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Eligibility and patient barriers to peritoneal dialysis in patients with advanced chronic kidney disease

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ELIGIBILITY AND PATIENT BARRIERS TO PERITONEAL DIALYSIS IN PATIENTS WITH ADVANCED CHRONIC KIDNEY DISEASE

By

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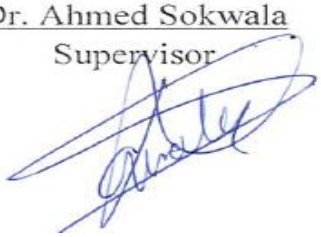

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DEDICATION

I dedicate this dissertation to my parents for their support and encouragement throughout the process.

ABSTRACT

Introduction: The burden of chronic kidney disease is on the rise in Kenya and is a significant cause of morbidity and mortality. While definitive treatment is renal transplantation, many patients require renal replacement therapy in the form of hemodialysis or peritoneal dialysis. The predominant modality utilized in Kenya is currently hemodialysis despite peritoneal dialysis having similar survival outcomes with the potential benefit of cost-effectiveness. There is need therefore to explore why peritoneal dialysis remains underutilized and whether patient factors may be contributory to barriers that limit the uptake of peritoneal dialysis.

Purpose: The main objective of this study is to determine eligibility for peritoneal dialysis of patients considered potential candidates for the modality. In addition, barriers to the same will be determined. Further, the impact of support (family support or paid assistance) on PD eligibility will be determined.

Methods: This was a descriptive cross-sectional study where patients who are potentially PD candidates were consecutively recruited. A multidisciplinary team assessed these patients for PD eligibility and this was done using a standardized tool. Contraindications and barriers to the modality were recorded as was the presence or absence of support for the provision of self-care PD. Other demographic and clinical data were also recorded using a standardized questionnaire. The impact of support on peritoneal dialysis eligibility was also determined.

Results/Conclusion: In this study on eligibility of patients with advanced CKD for self-care PD we found 68.9% of the patients eligible. Surgery-related abdominal scarring was the most common contraindication. Barriers to self-care PD were identified in 45.9% and physical barriers were more common than cognitive barriers. Presence of support was associated with a significant increase in PD eligibility (P<0.001%).

ABBREVIATIONS

MATCH-D	- Method to assess treatment choices for home dialysis
PD	- Peritoneal dialysis
CKD	- Chronic kidney disease
RRT	- Renal replacement therapy
ESRD	- End-stage renal disease
HIV	- Human Immunodeficiency Virus
KDOQI	- Kidney disease outcome quality initiative
HD	- Haemodialysis
AKUHN	- Aga Khan University Hospital Nairobi
BMI	- Body mass index
DM	- Diabetes Mellitus
HBA1C	- Glycated haemoglobin A1C
HTN	- Hypertension
CAD	- Coronary Artery Disease
CCF	- Congestive Cardiac Failure
eGFR	- Estimated Glomerular Filtration Rate
PTH	- Parathyroid Hormone
CRP	- C-Reactive Protein
ALP	- Alkaline Phosphatase
TB	- Tuberculosis
NHIF	- National Health Insurance Fund
Kg	- Kilogram
Cm	- Centimetre
AKI	- Acute Kidney Injury

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Thank you all.

DECLARATION

I declare this dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any material previously published or written by another person except where due references have been made in the text.

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(Signature of candidate)

30/05/2019

Date

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CHAPTER ONE

1.0 INTRODUCTION AND LITERATURE REVIEW

There is an increasing burden of chronic kidney disease/End stage renal disease in Kenya with increasing number of patients requiring renal replacement therapy (1, 2). Many such patients require dialysis while awaiting evaluation or definitive renal transplantation where eligible. In patients not eligible for transplantation, the modality of treatment remains dialysis either in the form of hemodialysis or peritoneal dialysis. The increasing prevalence of dialysis dependent patients has been noticed and acted on by various institutions including the Government of Kenya Ministry of Health and has been reflected by the institution of hemodialysis centers in counties across the country as well as increasing the training of nephrologists in a bid to address the problem. However, the greater emphasis by far has been on hemodialysis as the predominant mode of renal replacement therapy.

The uptake of peritoneal dialysis in Kenya in adults remains extremely low despite peritoneal dialysis having been shown to be equivalent to hemodialysis in terms of survival outcomes in various studies (3-8). In addition, there have been other benefits relative to hemodialysis including preservation of residual renal function and cost-effectiveness (9-12). A 2013 study by Karopadi et al comparing cost of PD and HD globally for example noted that PD was a more affordable modality in most countries with the same study quoting a ratio of cost of HD to PD of 1.33 (12). In addition, peritoneal dialysis may possibly be a better pre-transplantation dialysis modality (13). Frequently, dialysis may be instituted urgently and many times this occurs in the form of hemodialysis. However, studies suggest that peritoneal dialysis may be as effective an option thus introducing PD to this specific population as an option (14, 15). After graft failure post renal transplantation, peritoneal dialysis is considered as valid a

treatment modality as hemodialysis (16-20). In summary, peritoneal dialysis is an RRT option that may be of benefit in a number of scenarios, with comparable survival outcome as well as other benefits as elucidated compared to hemodialysis.

Given the low rates of utilization of the modality in Kenya, investigating whether there are any differences in eligibility in the local population is important, as well as to determine the nature of the contraindications/barriers that may exist. This would provide evidence for promoting the uptake of PD as well as investigate measures to address the barriers that would be determined. In addition, presence of family support has been associated with an increase in eligibility (21). Given that the population with advanced CKD/ESRD is likely to be older, have other comorbidities as well as physical/cognitive barriers to self-care PD it would be of importance to examine whether the presence of support in our setting has similar effect on PD eligibility.

Globally there is an increasing shift of burden towards non-communicable disease, with CKD being an important cause of mortality with an increasing rate of the same among the top causes of death (22). In adult populations in the developed countries such as the United States its estimated prevalence is around 11.6% with comparable figures in other developed countries.

In Africa CKD, due to various causes is becoming increasingly prevalent. A 2014 meta-analysis on prevalence of CKD in Africa noted that the overall prevalence on the basis of 21 medium quality and high-quality studies was 13.9% (1). This is likely to be higher given that the specific factors looked at were hypertension, diabetes and HIV.

Prevalence in Kenya from a study done examining CKD in HIV was estimated at 4% (1, 23). However, given other risk factors were not examined, the overall prevalence is likely to be higher. This may be in addition to the fact that there are a significantly greater number of other risk factors, infectious (Tuberculosis) and non-infectious (chronic glomerulonephritis, use of

herbal medication). Also, there may be significant under-diagnosis due to lack of diagnostic tests.

Patients that have progressive CKD develop ESRD and eventually require renal replacement therapy. This comes in the form of dialysis (hemodialysis or PD) or renal transplantation where eligible. While renal transplantation is currently available in Kenya cost and availability of kidney donors pose major challenges. Thus, many patients undergo dialysis while awaiting transplantation. CKD is predicted to pose an even greater burden of disease with associated increased mortality and a serious economic challenge. Thus, there is need to explore cost effective modalities of renal replacement therapy to conserve resources while still being accessible to the increasing number of people requiring it (12, 24).

KDOQI guidelines recommend pre-dialysis education on all dialysis modalities and the decision on modality choice to be individualized based on the patient's characteristics and preference (25, 26). This is in line with evidence that pre-dialysis education improves preparation for dialysis and survival of patients with CKD (27, 28)

Because of the limitations associated with renal transplantation, many patients undergo dialysis in the form of either hemodialysis or PD. Dialysis enables maintenance of fluid and electrolyte balance though does not give true and complete replacement of renal function. Hemodialysis is a form of renal replacement therapy that relies on fluid/solute transfer from one compartment to another, i.e. transfer between blood and dialysate fluid. The exchange occurs in an external device, the dialysis machine, with access to blood done either through an arteriovenous fistula or a dialysis catheter.

