

**Opinion**

**Peritoneal Dialysis In Pakistan: An Insider’s View. State of Affairs and Planning?**

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PJKD 2020;4(supplement 1):6-10

Pakistan has an estimated population of 212 million while the incidence of end stage renal disease in Pakistan is 100 patients per million; hence approximately 22,000 patients require maintenance dialysis to sustain life in our country.<sup>1</sup> Remarkably peritoneal dialysis (PD) as a form of maintenance renal replacement is utilized in less than one per cent of these patients.<sup>2</sup> In the absence of a formal dialysis registry, we place the total number of chronic ambulatory peritoneal dialysis patients (CAPD) in Pakistan at approximately 76 excluding holiday patients who are visiting from abroad (\**This figure was estimated by enquiring the total number of patients each PD units care in Pakistan. This figure was corroborated with the sole distributor of CAPD fluids in Pakistan.*). There are no patients on automated peritoneal dialysis (APD). A PD utilization ratio of less than one per cent is embarrassingly low in comparison to other countries (see Table 1).<sup>3</sup>

**Table 1:** Prevalent hemodialysis and peritoneal dialysis patients and percent peritoneal dialysis utilization in the world. **Reference 3**

Countries	Prevalent maintenance HD capacity (pmp)	Prevalent maintenance PD capacity (pmp)	% PD use among all dialysis patients
<b>Developed countries</b>			
USA	1,165	87.1	7.0
UK	365	61	17.0
Japan	2,148.4	71.9	3.3
Germany	768.1	38.8	4.8
Italy	738.8	78.3	9.6
Austria	449.7	43.3	8.8
Singapore	684	158	19
<b>Developing countries</b>			
South Africa	45	25	32
Sudan	46	85	3.5
Kenya	7.5	1.2	12
Egypt	421	0.3	0.0
Nigeria	8	0	0.0
Ghana	2	0	0.0
Senegal	4.1	1	18
Cameroon	5.9	0	0.0
Algeria	381	11.1	6.3
Nepal	10.1	1.5	13.5
India	18.0	5.8	24.5
Brazil	396.3	47	10.6

**Note:**  
**Abbreviations:** HD, hemodialysis; PD, peritoneal dialysis; pmp, per million population; RRT, renal replacement therapy.

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Sarcastically, either we seem to be under-forming in our provision of care to the dialysis population or we know something that countries like the USA, UK and Singapore do not. I would choose to believe that there is more merit in the former rather than the later. Furthermore, if one was to restrict their discussion to the developing world only, unless the plan is to rub shoulders with Ghana, Cameroon and Nigeria rather than India, South Africa and Brazil; urgent initiatives are required for improving PD utilization in our dialysis population. This beckons the question whether PD utilization was always this low since PD was introduced in Pakistan.

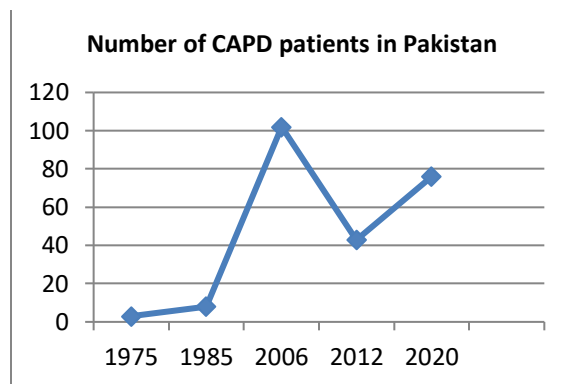
### The Journey of PD in Pakistan:

The first peritoneal dialysis facility in Pakistan was established in 1970 at the Civil Hospital, Karachi and till the late eighties there were not more than 9 patients on chronic ambulatory peritoneal dialysis at any point of time.<sup>4</sup> It was only in the late nineties and early 2000s that the popularity of CAPD started to gain momentum through a significant commercial push under which the distribution rights of the CAPD apparatus was bought by a company dedicated to PD alone. This push led to the development of a formal PD Training program in Pakistan with the industry providing comprehensive patient support through registered PD nurses who were responsible for trouble shooting, training, home visits and awareness drives. These initiatives showed immediate results with the number of patients on CAPD crossing the 100 mark (102 to be exact) in 2006 which remains the largest number of patients on CAPD in Pakistan to date at any one point of time.<sup>5</sup> It was during this time that the province Khyber Pakhtunkhwa (then NWFP) made strides in the development of a local PD programs serving itself and next door Afghanistan.<sup>5</sup>

It was most unfortunate when the above-mentioned company had to sell back its distribution rights on account of financial constraints to a company considered to be a giant in the hemodialysis industry. Just as the number of patients on CAPD had climbed earlier they plummeted to 31 in 2009.<sup>7</sup> Through inconsistent initiatives and solo awareness drives by a handful of nephrologists, the number of CAPD patients increased to 43 in 2012.<sup>8</sup> It is only in the last 5 years that a major push has once again been exhibited through which the number of CAPD patients have improved to 76 as of April 2020 (see above \*). Interestingly more than 90% of the current CAPD patients hail from Punjab and Islamabad.

