

## Factors Affecting the Decision to Initiate Dialysis: A Survey of Qalubia Governorate Nephrologists

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### Abstract:

**Background:** Patients with end-stage renal disease (ESRD) receive renal replacement therapy (RRT) to improve their survival and quality of life. Whereas RRT might be life-saving in certain conditions, dialysis also is unphysiological and may have life-threatening complications. Better understanding of nephrologists' decision making regarding the start of RRT would assist further studies relating residual kidney function and signs and symptoms at the start of dialysis therapy to prognosis. Therefore, the aim of this study was to evaluate current opinions on factors influence the decision of dialysis by performing a survey of nephrologists in Qalubia Governorate, Egypt. **Methods:** This cross-sectional observational study included nephrologists from different hospitals, in Qalubia, Egypt. This study included a web-based survey using the online tool SurveyMonkey (SurveyMonkey.com). Approval of the Ethics Committee in the Faculty of Medicine, Benha University was taken before preceding the study. **Results:** Our results showed that 84% of studied physicians would recommend dialysis decision patients when eGFR decreased regardless any clinical symptoms or signs out of them 71.4% recommend dialysis if GFR decreased below 10 ml and others 28.6% recommend it when GFR decreased below 15 ml. While only 30% of studied physicians recommend initiation of dialysis if GFR increased especially above 30 ml (60% out of them). **Conclusions:** That nearly 84% of nephrologists based their decision to initiate dialysis on eGFR alone. Initiatives designed to safely delay dialysis through aggressive medical management could focus on modifiable factors that are the most important drivers of the decision to initiate dialysis.

**Keywords:** Dialysis, Survey, Physical function, eGFR.

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## Introduction

During the past 3 decades, the number of persons undergoing maintenance dialysis globally has increased dramatically. In 2010 it was estimated that the number of patients on dialysis was more than 2 million worldwide, and modelling data suggest this number will more than double by 2030<sup>[1]</sup>.

Several factors have contributed to the increase: improved survival of the general population, reduction in mortality of dialysis patients, an increase in the incidence of chronic kidney disease (CKD), broadening of kidney replacement therapy acceptance criteria, and greater access to maintenance dialysis in low- and middle-income countries<sup>[2]</sup>.

For patients with CKD, the decision of when to start regular dialysis is made in collaboration between the nephrologist and patient. Although dialysis effectively treats the signs and symptoms of uraemia and fluid overload (some of which may be life threatening), it is a lifelong therapy that is associated with discomfort, inconvenience, and some risk for the patient<sup>[3]</sup>.

The circumstances of dialysis initiation and the choices regarding initial modality and access can significantly affect patient experiences and outcomes. Lack of patient preparedness and an urgent start to dialysis are associated with lower survival and higher morbidity<sup>[4]</sup>.

The decision of when to start dialysis is likely to be guided by the level and rate of decrease in residual kidney function (RKF) and the clinical condition of the patient. Whereas dialysis might be life-saving in certain conditions, dialysis also is unphysiological and may have life-threatening complications. It carries a significant burden for patients and consumes substantial health care resources<sup>[5]</sup>.

Many studies evaluating associations between the timing of the start of dialysis and survival were limited in that they considered only serum creatinine level, (which is decreased in patients with

deteriorating nutritional status), as a surrogate marker of RKF and an index to define “early” versus “late” starters. In addition, they were unable to assess clinical status or specific reasons to start dialysis at a particular moment in time<sup>[6]</sup>.

The IDEAL (Initiating Dialysis Early and Late) trial was the first randomized controlled trial attempting to assess whether starting dialysis therapy at high (10-14 mL/min/1.73 m<sup>2</sup>) or low (5-7 mL/min/1.73 m<sup>2</sup>) estimated glomerular filtration rates (eGFRs) is more beneficial with respect to patient survival. However, 76% of patients randomly assigned to start at low eGFRs actually started at higher levels because of uremic signs and symptoms, resulting in a relatively small difference in eGFRs between the groups<sup>[7]</sup>.