PD is a modality of renal replacement therapy that utilizes the peritoneal membrane as a natural semi-permeable membrane with dialysis occurring via mechanisms of solute exchange and ultrafiltration. It involves placement of an intra-abdominal peritoneal dialysis catheter, which

serves the same purpose as an intravenous hemodialysis catheter for access. Insertion of a peritoneal dialysis catheter may be precluded in certain situations for example previous complex abdominal surgery, massive obesity or active diverticulitis, among other medical conditions and thus determining presence of such contraindications is an important step in determining eligibility for the modality.

The process of PD entails running dialysis fluid into the abdominal cavity via the catheter, allowing time for exchange followed then by draining the fluid out and infusing fresh fluid. It can take the form of either continuous ambulatory peritoneal dialysis or automated peritoneal dialysis. The figure below (29) shows the principles of PD.

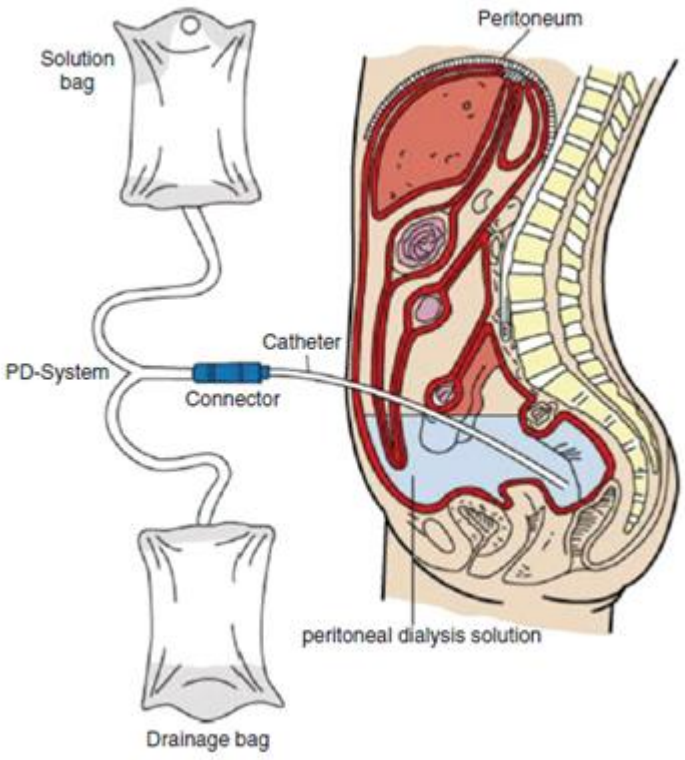


Figure 1: The principles of peritoneal dialysis (29).

It’s a relatively simple procedure to learn and patients can achieve competence fairly easily and are able to self-perform or do it with assistance in the comfort of their homes. Despite the

ease of performing self-care PD, it does require a level of physical and psychosocial ability for example in the handling of dialysis bags and the physical aspects of the process involved. For this reason, patient assessment for ability to perform the procedure safely and effectively becomes crucial. The adequacy of dialysis is assessed using clinical assessment i.e. symptoms such as nausea, fatigue, solute clearance assessed using 24-hour urine and peritoneal fluid collection and serum creatinine and fluid status i.e. blood pressure and presence or absence of edema. Some of the advantages of PD include equivalence to HD in terms of survival outcomes in various studies, preservation of residual renal function, cost-effectiveness, pre-transplantation dialysis modality, PD may be as effective an option in urgent dialysis, and that PD shows similar outcomes to HD as a dialysis modality in post renal transplantation graft rejection. Some of the limitations of PD are ineligibility due to contraindications/barriers, mortality in patients transferred to PD from HD may be higher than those on PD without prior HD and complications including infection, failure, catheter related and dialysate leaks and hernias (30).

Despite the equivalence of PD to HD in terms of survival outcomes while having the advantage of cost effectiveness and convenience, PD globally, in developed countries and developed countries remains largely underutilized (11,12,24). In the United States for example the prevalence in 2009 was 6.9% but this increased to 9.7% in 2014 (31). The increase in prevalence is believed to be due to a combination of better patient and provider education as well as the economic benefit of the cost-effectiveness of the modality.

A 2010 study on PD in Africa noted that the prevalence of PD in Kenya was 12% with 20-50 patients of 380 patients on dialysis utilizing PD. The number of patients on dialysis since then has significantly increased with an estimate of around 1000 patients of whom less than 20 currently on PD (24). There has therefore been a disproportionate increase in the number of patients on hemodialysis as compared to PD.

From the above it is apparent that PD as a modality of RRT remains largely underutilized in Africa generally as well as in Kenya. Factors that have been suggested to explain the reasons behind underutilization include: Predominantly rural settings with limited infrastructure limiting transportation, inadequate electrification and water supply coverage, inadequate sanitation systems as well as a lack of nephrologists (24, 32-33).

While attempts have been made to define system factors that may explain why PD is underutilized in our population, there are no local studies examining patient factors that may influence PD utilization. Whether patient factors contribute significantly to them not being eligible for PD is not known, nor the nature of the contraindications/barriers to the same.

Identification of suitable patients for peritoneal dialysis is a critical component as it determines what patients would derive benefit from the modality as well as identify those who would be excluded. A thorough system of evaluation also identifies potential barriers from an early point and thus measures can be taken to attempt to address these barriers.

Steps have been attempted to be defined to optimize incident peritoneal dialysis (34). These involve sequentially identifying all possible PD patients, assessing them for PD eligibility, offering PD to eligible patients, determining patient choice i.e. a record of a patient's stated decision after modality education has been completed, PD catheter placement and finally successful initiation of PD.

Examining each step reveals potential reasons to why PD remains greatly underutilized. It is generally considered that there are few absolute contraindications to PD, i.e. absence of a functional peritoneal membrane and lack of stable residence. Because self-care PD requires a certain level of physical, cognitive and psychological ability, it is important to assess patients thoroughly for presence of barriers that could limit their ability to effectively and safely perform self-care PD. Identification of such barriers is done by a comprehensive assessment

that includes: history, physical examination and assessment of laboratory parameters. Certain barriers for example physical frailty may be overcome if there is presence of support to carry out PD which makes them eligible for the modality (21). Support could be either in the form of family support or home care assistance. Family support is defined as spouse, son or daughter available, able and willing to provide regular assistance with PD. Home care assistance defined as a visiting nurse or health-care aid who could assist patients with set up, connection and disconnection from PD machines or perform PD exchanges (maximum two visits per day)

In a bid to attempt assist clinicians evaluate eligibility for home dialysis including PD, the Method to Assess Treatment Choices for Home Dialysis (MATCH-D) tool has been developed (35). It contains a checklist of potential contraindications and barriers and summarizes them as well as states recommendation for or against PD based on these. Previous studies on eligibility for PD have relied on the decision of a multidisciplinary team without necessarily using a standardized tool. The tool has been suggested as a potential way of assessing PD eligibility in a standardized way (36). The table below indicates some examples of contraindications.

Relative Contraindications to Peritoneal Dialysis
Medical Conditions
Abdominal surgery- Prior scarring, recent or planned surgery
Colostomy, ileostomy or ileal conduit
Diverticulitis-active
Gastric tube
Hernia – uncorrectable
Inflammatory bowel disease- active
Obesity - morbid
Polycystic kidney disease – very large kidneys
Pulmonary disease- severe
Other bowel abnormalities- (cancer, ischemia)
Social Conditions
Residence does not permit PD
Employment does not permit PD

Table 1: Relative contraindications to peritoneal dialysis

Some examples of barriers to PD include medical barriers such as diarrhea, incontinence, and gastroparesis, physical barriers such as decreased strength, manual dexterity, vision, hearing, and general frailty and cognitive barriers such as decreased memory, executive functions, dementia, prior stroke, and psychiatric conditions.

Barriers likely demonstrate variability in terms of region/level of development of a country. There are no local studies on patient barriers to PD with most studies on PD eligibility being done in developed countries. For example, a study done in Canada by Prakash et al on socioeconomic status and barriers to PD (37) found no association between socioeconomic status and PD eligibility. The commonest reason for non-eligibility in the same study was presence of a diagnosis or medical condition that contraindicated peritoneal dialysis.

