made a stakeholder in the Centre to ensure that a center performs well
National Head-Govt. Relations-Leading organized dialysis chain	States coming up with PPP in near future are Punjab, Chhattisgarh, Jammu and Kashmir, and Odisha. The timeline of a PPP contract is 7 years minimum and 10 years maximum
Project Director – Equipment manufacturer	The prices in cities like Mumbai are lower due to the presence of trust based centers offering services at lower prices. The prices of dialysis services are higher in North India
Project Director – Equipment manufacturer	Amongst the organized dialysis service providers, Fresenius and DaVita are the best followed by Nephroplus and then Apex and DCDC (poor in quality). Apollo is trying to enter through AHLL and is also planning to bid for PPP centers

National Head-Govt. Relations-Leading organized dialysis chain	6-7% of the seronegative dialysis patients use single use dialyzer and rest use reuse ones. 15% of the overall patients are seropositive and have single use sessions
Head-Leading dialysis equipment manufacturer	Number of nephrologists in the country as on Dec 2016 are ~1300-1400. 70% of the nephrologists in the country are located in the top 15 cities.
National Sales Manager-Leading dialysis equipment manufacturer	There are around 50-60 cities in India with a population of around 1 million with some dialysis infrastructure in place. centers in remote areas are manned by MBBS doctors
Nephrologist-Leading hospital in Delhi	Price of dialysis is location specific. It varies across centers of same provider. The price was historically set by hospitals before organized players entered the market
Nephrologist-Leading hospital in Delhi	Life span of a patient once he starts dialysis varies from ~8-10 years. Cost of dialysis ranges from 30,000-50,000 INR per month plus the cost of intermittent illness