The IDEAL study failed to show a survival difference between those randomly assigned to start dialysis therapy with higher and lower eGFRs, possibly because of this relatively small difference, but suggested that clinical status is important in the decision making of nephrologists<sup>[7]</sup>. Nevertheless, little is known about exactly which criteria nephrologists use in their decision for when to start dialysis therapy. Better understanding of nephrologists' decision making regarding the start of dialysis would assist further studies relating residual kidney function and signs and symptoms at the start of dialysis therapy to prognosis. This ultimately would guide us to define better care for patients with end stage renal disease (ESRD)<sup>[2]</sup>.

The main aim of this study was to evaluate current opinions on how clinical, social, and logistical factors influence the decision of when to start renal dialysis in early referred adult patients by performing a survey of nephrologists in Qalubia Governorate, Egypt.

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## Patients and Methods:

This cross-sectional observational study was conducted from march 2023 to March

2024 at Internal Medicine departments in Benha University, Egypt. This study included a web-based survey using the online tool SurveyMonkey (SurveyMonkey.com), this survey was depended on another survey used in a previous study Mathur et al., 2022. The survey was distributed through direct invitations to nephrologists in Qalubia, Egypt in Hospitals, Outpatient clinics or Private clinics where they usually work. All respondents were asked to provide their opinions and clinical practice in place in the last 3 years. Clinical assessment of a case to initiate dialysis decision from the studied group` point of view was done. On a scale of 1 to 100, where 100 means “initiate dialysis today” and 1 means “no plans to initiate dialysis in the next year.

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#### Statistical analysis

Statistical analysis was done by SPSS v27 (IBM©, Chicago, IL, USA). The Shapiro-Wilks test and histograms were used to

evaluate the normality of the distribution of data. Quantitative parametric data were presented as mean and standard deviation (SD) and were analysed by ANOVA (F) test with post hoc test (Tukey). Quantitative non-parametric data were presented as median and interquartile range (IQR) and were analysed by Kruskal-Wallis’s test with Mann Whitney-test to compare each group. Qualitative variables were presented as frequency and percentage (%) and were analysed utilizing the Chi-square test. A two tailed P value < 0.05 was considered statistically significant.

#### Results:

Age of studied group most of participants (46%) were <35 years with the clinical practice ranging from 10-15 years and over 52% of them work in University Hospital (Table 1).

**Table 1:** Basic characteristics of the studied group.

	Studied group	
	N=50	
	N	%
Age		
<35 years	23	46
35-45	17	34
>45 years	10	20
Duration of work in clinical practice		
<10 years	12	24
10-15	23	46
>15 years	15	30
Degree		
Specialist	32	64
Consultant	18	36
Average working time spent in direct patient care		
>50% of all working hours	28	56
<50% of all working hours	22	44
Average no. of pre-dialysis CKD (eGFR ≤60) patients\ month		
>20 patients	32	64
<20 patients	18	36
Type of working hospital		
University teaching hospital	26	52
Governmental hospital	16	32
Insurance hospital	5	10
Specialized hospital	3	6

This table shows that 84% of studied physicians would recommend dialysis decision for CKD patient when his eGFR decreased regardless any clinical symptoms or signs, out of them 71.4% recommend dialysis if GFR decreased below 10 ml and others 28.6% recommend it when GFR decreased below 15 ml. while only 30% of studied physicians recommend initiation of dialysis if GFR increased especially above 30 ml (60% out of them) (Table 2).

From clinical point of view regarding 2 patients aged 59 years with an eGFR of 10 mL/min/1.73m<sup>2</sup>, having minimal uremic symptoms and both have a reasonably well managed fluid status, blood pressure, and potassium. Neither has had recent weight loss or decline in serum albumin, while Patient no.1 does not report any changes in physical ability/function during the past 6 months, but Patient 2 has developed progressive limitations with physical ability/function during the past 6 months that you think is related to CKD/CKD-associated factors. On a scale of 1 to 100, where 100 means "initiate dialysis today" and 1 means "no plans to initiate dialysis in the next year," 24% of studied physicians considered scale 0 or 1 for patient 1 and 12% considered scale 100,

while for patient 2 30% considered scale 100 and 60% considered scale above 50% to initiate dialysis as soon as possible (Table 2).