Another prospective eligibility study by Jager et al determined that 87% of patients were considered medically eligible for PD. The commonest barriers that were identified were advanced age, anatomic issues like adhesions and hernia, and weight (38). Another study done investigating the impact of contraindications, barriers to self-care and support on incident PD utilization found that 22% of 497 patients had absolute medical or social contraindications to

PD and of the remaining 387 potentially eligible, 63% had at least one barrier to self-care PD. Family support increased PD eligibility from 63% to 80% among patients (21).

There are however, no local studies investigating the eligibility of patients with ESRD/CKD and often in practice, patients do not undergo a formal process of determination of the same. Neither are there local studies exploring the factors behind non-eligibility i.e. contraindications or barriers to PD.

This study therefore, investigated eligibility of patients in our setting for peritoneal dialysis as well as determined the presence and nature of contraindications and barriers to the same. The effect of presence of support on eligibility for self-care PD was also investigated.

1.1 STUDY JUSTIFICATION

The burden of disease due to end stage renal disease globally and in developing countries like Kenya continues to rise and poses an increasing strain on resources (1,2). There is need therefore to promote alternative modalities of dialysis such as PD that have been shown to be more cost effective particularly when greater number of patients can be enrolled thereby obtaining economies of scale (11, 12). The predominant mode in Kenya is hemodialysis with significant government investment in setting up hemodialysis units across the country (24). There have been no studies in Africa exploring eligibility for peritoneal dialysis or prevalence/nature of contraindications/barriers to the modality that may explain why the uptake of PD remains poor, despite it being a modality that is cost effective and thus suitable for developing countries. System factors that have been explored as potential reasons include; lack of nephrologists, lack of supplies/solution, lack of access to water/electricity and lack of peritoneal dialysis nurses (24, 32, 33).

It would be of significance to examine the eligibility of the local population for PD and investigate potential barriers to the same. Doing so would have significant benefit including: Greater emphasis on PD during pre-dialysis education, encouraging nephrologists to promote the use of the same, involving government through policy for example and other stakeholders to promote the utilization of PD given its cost effectiveness as well as take measures to investigate/address the barriers that may limit the use of PD.

1.2 RESEARCH QUESTIONS

What is the eligibility of patients with advanced CKD/ESRD for peritoneal dialysis in Aga Khan University Hospital Nairobi and the associated barriers to self-care peritoneal dialysis?

1.3 STUDY OBJECTIVES

1.3.1 Primary Objective

1. To determine the eligibility of patients with advanced CKD/ESRD for peritoneal dialysis at Aga Khan University Hospital, Nairobi.
2. To investigate the barriers to peritoneal dialysis in patients with advanced CKD/ESRD at Aga Khan University Hospital, Nairobi.

1.3.2 Secondary Objectives

1. To determine the impact of presence of support on eligibility for self-care PD.

CHAPTER TWO

2.0 STUDY SETTING

The study was carried out at the Aga Khan University Hospital, Nairobi in the dialysis unit, outpatient nephrology clinics and the inpatients. The hospital is a 254-bed facility offering general medical services, specialist clinics and diagnostic services. It serves as a tertiary referral facility not only in Kenya but also in the East African region.

2.1 STUDY DESIGN

This was a descriptive cross-sectional study.

2.2 SAMPLE SIZE ESTIMATION

Sample size was calculated according to the formula below. The proportions used were based on the study done in Canada by Oliver et al (21). From the study, 64.2% was the estimated proportion for those eligible for PD and the population size was 500. From the above, with an 8% level of precision, and at 5% significance level, the minimum sample size required for the study was 109 patients. Consecutive sampling was done where all patients meeting inclusion criteria were recruited.

$$n = \frac{N \times \hat{p} \times \hat{q}}{\frac{d^2}{Z^2_{1-\frac{\alpha}{2}}}(N-1) + \hat{p} \times \hat{q}}$$

The notations for the formula are:

$\hat{p}$ = The estimated proportion of patients eligible for PD.
$\hat{q}$ = 1 - $\hat{p}$
N= Population size
α= Significance level
d= absolute level of precision

2.3 STUDY POPULATION

All patients 18 years and above with the diagnosis of advanced CKD/ESRD at Aga Khan University Hospital, Nairobi were included in the study, provided that they were willing to provide a valid informed consent.

2.3.1 Inclusion Criteria

1. Patients with a written diagnosis of advanced CKD/ESRD.
2. Age: 18 years and above.

2.3.2 Exclusion Criteria

1. Patients on dialysis for acute kidney injury.
2. Not being able to assess the eligibility of PD due to early death, transfer out or refusal to participate.

2.4 SAMPLING PROCEDURE

Consecutive sampling technique was utilized and a total of 109 patients were recruited for the study between December 2018 and March 2019.

2.5 DATA COLLECTION

Assessment for PD eligibility was done by a multi-disciplinary team led by the consultant nephrologist. It entailed a detailed clinical assessment i.e. history, physical examination and laboratory parameters to determine presence of contraindications that would exclude them from being eligible for PD and potential barriers- physical, cognitive or both.

The above was guided by the MATCH-D tool which served as a checklist to ensure the important factors were all considered individually. It enabled formulation of a summary of reasons for/against PD for a particular patient to be made, in an organized and exhaustive manner which formed a basis for determining whether a patient was deemed eligible or not. It also emphasized that factors considered for example absolute contraindications previously be re-examined and evaluated on a case by case basis. These include for example obesity and single prior simple abdominal surgery (See appendix III- MATCH-D tool). The information was collected at the time of assessment for PD eligibility by the investigators and the various aspects determined from clinical assessment of the patients i.e. using history and physical examination. Ultimate eligibility for self-care PD was determined as yes or no after assessment by the team with final determination of eligibility done by the respective consultant nephrologist. Patients without contraindications or significant barriers or those patients with barriers but in whom support was considered to be able to overcome such barriers, were considered eligible for self-care PD.

Presence or absence of support systems for self-care PD was also determined using a questionnaire in the group of patients with barriers to self-care PD and recorded. Support was defined as family or paid care-giver in providing of assistance with PD. After accounting for presence or absence of support, eligibility for self-care PD was further determined by the team. The total proportion of patients eligible for self-care PD was determined by the sum of patients without contraindications or barriers considered eligible for self-care PD and the patients with barriers to self-care PD but deemed eligible after taking into consideration the presence/absence of support, divided by the total number of patients included in the study.

2.6 STUDY FLOW CHART

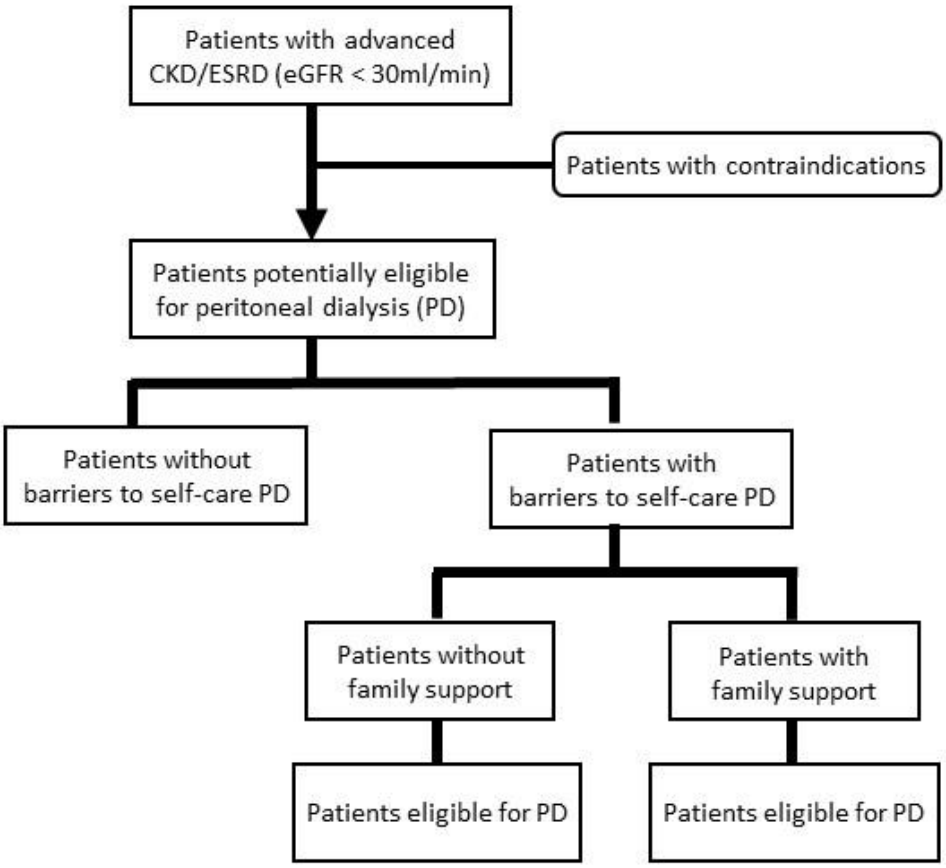


Figure 2: Flowchart representing the study.