Figure 1 demonstrates (with limited available data) the general trend of number of patients on CAPD in Pakistan. It is cautiously encouraging to see an improvement of PD utilization in the recent past. Whether this is a final flicker before the flame of CAPD in Pakistan is extinguished or a representation of recent pro-PD initiatives bearing fruit; remains to be seen.

**Figure 1:** Number of patients enrolled in the continuous peritoneal dialysis program since 1975 to date.



### Are Quoted Obstacles to PD utilization in Pakistan Real?: Myth Busting.

There are 3 main obstacles which have led to a decreased PD utilization in Pakistan. Whether these impediments carry enough weight for PD to be dismissed so easily despite its innumerable benefits ranging from preservation of residual renal function to better outcomes post transplantation is left for the reader to judge. The merit of each alibi is dealt with individually below:

#### 1. The Infection Alibi:

Peritonitis remains one of the leading causes of technique failure in PD worldwide and Pakistan is no exception. Although, there is significant evidence to suggest that the fear of peritonitis and its associated complications are over-stated.<sup>9</sup> With the advent of proper disconnecting systems, hygiene protocols and exit site care the peritonitis rates have declined significantly over time to the extent that nowadays on average a patient on CAPD in Hong Kong gets an episode of peritonitis every 3 years, while in the UK after every 4 years approximately. The International Society of Peritoneal Dialysis has declared a peritonitis rate of less than 0.5 episodes per year for each PD patient to be within an acceptable limit.<sup>10</sup> Hence, peritonitis in itself is not a frequent occurrence in the larger scheme of things and is usually exaggerated. Adding strength to this statement is the fact that the majority of the peritonitis episodes can be treated at home without any admission or associated complication.<sup>11</sup>

Whilst comparing all cause infections (including peritonitis) and admission to hospital/mortality secondary to infective complications between a matched hemodialysis (HD) and PD cohort; more bacteremia, fungemia, admission for cellulitis, pneumonia and total admissions were seen in the HD patients.<sup>11</sup>

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Furthermore, the risk of acquiring a viral infection like hepatitis B, C and HIV on hemodialysis in Pakistan cannot be underplayed. Hussain et al. demonstrated a 53.3% seroconversion rate for hepatitis C positive on HD in Lahore.<sup>12</sup> The risk of acquiring these sinister infections on PD is negligible.

### 1. The Patient Survival Alibi:

There is a general misconception in Pakistan that patients on peritoneal dialysis have a very poor survival. This misconception has a major confounding factor which requires due consideration i.e. patients aren't placed on PD right at the start of dialysis vintage rather they are offered PD once all AV access for HD has been exhausted. Hence, comparing HD survival rates in a dialysis naive patient to patients who have been on HD for 10 years and are now being shifted onto PD would be unfair proposition.

International data has shown an initial 2 year mortality benefit with PD over HD after which mortality is comparable amongst the 2 modalities.<sup>13</sup>

### 2. The PD is more expensive Alibi:

Another major impediment to increased PD utilization in Pakistan is that it is considered more expensive than HD. Once again similar to the "patient survival alibi" there is a major confounding factor which needs to be taken into consideration i.e. PD has hidden cost benefits over HD which are not taken into account when we do a head to head cost analysis. Once we include these hidden costs PD is cheaper than HD.<sup>14</sup>

Such hidden costs include transportation costs incurred in bringing a patient for in-center HD, work hours lost by the patient and an accompanying attendant with HD, comparatively higher dose requirement of erythropoietin in HD, increased electricity expenditures per HD machine to name a few. Furthermore, Atapour et al, shed light on the costs incurred as salaries to HD and PD technicians. They go onto suggest that 2 PD technicians can cover the same number of PD patients in comparison to 21 HD technicians catering to the same number of patients on HD.<sup>15</sup>

Apart from hidden costs, multiple meta-analyses have demonstrated that from a global perspective PD is cheaper than HD in an overwhelming majority of the countries.<sup>16</sup> Strictly from a Pakistani perspective, the cost of PD fluids and apparatus available in the market remains lower than what is being charged in the USA, UK and Singapore.<sup>17</sup>

## Recent Attempts to Improve PD Utilization in Pakistan.

Figure 1 denotes a slow and steady increase in PD utilization over the past 6 years. Initiatives which may have had a positive impact on this include:

### Development of a PD support group:

Regular PD related continuous medical education (CME) activities under the umbrella of the Pakistan Society of Nephrology and in collaboration with the International Society of Nephrology are ideal forums for nephrologists with special interest in PD to interact and network with each other. Such interactions have allowed nephrologists who are eager to start PD program at their local hospital to develop a mentor mentee type of relationship through which nephrologists with experience of running a PD service provide guidance and support to those in need. A dedicated WhatsApp group for increasing PD utilization and troubleshooting of PD related problems in Pakistan was formed which keeps everyone motivated and gives each individual a sense of support. Whereby only 6 main health facilities across Pakistan were practicing CAPD in 2014, through support and guidance 12 centers are offering PD to their patients in 2020.