This table shows that the studied physicians considered that out of the most common medical conditions very likely improved on initiation of dialysis were hypertension and overload (90%), shortness of breath (80%), loss of appetite (70%), declining cognitive function (68%), itching (64%), fatigue (58%), hyperphosphatemia (56%) and generalized weakness (48%) (Table 2).

This table shows that the most common uremic symptoms considered as end stage kidney disease among CKD patients were generalized weakness (90%), loss of appetite (94%), fatigue and malaise (84%), declining physical activity (74%), shortness of breath (66%) and 56% for declining cognitive function (Table 3).

This table shows that, 50% of the studied physicians considered CVD and metabolic acidosis common causes of decreased physical activity among CKD patients, 54% of them considered uraemia, 46% for older age, 42% for pulmonary disease, while only 26% for obesity and orthopaedic disorders (Table 4).

**Table 2:** Relation between eGFR level and dialysis decision from the studied group` point of view.

	Studied group N=50	
	N	%
Is there an eGFR below which you would always recommend initiation of chronic dialysis?		
Yes	42	84
No	8	16
Average eGFR	N=42	
<15 ml /min	12	28.6
<10 ml /min	30	71.4
Is there an eGFR above which you would never recommend initiation of chronic dialysis?		
Yes	15	30
No	35	70
Average eGFR	N=15	
>30 ml/min	9	60
>10 ml/min	3	20
>15 ml/min	3	20

**Table 3:** Uremic symptoms considered end stage of CKD patients, Clinical assessment of a case to initiate dialysis decision, and Improvement of medical factors on initiation of dialysis among CKD patients from studied group point of view

		Studied group N=50	
		N	%
<b>Uremic symptoms</b>			
Generalized weakness		45	90
Loss of appetite, nausea and vomiting		47	94
Declining physical activity		37	74
Declining cognitive function		28	56
Fatigue, malaise or lethargy		42	84
Itching		25	50
Shortness of breath		33	66
Sleep disturbances, insomnia		20	40
Bones or joints pain		16	32
Loss of lipido		22	44
<b>Clinical assessment of a case</b>			
Patient 1			
0-1		12	24
<50%		12	24
>50%		20	40
100%		6	12
Patient 2			
0-1		5	10
>50%		30	60
100%		15	30
<b>Improvement of medical factors</b>			
Generalized weakness	Somewhat likely	26	52
	Very likely	24	48
Loss of appetite, nausea and vomiting	Somewhat	15	30
	Very likely	35	70
Declining physical activity	Somewhat likely	30	60
	Very likely	20	40
Declining cognitive function	Somewhat likely	16	32
	Very likely	34	68
Fatigue, malaise or lethargy	Somewhat likely	21	42
	Very likely	29	58
Itching	Somewhat likely	18	36
	Very likely	32	64
Shortness of breath	Somewhat likely	10	20
	Very likely	40	80
Sleep disturbances, insomnia	Unlikely	6	12
	Somewhat likely	25	50
Bones or joints pain	Very likely	19	38
	Unlikely	6	12
Loss of lipido	Somewhat likely	27	54
	Very likely	17	34
Metabolic acidosis	Unlikely	11	22
	Somewhat likely	22	44
Malnutrition	Very likely	17	34
	Somewhat likely	34	68
Hypertension or volume overload	Very likely	16	32
	Unlikely	5	10
Hyperkalemia	Somewhat likely	22	44
	Very likely	23	46
Anemia	Unlikely	5	10
	Very likely	45	90
Hyperphosphatemia	Unlikely	7	14
	Somewhat likely	34	68
	Very likely	9	18
	Unlikely	11	22
	Somewhat likely	16	32
	Very likely	23	46
	Unlikely	9	18
	Somewhat likely	13	26
	Very likely	28	56