2.7 STATISTICAL ANALYSIS

The data from the completed data collection was coded and entered into a SPSS database software for analysis. The hard copies of the data collection tools were stored by the principal investigator in a locked cabinet for the purposes of confidentiality.

Categorical data were expressed as frequencies and percentages whereas continuous data were expressed as mean and standard deviations whereas categorical variables were expressed as a frequencies and percentages. Univariate analysis was conducted using Chi square (χ^2) or Fisher's exact test for categorical data and Student's t-test or the Kruskal Wallis test for continuous data.

2.8 ETHICAL CONSIDERATIONS

The ethical approval for this study was obtained from the Research and Ethics Committee of Aga Khan University Hospital, Nairobi. Informed consent was obtained from all participants (Appendix 1). Anonymity and confidentiality of data collected was strictly maintained.

Where patients expressed interest in PD as a modality of themselves, their interest and any concerns or queries were addressed by their respective consultant nephrologist. This included patients who sought to enquire whether they were deemed eligible or not for PD.

2.9 STUDY LIMITATIONS

The study assessed patients at Aga Khan University Hospital Nairobi and there may be regional variations in eligibility and therefore eligibility rates may be different in other parts of the country.

We did not assess the socioeconomic status of patients or whether it had an interaction with PD eligibility since the aim of this study was to examine the population for contraindications or barriers inherent to the population itself as opposed to economic factors.

The patient population comorbidity profile in this study showed a predominant burden of non-communicable disease i.e. diabetes mellitus and hypertension. While this reflects the increasing burden of non-communicable disease locally in Kenya, other comorbidities such as HIV still pose a significant burden of disease as well as contributory to renal disease. The nature of

contraindications, barriers and eligibility profile of this subset of patients may be different and possibly not completely captured in this study

We assessed in this study the effect of barriers and support on eligibility of PD and not the choice and use of PD. Determining effect of support on PD utilization is considered more informative of effect on ultimate decision making and has been investigated in other studies (21). Due to limitations of time we were not able to assess for the impact of support on PD utilization and choice. Further studies could perhaps explore this including the effect of education on choice.

Eligibility was determined as per the judgement of the multidisciplinary team guided by the MATCH-D tool to attempt to standardize the assessment process. However, the tool has not been evaluated for the local context, therefore a more standard way needs to be explored in determining the eligibility for PD.

For purposes of the secondary objective of determining effect of presence of support on PD eligibility, a larger number of patients studied may have been more informative.

2.10 DISSEMINATION OF STUDY FINDINGS

The findings of this study will be presented at the Faculty Academic Rounds in 2019 and at a national conference. The results will also be submitted for a manuscript publication in a journal and the dissertation will be available at the Aga Khan University library.

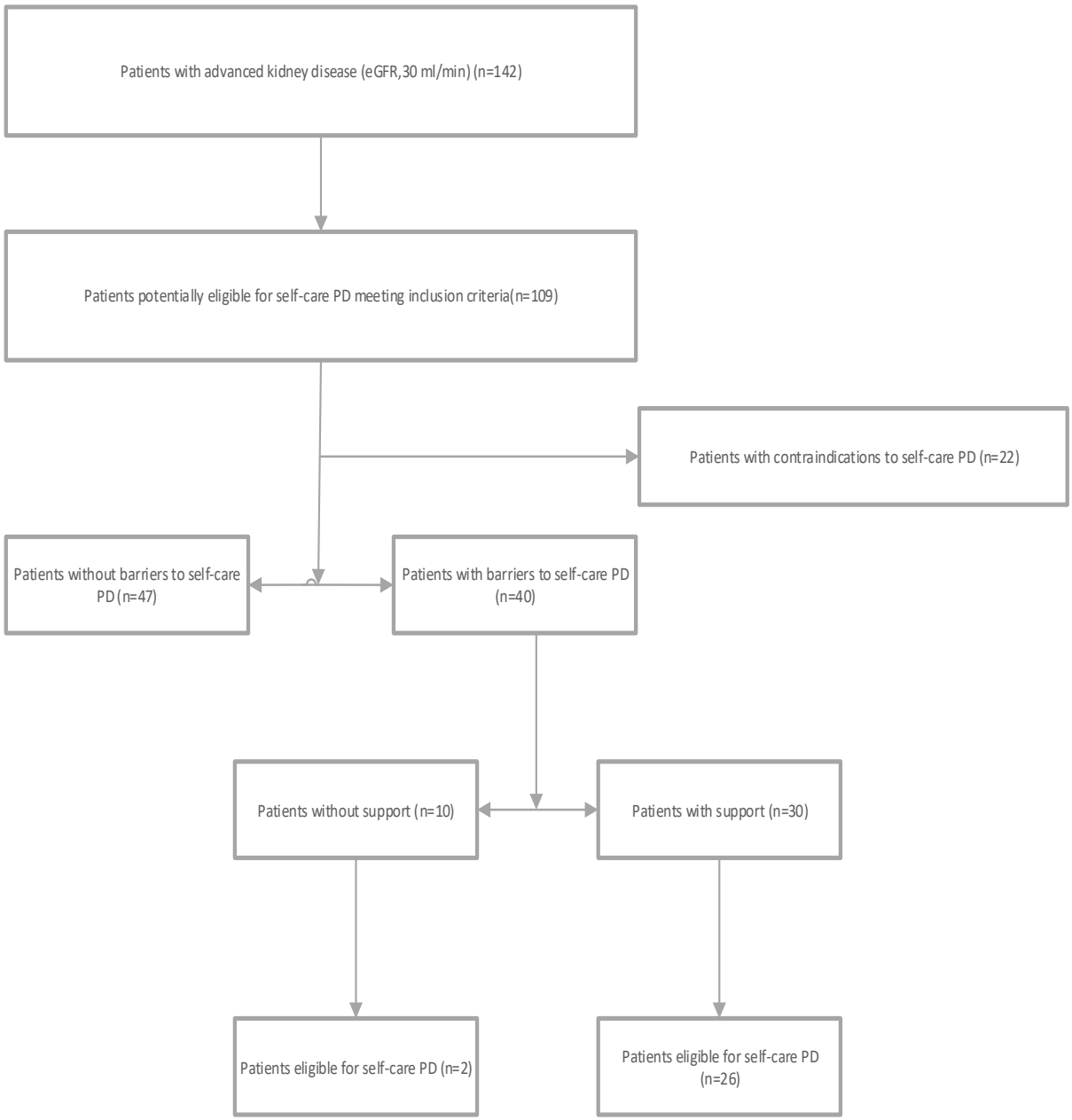
CHAPTER THREE

3.0 RESULTS

Patient Characteristics

Of 142 patients meeting initial eligibility criteria for the study, 109 patients were recruited and assessed for self-care PD eligibility (Figure 3).