### Improving PD technique & the PD Academy:

With such low numbers of PD patients and centers; the practice of PD in Pakistan has entered into a negative vicious cycle. With less and less exposure to PD patients; our local nephrologists have become deskilled in the management of these patients. Furthermore, minimal to zero exposure of the renal registrars and the nursing staff to PD patients has led to a void in their training and awareness of this technique. Hence even if our budding nephrologists were to develop an interest in PD utilization, we as a renal community have left them handicapped by not training them in regard to this modality of renal replacement therapy.

To fill this void the PD Academy was conceived which entailed a PD core curriculum spread over 3 days whereby all interested doctors and nurses are provided with training and hands on exposure to the management of PD patients. The curriculum aims to standardize and provide uniformity to PD practices across Pakistan in line with the International Society of Peritoneal Dialysis (ISPD) best practice guidelines. This initiative has been well received, with the recent event concluded in Lahore wherein 35 delegates from Lahore and Karachi got opportunities to enhance their PD training (see picture 1). The PD Academy will be rotating to other cities to develop local PD leaders and focal persons.

### Industrial Involvement:

By taking the industry (distributor and importer of PD apparatus) on-board, local PD practitioners have been able to bring all the stakeholders on one page. Wherein there are quoted instances that the supply of PD fluids and materials have been inconsistent. By reaching out to the industry we have been able to get a seamless and consistent supply chain for PD apparatus for the last 5 years now. Additionally to aid with the training of PD patients and local staff the industry has been kind to recruit more PD trainers. This has helped alleviate any pressure or hesitance on the part of the PD practitioner as these PD trainers press-on to develop local expertise at interested hospitals.

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**Figure 2:** Participants and course trainers of the First Peritoneal Dialysis Academy of Pakistan conducted on 4-6 March 2020.

### **Collaboration between the PSN & ISPD:**

The last Pakistan Society of Nephrology International Conference in October 2019 marked the initiation of a robust collaborative relationship with the ISPD wherein the Chair of the International Liaison Committee Professor Fred Finkelstein (Yale, USA) and Professor Edwina Brown (Imperial College London, UK) were in attendance and organized the first hands on PD workshop in Pakistan. It is through the ISPD guidance that the curriculum for the PD Academy was formulated and executed. Furthermore, the ISPD has been gracious in providing short 6-12 months fully paid fellowships for young nephrologists to train at centers of excellence across the globe.

### **What more needs to be done?**

A slow but steady increase in PD utilization over the last 6 years is heartening (as shown in figure 1) but a lot more is needed. In this endeavor one does not need to re-invent the wheel. The Indian road map to enhanced PD utilization has shown the way to numerous countries and we should attempt to learn from their success story as well. Abraham et al, has very succinctly laid out further steps that we need to adopt [18]

### **Local manufacturing:**

Every effort should be made to involve the private sector and industry to develop local PD fluids and associated apparatus. Not only would this lead to a decrease in the prices but also ensure seamless supply of materials required to carry out the PD processes. There are 2 companies of note in Pakistan that have come a long way in the development of a locally manufactured PD cyclor and PD fluids. Local manufacturing for commercial use is being planned to start in early 2021. These initiatives from the private sector would only bear fruit if we as a community are willing to guide them within bounds of ethical practices ofcourse.

### **Government support**

It is very important to realize that PD is actually cheaper if not equivalent to HD in Pakistan (see section “The PD is more expensive Alibi” ). However, considering hemodialysis is subsidized by the government of Pakistan and the case for a similar arrangement for PD has never been advocated; it is obvious that HD will appear cheaper to the end user i.e. patient. Hence every effort must be made to make the government officials and policy makers aware of the benefits of PD over HD resulting in subsidizing PD similar to the HD effort. Some of our PD physicians have been successful in securing funds to start pilot PD projects in Kashmir and Balochistan through direct meetings with government officials.

### **Financial modelling**

Our Indian colleagues have been very successful in bringing the insurance companies on board to cover the health of PD patients. These packages include total coverage of admissions for complications if any, catheter exchange and liaison with PD physicians [19]. If we are able to develop a similar coverage tailored to our religious beliefs and requirements of our patients, we may be able to increase the popularity of PD.

### **PD Registry & a Dedicated Body**

For any of the above initiatives to be taken there are 2 primary requirements. The first of which is to have hard evidence-based data and numbers to show the potential success story of PD in Pakistan and across the world. In this fast paced and literate world anecdotal evidence does not hold and stand, hence the inception of a PD registry is the need of the hour. The second requirement is to have a dedicated body or committee which has the mandate and expertise to speak for the PD community and effort in Pakistan. It is only sensible that PD has nominated representatives who are mandated to collaborate with the government, private sector, financial institutions etc. At the moment in the absence of a proper body/committee representing PD in Pakistan, it does not come as surprise that each PD physician is trying to re-invent the wheel on his/her own.

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