**Table 4:** Causes of decreased physical activity\ functions among patients

	Studied group N=50	
	N	%
CVD		
>50%	25	50
<50%	25	50
Pulmonary disease		
>50%	21	42
<50%	26	52
Not a cause	3	6
Orthopedic disease		
>50%	13	26
<50%	25	50
Not a cause	12	24
Obesity		
>50%	13	26
<50%	21	42
Not a cause	16	32
Older age		
>50%	23	46
<50%	16	32
Not a cause	11	22
Uremia		
>50%	27	54
<50%	23	46
Metabolic acidosis		
>50%	25	50
<50%	25	50

## Discussion

Patients with end-stage renal disease (ESRD) receive renal replacement therapy (RRT) to improve their survival and quality of life. The decision of when to start RRT is likely to be guided by the level and rate of decrease in residual kidney function and the clinical condition of the patient. Whereas RRT might be life-saving in certain conditions, dialysis also is unphysiological and may have life-threatening complications. It carries a significant burden for patients and consumes substantial health care resources [8].

Many studies evaluating associations between the timing of the start of RRT and survival were limited in that they considered only serum creatinine level, which is decreased in patients with deteriorating nutritional status, as a

surrogate marker of residual kidney function and an index to define “early” versus “late” starters. In addition, they were unable to assess clinical status or specific reasons to start RRT at a particular moment in time [9].

The IDEAL (Initiating Dialysis Early and Late) trial was the first randomized controlled trial attempting to assess whether starting dialysis therapy at high (10-14 mL/min/1.73 m<sup>2</sup>) or low (5-7 mL/min/1.73 m<sup>2</sup>) estimated glomerular filtration rates (eGFRs) is more beneficial with respect to patient survival. However, 76% of patients randomly assigned to start at low eGFRs actually started at higher levels because of uremic signs and symptoms, resulting in a relatively small difference in eGFRs between the groups [10].

The study failed to show a survival difference between those randomly assigned to start dialysis therapy with higher and lower eGFRs, possibly because of this relatively small difference, but suggested that clinical status is important in the decision making of nephrologists. 6-8 Nevertheless, little is known about exactly which criteria nephrologists use in their decision for when to start dialysis therapy <sup>[10]</sup>.

There is uncertainty regarding the optimal timing of the elective initiation of dialysis among patients being followed in clinic for progressive chronic kidney disease (CKD). Contrary to a previous opinion-based guideline recommendation that dialysis should be started earlier in the course of CKD <sup>[11]</sup>.

Better understanding of nephrologists' decision making regarding the start of RRT would assist further studies relating residual kidney function and signs and symptoms at the start of dialysis therapy to prognosis. This ultimately would guide us to define better care for patients with ESRD. Therefore, the aim of this study was to evaluate current opinions on how clinical, social, and logistical factors influence the decision of when to start renal dialysis in early referred adult patients by performing a survey of nephrologists in Qalubia Governorate, Egypt.

This cross-sectional observational study included nephrologists from different hospitals, in Qalubia, Egypt. This study included a web-based survey using the online tool SurveyMonkey (SurveyMonkey.com), this survey was depended on another survey used in a previous study <sup>[5]</sup>.

Our demographic results showed that, regarding the age of studied group most of participants (46%) were <35 years with the clinical practice ranging from 10-15 years and over 52% of them work in University teaching Hospital.

Similarly, a previous study by van de Luijngaarden, et al., aimed to studied

opinions of European nephrologists about the influence of clinical, social, and logistical factors on decision making regarding when to start RRT reported that 41% of their participants were < 44 years with < 14 years of experience and 81% work in public facility <sup>[12]</sup>.

Our results showed that 84% of studied physicians would recommend dialysis decision for CKD patient when his eGFR decreased regardless any clinical symptoms or signs, out of them 71.4% recommend dialysis if GFR decreased below 10 ml and others 28.6% recommend it when GFR decreased below 15 ml. While only 30% of studied physicians recommend initiation of dialysis if GFR increased especially above 30 ml (60% out of them).