Figure 3: Study flow



The mean age of the patients was 59.58 years (SD = 15.46) and 71.6 % were male and 28.4% female. Average body mass index of all patients assessed was 25.92 (SD = 5.43). The most common risk factors/comorbidities identified that were associated with chronic kidney disease were hypertension (83.5%) and diabetes mellitus (58.7%).

83.5% of patients had end-stage renal disease and the remainder (16.5%) were categorized as having stage 4 CKD. Mean eGFR was 10.91 mmol/min (SD = 6.72) and average creatinine levels were 599.71 micromoles/L (SD = 285.51). Majority of the patients were on dialysis (84.4%) with 15.6% in the pre-dialysis stage of treatment. 22% of the patients had reported having received formal pre-dialysis education. Mean values for hemoglobin and albumin were 10.73 g/dl (SD = 2.00) and 36.34 g/L (SD = 6.29) respectively.

Eligibility for self-care Peritoneal Dialysis

Of the 109 patients assessed for PD eligibility, 22 (20.2%) had absolute contraindications to self-care PD which precluded them for PD. Of the remaining 87 (79.8%) patients, had no significant physical or cognitive barriers to self-care PD. Patients with barriers then had eligibility determined after taking into account the presence or absence of support for self-care PD. A total of 28/40 patients with barriers were thus deemed eligible for self-care PD after taking into account presence of support for self-care PD. The total number of patients eligible for self-care PD was therefore 75/109 (68.9%).

Contraindications to self-care PD

From the 109 patients, 20.2% indicated the presence of contraindications (Table 2). Gender was associated with contraindications ($p = 0.017$). The hemoglobin levels were lower in the group with contraindications. ($p = 0.015$) (Table 3).

Abdominal scarring secondary to prior multiple or complex abdominal surgeries were identified as the most common contraindications to self-care PD 16/22 (72.7%). The most common complex abdominal surgeries noted were prior total abdominal hysterectomy (4/16) 25% and prior intestinal resection and anastomosis for intestinal obstruction (4/16) 25%. Other contraindications identified included terminal disease secondary to metastatic cancer (n=2), polycystic kidney disease (n=1), morbid obesity (n=1), abdominal aortic aneurysm (n=1), active inflammatory bowel disease (n=1) and active diverticulitis (n=1). One patient had both surgical-related abdominal scarring contraindication and a non-surgical related contraindication (morbid obesity). After taking into account patients with contraindications to self-care PD, the remaining 87 patients were assessed for barriers to self-care PD (Table 4).

Contraindications to self-care PD	
Number of patients assessed	109
Surgical related contraindications	
Abdominal scarring secondary to prior multiple/complex abdominal surgery	16 (14.7%)
Non-surgical related contraindications	
Terminal disease (Metastatic cancer)	2 (1.8%)
Morbid obesity	1 (0.9%)
Polycystic kidney disease	1 (0.9%)
Abdominal aortic aneurysm	1 (0.9%)
Active inflammatory bowel disease	1 (0.9%)
Diverticulitis	1 (0.9%)

Table 2: Contraindications to self-care PD (Data represented as counts(percentages)), Surgical related contraindications were more common than non-surgical contraindications

Variables		Total (n= 109)		Contraindications				P Value
				No (n = 87)		Yes (n = 22)		
Age (years)		59.58	(15.46)	59.40	(14.70)	60.27	(18.53)	0.615
Gender	Male	78	(71.6%)	67	(77.0%)	11	(50.0%)	0.017
	Female	31	(28.4%)	20	(23.0%)	11	(50.0%)	
Weight (kg)		72.45	(16.50)	72.33	(14.54)	72.96	(23.09)	0.763
Height (cm)		166.99	(8.12)	167.87	(8.33)	163.50	(6.22)	0.020
BMI		25.92	(5.43)	25.60	(4.59)	27.19	(7.96)	0.553
DM	No	45	(41.3%)	35	(40.2%)	10	(45.5%)	0.809
	Yes	64	(58.7%)	52	(59.8%)	12	(54.5%)	
HBA1C		6.98	(1.50)	7.12	(1.55)	6.39	(1.15)	0.167
HTN	No	18	(16.5%)	14	(16.1%)	4	(18.2%)	1.000
	Yes	91	(83.5%)	73	(83.9%)	18	(81.8%)	
CAD	No	102	(93.6%)	80	(92.0%)	22	(100.0%)	0.341
	Yes	7	(6.4%)	7	(8.0%)	0	(0.0%)	
CCF	No	104	(95.4%)	84	(96.6%)	20	(90.9%)	0.581
	Yes	5	(4.6%)	3	(3.4%)	2	(9.1%)	
Other	No	57	(52.3%)	50	(57.5%)	7	(31.8%)	0.035
	Yes	52	(47.7%)	37	(42.5%)	15	(68.2%)	
HIV	Negative	103	(94.5%)	82	(94.3%)	21	(95.5%)	1.000
	Positive	6	(5.5%)	5	(5.7%)	1	(4.5%)	
Creatinine		599.71	(285.51)	616.45	(300.38)	533.50	(209.64)	0.306
EGFR		10.91	(6.72)	11.11	(7.26)	10.09	(3.96)	0.655
Stage	4	18	(16.5%)	16	(18.4%)	2	(9.1%)	0.520
	5	91	(83.5%)	71	(81.6%)	20	(90.9%)	
Payment	Self	14	(12.8%)	13	(14.9%)	1	(4.5%)	0.377
	NHIF	93	(85.3%)	72	(82.8%)	21	(95.5%)	
	Private insurance	2	(1.8%)	2	(2.3%)	0	(0.0%)	
Pre-dialysis Education	No	85	(78.0%)	66	(75.9%)	19	(86.4%)	0.393
	Yes	24	(22.0%)	21	(24.1%)	3	(13.6%)	
Treatment Modality	Pre-dialysis	17	(15.6%)	16	(18.4%)	1	(4.5%)	0.186
	Haemodialysis	92	(84.4%)	71	(81.6%)	21	(95.5%)	
Haemoglobin		10.73	(2.00)	10.94	(1.94)	9.87	(2.05)	0.015
Albumin		36.34	(6.29)	36.63	(6.47)	35.20	(5.54)	0.157
Calcium		2.22	(.24)	2.22	(.26)	2.25	(.17)	0.700
Phosphate		1.41	(0.46)	1.41	(.47)	1.40	(.39)	0.893
PTH		357.28	(309.38)	370.99	(329.27)	298.63	(200.17)	0.732
Trans Saturation		30.65	(20.12)	31.27	(21.19)	28.49	(16.21)	0.796
Vitamin D		30.24	(17.75)	30.97	(18.09)	26.99	(16.25)	0.482
CRP		9.72	(10.42)	8.67	(9.48)	14.20	(13.71)	0.259
Alkaline Phosphatase		180.63	(193.88)	183.83	(187.24)	168.14	(222.50)	0.306

Table 3: Baseline characteristics of patients with and without contraindications to self-care PD.

((Data represented as means (SD)/counts(percentages))

Barriers to self-care PD

The 87 patients that had no contraindications were categorized into those with barriers and without barriers, and 54% had no barriers to self-care PD. A barrier was identified as any factor that could potentially affect the patient's ability to perform self-care PD. Barriers were grouped as physical, cognitive or both physical and cognitive. Patients with barriers were likely to be older ($p = 0.001$), have diabetes mellitus ($p = 0.009$), have a higher eGFR ($p = 0.042$), lower parathyroid hormone level ($p = 0.026$) and higher CRP ($p = 0.019$) (Table 5).

Physical barriers were the most common 82.5% (33/40), with six patients having both physical and cognitive barriers and one patient with cognitive barriers alone. The most common physical barriers encountered were reduced physical strength (22/40) 55% and obesity (12/40) 30%, impaired vision (7/40) 17.5% and reduced mobility (7/40) 17.5%. A single simple prior abdominal surgery was not considered an absolute contraindication and was found in (3/40) 7.5% of patients with barriers to self-care PD. Cognitive barriers included illiteracy/language barrier (4/40) 10%, dementia (2/40) 5%, psychosis (1/40) 2.5%, depression (1/40) 2.5% and schizoaffective disorder (1/40) 2.5% (Table 4).

Barriers to self-care Peritoneal Dialysis		
Patients assessed for barriers		87
Patients with barriers		40
Physical barriers		
Reduced physical strength		22 (55%)
Obesity		12 (30%)
Impaired vision		7 (17.5%)
Reduced mobility		7 (17.5%)
Impaired hearing		3 (7.5%)
Single prior abdominal surgery		3 (7.5%)
Neuropathy		2 (5%)
Chronic diarrhoea		1 (2.5%)
Reduced manual dexterity		1 (2.5%)
Polycystic kidney disease		1 (2.5%)
Cognitive barriers		
Illiteracy		4 (10%)
Dementia		2 (5%)
Psychosis		1 (2.5%)
Depression		1 (2.5%)
Schizoaffective disorder		1 (2.5%)

Table 4: Barriers to self-care PD (Data represented as counts (percentages)). Physical barriers were more commonly identified than cognitive barriers

Variables		Barriers				P Value
		No (n = 47)		Yes (n = 40)		
Age (years)		54.34	(14.61)	65.35	(12.55)	0.001
Gender	Male	40	(85.1%)	27	(67.5%)	0.073
	Female	7	(14.9%)	13	(32.5%)	
Weight (kg)		70.16	(12.44)	74.87	(16.48)	0.245
Height (cm)		168.43	(9.17)	167.23	(7.28)	0.682
BMI		24.61	(3.09)	26.77	(5.71)	0.201
DM	No	25	(53.2%)	10	(25.0%)	0.009
	Yes	22	(46.8%)	30	(75.0%)	
HBA1C		7.12	(1.86)	7.16	(1.27)	0.670
HTN	No	9	(19.1%)	5	(12.5%)	0.560
	Yes	38	(80.9%)	35	(87.5%)	
CAD	No	45	(95.7%)	35	(87.5%)	0.240
	Yes	2	(4.3%)	5	(12.5%)	
CCF	No	47	(100%)	37	(92.5%)	0.093
	Yes	0	(0.0%)	3	(7.5%)	
Other	No	28	(59.6%)	22	(55.0%)	0.828
	Yes	19	(40.4%)	18	(45.0%)	
HIV	Negative	44	(93.6%)	38	(95.0%)	1.000
	Positive	3	(6.4%)	2	(5.0%)	
Creatinine		700.38	(323.92)	517.83	(238.22)	0.006
EGFR		10.45	(7.57)	11.90	(6.89)	0.042
Stage	4	9	(19.1%)	7	(17.5%)	1.000
	5	38	(80.9%)	33	(82.5%)	
Payment	Self	10	(21.3%)	3	(7.5%)	0.064
	NHIF	37	(78.7%)	35	(87.5%)	
	Private insurance	0	(0.0%)	2	(5.0%)	
Pre-dialysis Education	No	32	(68.1%)	34	(85.0%)	0.082
	Yes	15	(31.9%)	6	(15.0%)	
Treatment Modality	Pre-dialysis	10	(21.3%)	6	(15.0%)	0.581
	Haemodialysis	37	(78.7%)	34	(85.0%)	
Haemoglobin		10.99	(2.05)	10.89	(1.81)	0.966
Albumin		37.67	(5.48)	35.36	(7.37)	0.122
Calcium		2.18	(.27)	2.26	(.24)	0.208
Phosphate		1.49	(.52)	1.30	(.39)	0.100
PTH		452.67	(381.99)	272.97	(219.69)	0.026
Trans Saturation		30.50	(21.67)	32.20	(21.02)	0.830
Vitamin D		29.86	(15.81)	32.34	(20.77)	0.932
CRP		5.23	(6.67)	12.61	(10.86)	0.019
Alkaline Phosphatase		172.09	(174.76)	196.77	(201.61)	0.116

Table 5: Baseline characteristics of patients with and without barriers to self-care PD. ((Data represented as means (SD)/counts(percentages))

Impact of support on PD eligibility in patients with barriers to self-care PD

The group of patients with barriers to self-care PD were assessed for presence of support for self-care PD which could be in the form of family support of paid assistance. Eligibility for self-care PD was then assessed to determine whether the presence of support would be able to overcome barriers identified. 75% received support from the 40 patients that had barriers to self-care PD.

In the group of patients with barriers to self-care PD and presence of support (30/40), 26 were deemed eligible and 4 not eligible for self-care PD whereas in the group of patients with barriers and no support (10/40), 2 were deemed eligible and 8 were not eligible for self-care PD (See figure 3). Impact of support on PD eligibility was determined and found to be significant ($p = <0.001$).

3.1 DISCUSSION

With peritoneal dialysis in adults being a largely underutilized modality of renal replacement therapy in Kenya, we undertook this study to examine the local population to attempt to determine eligibility and suitability for self-care PD, explore potential contraindications and barriers to PD and determine whether support had any impact on PD eligibility in patients deemed to have barriers to self-care PD. Data on PD eligibility from Kenya and Africa generally is scant and this study provided some insight into the local population.

The mean age of the population (60 years) studied was comparable to that found in other populations and it was a predominantly male population (71.6% were male). The aetiology/risk factor profile for chronic kidney disease was reflective of the increasing burden of non-communicable disease locally with hypertension and diabetes present in 83.5% and 58.7% of the total number of patients assessed respectively. This emphasizes the point that non-communicable disease continues to pose an increasing burden on renal disease in Kenya and may even influence eligibility for ESRD treatment modalities as this study for instance found that patients with barriers to self-care PD were more likely to be diabetic. In comparison, a relatively smaller proportion of patients in this study were noted to have HIV disease. HIV remains a major health concern and contributor to morbidity and mortality as well as to renal disease in Kenya. The nature of contraindications, barriers and eligibility profile of this subset of patients may be different and possibly not completely captured in this study.

Of the total 109 patients in the study 75/109 (68.9%) were deemed eligible for self-care PD. Previous studies done between 1996 and 2010 in Canada, the United Kingdom and Netherlands, revealed eligibility rates of 64-87% (6, 21, 38-40). However, there were some important differences between our study and prior ones including that there was no use of a single standardized tool in previous studies and that some of the factors previously cited as

absolute contraindications in previous studies were re-examined and not deemed to necessarily be contraindications to self-care PD. Examples of these include advanced age, obesity, the presence of any previous abdominal surgery regardless of the actual likelihood of abdominal scarring which would impair the efficacy of PD. The overall rate for self-care PD eligibility of 68.9% found in this study may have therefore been lower had the stated factors been applied as absolute contraindications and therefore potentially a lower rate than those found in previous studies in developed countries.

We therefore assessed patients in a standardized manner on an individual basis and applied stricter criteria to exclude patients from PD eligibility. For example, 16 patients were noted to have had prior multiple or complex abdominal surgeries therefore judged to be at higher likelihood of having significant peritoneal scarring whereas 3 patients in the group of patients with barriers were noted to have a single prior abdominal surgery and therefore not judged to be absolutely precluded from PD given the lesser likelihood of significant peritoneal scarring. Studies have noted however, that the presence of prior surgery may not be entirely predictive of the extent of abdominal scarring and likelihood of PD failure and that laparoscopic evaluation may be an objective way to actually assess for the same (41). This reiterates the need for a case-by-case and more objective assessment for absolute contraindications to PD but given limitations of time and resources we used the complexity and number of prior surgeries to determine contraindication from the modality.

Non-surgical related contraindications were also identified but of note is that some of these conditions such as morbid obesity, active inflammatory bowel disease and active diverticulitis are states that may change clinically with time hence re-evaluating such patients on a continuous basis rather than applying a label that they are permanently contraindicated from the modality is important.

After excluding patients with contraindications, the remaining patients were assessed for potential physical or cognitive barriers to self-care PD. 47/87 (54%) patients were found to have no significant barriers. 40/87 (45.9%) of patients were noted to have at least one potential physical or cognitive barrier to self-care PD and patients were likely to be older ($p = 0.001$), have diabetes mellitus ($p = 0.009$), have a higher eGFR ($p = 0.042$), lower parathyroid hormone level ($p = 0.026$) and higher C-Reactive Protein ($p = 0.019$). This may be because of the greater level of physical and cognitive comorbidities that come with age and diabetes. The association with higher CRP levels may more advanced disease or greater burden of comorbid inflammatory processes. Physical barriers were more common than cognitive barriers and may partly be a reflection of the association with the older age noted in patients with barriers. We utilized a single tool (MATCH-D tool) to guide the assessment of barriers methodically which were recorded for each patient.

The most common barriers identified included reduced physical strength, obesity, impaired vision and reduced mobility. Reduced physical strength was also identified as a common physical barrier in other studies (21). Obesity in some previous studies was listed as a contraindication but we only considered it one when it was classified as morbid obesity (Body Mass Index greater than 45). Diabetes related complications contributed to four of the seven patients having barriers due to impaired vision, reflective of the burden of diabetes contributing not only to chronic kidney disease in our population but also to other microvascular complications that could impact patients as barriers to receiving PD as a treatment modality. Other diabetes related complications identified as contributory to barriers to self-care PD included neuropathy. Of note in the patients with reduced mobility, two of seven had spinal TB that was contributory to this barrier; infectious diseases continue to pose a challenge and beyond being directly contributory to kidney disease may be associated with other morbidity that may be a barrier to treatment such as self-care PD.

Cognitive barriers were less frequently noted than physical barriers. Illiteracy/language barrier was the most commonly noted cognitive barrier. Psychiatric conditions accounted for barriers in three of seven patients with cognitive barriers. Depression is prevalent in patients with end-stage renal disease though no local data is available and demonstrates the importance of screening for this important morbidity as it and other psychiatric conditions may affect compliance to the modality (42).

The effect of presence of support on PD eligibility was assessed as a secondary outcome and found to be significant ($p < 0.001$) This had also been demonstrated in another prior 2010 study in Canada by Oliver et al which found that the presence of family support for self-care PD was associated with an increase in eligibility from 63% to 80% (P=0.003) (21).We found that of the 40 patients with barriers to self-care PD, 30 (75%) had presence of support for self-care PD and it was associated with an increase in eligibility for self-care PD ($p<0.001$). We did not assess PD choice or the impact of presence of support on it, and ultimately utilization by patients in this study due to constraints of time. However, presence of support in the form of family support or paid home-care assistance may help overcome patient barriers to self-care PD and therefore influence eligibility for the modality and therefore may be an important factor to explore in patients with advanced CKD.

Pre-dialysis education has been shown to improve preparation for dialysis and survival of patients with CKD yet only a minority of the patients assessed (22%) reported having had any formal pre-dialysis education (27, 28). There is need therefore to emphasize and implement this important aspect of care in patients with advanced CKD.

A sequential and standardized approach to assessing PD eligibility by evaluating for contraindications and barriers is important as it enables recognition of potential challenges from early on and allows for exploration of ways to overcome the same. This is even more

important in limited resource settings like Kenya where PD as a modality of RRT is greatly underutilized.

3.2 CONCLUSIONS

In this study on eligibility of patients with advanced CKD for self-care PD we found 68.9% of the patients eligible for self-care PD. This is comparable to eligibility for self-care PD in other developed countries and therefore a significant proportion of the local population may be candidates for self-care PD, a modality of RRT that is at the moment greatly underutilized in Kenya. Other factors that contribute to under-utilization including physician and system factors may need to be explored.

Contraindications to self-care PD were identified in 22/109 patients and surgery-related abdominal scarring was the most common contraindication. Non-surgical contraindications were also identified in 7/22 patients with contraindications to self-care PD. Examining patients for contraindications is an important step in determining presence of eligibility for self-care PD as the presence of such precludes patients from the modality regardless of their or the physician's preference.

Barriers to self-care PD were identified in 45.9% (40/87) after excluding patients with contraindications to self-care PD and physical barriers were more common than cognitive barriers. Patients with barriers were likely to be older and have diabetes mellitus. Presence of support for self-care PD in patients with barriers to self-care PD was associated with a significant increase in self-care PD eligibility ($P < 0.001$). This has also been noted in a previous study and supports the view that presence of support may help overcome barriers that are more frequently noted in the older population.

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APPENDICES

Appendix 1: Informed Consent Form

My name is Dr Saleem Mohamed. I am a third-year resident at Aga Khan University Hospital Nairobi in the Department of Internal Medicine. I am conducting a study investigating the eligibility of patients for peritoneal dialysis and the barriers associated.

Peritoneal dialysis is a form of treatment for kidney failure. It involves the use of a tube that is inserted into the belly to allow piping of fluid and removal of excess salt and water and waste that accumulate in kidney failure. It is a fairly easy procedure to learn but requires careful selection of patients as its safe and effective performance requires some level of physical and mental ability. Factors that may make it difficult for one to perform self-care peritoneal dialysis are referred to as barriers.

Also, to be investigated is how the presence of support impacts eligibility for peritoneal dialysis. Support can be either in the form of a family member who is able to assist in the performance of PD or a paid home-care assistant. We would like to explore this because presence of support may help overcome some of the patient barriers that may otherwise make them considered not eligible for peritoneal dialysis.

The study will involve you being assessed for eligibility by a multi-disciplinary team as well as collection physical examination findings as well as relevant laboratory tests will be collected. All information will be strictly confidential and anonymity will be ensured. Your involvement in the study will be completely voluntary and your non-involvement will not affect the care you currently receive. You will be entitled to ask any questions regarding the study. You will also be entitled to withdraw unconditionally from the study at any time.

The study is supervised by Dr Ahmed Sokwala, assistant professor and consultant nephrologist at Aga Khan University Hospital Nairobi. Ethical approval for the study has been obtained by the ethics committee of Aga Khan University Hospital. Results of the study will be available at the Aga Khan University Library.

Thank you for your participation.

Name……..…….

Signature…….

Date ……

Tel number: ……....

Jina langu ni Dr Saleem Mohamed. Ninasomea shahada ya uzamili ya utabibu katika Hospitali ya Chuo Kikuu cha AgaKhan Nairobi. Ninafanya utafiti kuchunguza ustahiki wa wagonjwa kwa dialysis ya peritoneal na vikwazo vinavyohusishwa.

Dialysis ya peritoneal ni aina ya matibabu ya kushindwa kwa figo. Inahusisha matumizi ya bomba ambalo linaingizwa ndani ya tumbo kuruhusu kuondolewa kwa chumvi na maji kupita kiasi na taka ambayo hujilimbikiza katika kushindwa kwa figo. Ni utaratibu rahisi sana wa kujifunza lakini unahitaji uteuzi makini wa wagonjwa kama utendaji salama na ufanisi unahitaji kiwango fulani cha uwezo wa kimwili na wa akili. Mambo ambayo yanaweza kuwa vigumu kwa mtu kufanya huduma ya kujitegemea ya dialysis yanajulikana kama vikwazo.

Pia kuchunguzwa, ni jinsi uwepo wa msaada unaathiri kustahiki kwa dialysis ya peritoneal. Msaada unaweza kuwa mshirika wa familia ambaye anaweza kusaidia katika utendaji wa PD au msaidizi wa huduma ya nyumbani. Tungependa kuchunguza hili kwa sababu kuwepo kwa msaada kunaweza kushinda vikwazo vingine vya mgonjwa ambavyo vinginevyo vinaweza kuwafanya wasizingatiwe kuwa halali kwa dialysis ya peritoneal.

Utafiti huo utahusisha wewe kuchunguzwa kwa ustahiki na timu ya taaluma nyingi pamoja na kukusanya habari kuhusu historia yako ya matibabu, matokeo ya uchunguzi wa kimwili na vipimo vya maabara.

Taarifa zote zitakuwa za siri na kutotambulika itahakikishwa. Ushiriki wako katika utafiti utakuwa kwa hiari na hautaathiri huduma unayopokea sasa. Utakuwa na fursa ya kuuliza maswali yoyote kuhusu huo utafiti. Pia utaweza kujitoa kutoka huo utafiti bila vikwazo vyovyote wakati wowote.

Utafiti huo unasimamiwa na Dr Ahmed Sokwala, profesa msaidizi na mtaalamu wa nephrologist katika Hospitali ya Chuo Kikuu cha AgaKhan Nairobi.

Idhini ya kimaadili ya utafiti imepatikana na kamati ya maadili ya Hospitali ya Chuo Kikuu cha AgaKhan. Matokeo ya utafiti yatapatikana kwenye Maktaba ya Chuo Kikuu cha Aga Khan.

Asante kwa ushiriki wako.

Jina…….

Sahihi…….

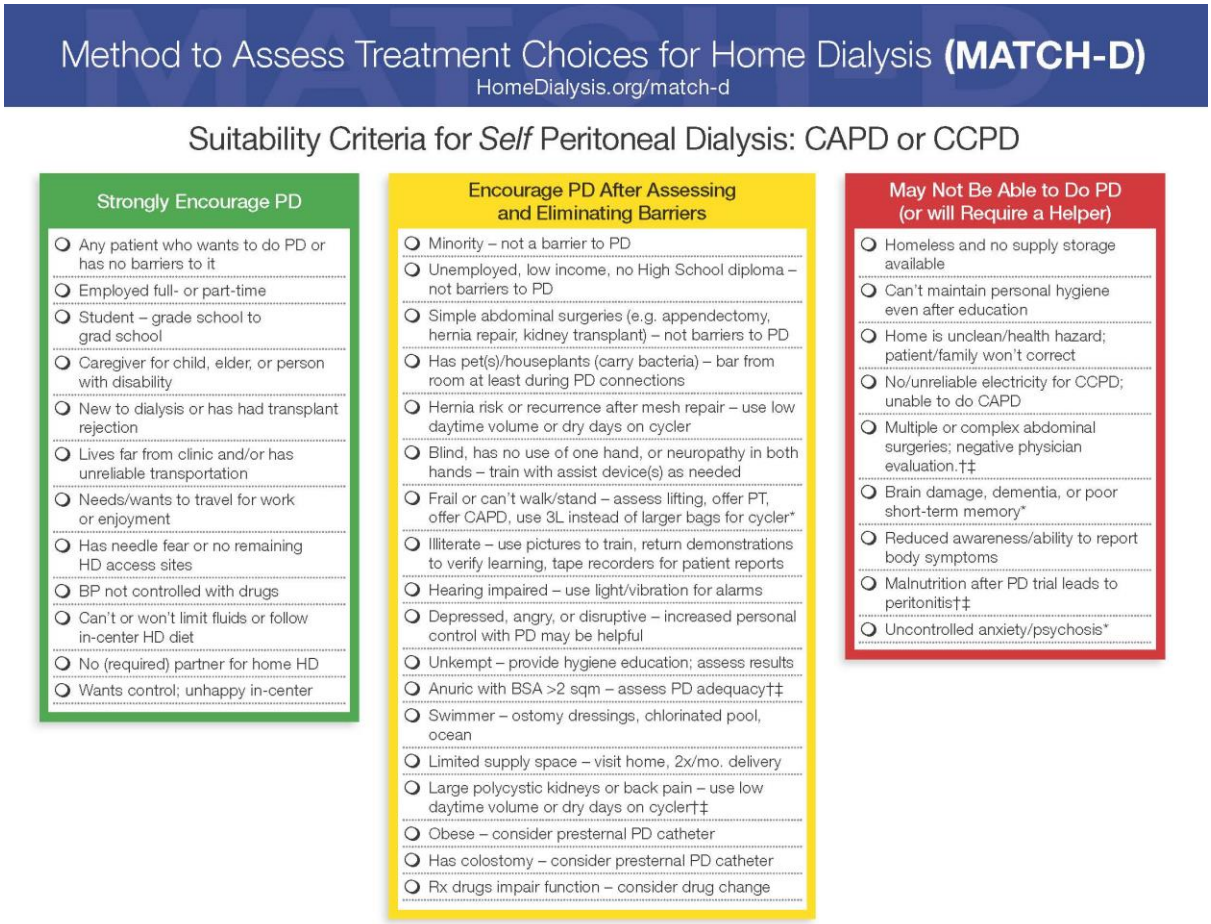
Tarehe……..……

Nambari ya simu……....

Appendix 2: Sample data collection tools.

DEMOGRAPHICS	
Age	
Gender	Male
	Female
Dialysis Payment	Self/family
	NHIF
Presence of support for self-care PD	Present
	Absent
Prior receipt of pre-dialysis education	Yes
	No
Weight (kg)	
Height (cm)	
BMI	
TREATMENT	
Current treatment modality	Hemodialysis
	Predialysis
Type of renal failure (if on dialysis)	AKI
	ESRD
COMORBIDITIES	
Diabetes Mellitus	
Coronary Artery Disease	
Congestive Cardiac Failure	
Other	
HIV	
LABORATORY PARAMETERS	
Hemoglobin	
Albumin	
Corrected Calcium	
Phosphate	
Parathyroid Hormone	
ALP	
Vitamin D	
Transferrin Saturation	
Ferritin	
CRP	

Appendix 3: MATCH –D TOOL



Method to Assess Treatment Choices for Home Dialysis **(MATCH-D)**

HomeDialysis.org/match-d

Suitability Criteria for *Self* Peritoneal Dialysis: CAPD or CCPD

Strongly Encourage PD

- Any patient who wants to do PD or has no barriers to it
- Employed full- or part-time
- Student – grade school to grad school
- Caregiver for child, elder, or person with disability
- New to dialysis or has had transplant rejection
- Lives far from clinic and/or has unreliable transportation
- Needs/wants to travel for work or enjoyment
- Has needle fear or no remaining HD access sites
- BP not controlled with drugs
- Can't or won't limit fluids or follow in-center HD diet
- No (required) partner for home HD
- Wants control; unhappy in-center

Encourage PD After Assessing and Eliminating Barriers

- Minority – not a barrier to PD
- Unemployed, low income, no High School diploma – not barriers to PD
- Simple abdominal surgeries (e.g. appendectomy, hernia repair, kidney transplant) – not barriers to PD
- Has pet(s)/houseplants (carry bacteria) – bar from room at least during PD connections
- Hernia risk or recurrence after mesh repair – use low daytime volume or dry days on cycler
- Blind, has no use of one hand, or neuropathy in both hands – train with assist device(s) as needed
- Frail or can't walk/stand – assess lifting, offer PT, offer CAPD, use 3L instead of larger bags for cycler*
- Illiterate – use pictures to train, return demonstrations to verify learning, tape recorders for patient reports
- Hearing impaired – use light/vibration for alarms
- Depressed, angry, or disruptive – increased personal control with PD may be helpful
- Unkempt – provide hygiene education; assess results
- Anuric with BSA >2 sqm – assess PD adequacy†‡
- Swimmer – ostomy dressings, chlorinated pool, ocean
- Limited supply space – visit home, 2x/mo. delivery
- Large polycystic kidneys or back pain – use low daytime volume or dry days on cycler†‡
- Obese – consider presternal PD catheter
- Has colostomy – consider presternal PD catheter
- Rx drugs impair function – consider drug change

May Not Be Able to Do PD (or will Require a Helper)

- Homeless and no supply storage available
- Can't maintain personal hygiene even after education
- Home is unclean/health hazard; patient/family won't correct
- No/unreliable electricity for CCPD; unable to do CAPD
- Multiple or complex abdominal surgeries; negative physician evaluation.†‡
- Brain damage, dementia, or poor short-term memory*
- Reduced awareness/ability to report body symptoms
- Malnutrition after PD trial leads to peritonitis†‡
- Uncontrolled anxiety/psychosis*

MATCH-D

Reasons to encourage PD or home HD	Barriers to PD or home HD and how to address them	Contraindications to independent PD or home HD

I have talked with my care team about whether PD or home HD is a good fit for me now.

Patient signature: _____ **Keep copy in the patient's record.**

Healthcare provider signature: _____ Date: _____