In line with us, van de Luijngaarden, et al., found that median values for residual kidney function at which nephrologists aimed to start RRT in uncomplicated patients; for eGFR, the median target level was 10 mL/min/ 1.73 m<sup>2</sup>. Regarding the perceived clinical benefit of starting RRT at GFR 10.5 mL/min/1.73 m<sup>2</sup>. Most (86%) believed that starting at higher GFRs is beneficial only in the presence of symptoms, with "reduction of emergency-start dialysis" as the main reason <sup>[12]</sup>.

In disagreement with our finding, Mann et al., in a study on assessment of dialysis provider's attitudes towards timing of dialysis initiation in Canada they reported that Fifty-one percent (n=64) of participants indicated they would initiate dialysis at a higher eGFR in patients with multiple comorbidities and 57% (n=72) agreed that uremic symptoms occur earlier in patients with advanced age or a greater number of co-morbid conditions. The majority of participants were neutral or disagreed that initiation of dialysis in patients at a lower eGFR compared to a higher eGFR improves outcomes, worsens quality of life, decreases AVF or PD use and leads to sicker patients <sup>[13]</sup>.

Our analysis showed that the most common uremic symptoms considered as

end stage kidney disease among CKD patients were generalized weakness (90%), loss of appetite (94%), fatigue and malaise (84%), declining physical activity (74%), shortness of breath (66%) and 56% for declining cognitive function.

Comparable to our findings, Wulczyn et al., in a study on trajectories of uremic symptom severity and kidney function in patients with chronic kidney disease confirmed that among their participants the common symptoms were as follows pain (57%), fatigue (52%), paresthesia (45%), and pruritus (42%) were most prevalent at the baseline assessment. Anorexia (21%) and nausea (28%) were less commonly reported<sup>[14]</sup>.

Regarding cause of decreased physical activity among patients 50% of the studied physicians considered CVD and metabolic acidosis common causes of decreased physical activity among CKD patients, 54% of them considered uraemia, 46% for older age, 42% for pulmonary disease, while only 26% for obesity and orthopaedic disorders.

In line with us, Rampersad et al., in a study aimed to evaluate association between physical activity and poor health outcomes in patients with advanced CKD found that low physical activity was higher in older age (52%), CVD (35%), metabolic acidosis and obesity (24)%<sup>[15]</sup>.

From clinical point of view regarding 2 patients aged 59 years with an eGFR of 10 mL/min/1.73m<sup>2</sup>, having minimal uremic symptoms and both have a reasonably well managed fluid status, blood pressure, and potassium. Neither has had recent weight loss or decline in serum albumin, while Patient no.1 does not report any changes in physical ability/function during the past 6 months, but Patient 2 has developed progressive limitations with physical ability/function during the past 6 months that you think is related to CKD/CKD-associated factors. On a scale of 1 to 100, where 100 means "initiate dialysis today" and 1 means "no plans to initiate dialysis in the next year," 24% of studied

physicians considered scale 0 or 1 for patient 1 and 12% considered scale 100, while for patient 2 30% considered scale 100 and 60% considered scale above 50% to initiate dialysis as soon as possible.

In 1997, the National Kidney Foundation<sup>10</sup> recommended that dialysis be initiated when the estimated GFR is approximately 10.5 ml per minute, on the basis of the minimum target level of total (residual renal and dialysis) clearance for peritoneal dialysis<sup>[16]</sup>. In 2006, the National Kidney Foundation updated these guidelines to specify that the benefits, risks, and disadvantages of renal-replacement therapy should be considered when the estimated GFR is less than 15.0 ml per minute and also suggested that the initiation of dialysis therapy when the estimated GFR is higher than 15.0 ml per minute may be warranted when patients have coexisting conditions or symptoms of uraemia<sup>[17]</sup>. The Canadian Society of Nephrology recommends the initiation of dialysis when the estimated GFR is less than 12.0 ml per minute, with a proviso that dialysis can be deferred if there is no evidence of uraemia or malnutrition<sup>[18]</sup>. The Caring for Australasians with Renal Impairment (CARI) guidelines specify an estimated GFR of 10.0 ml per minute for initiation of dialysis in the case of patients with evidence of uraemia or malnutrition and a lower estimated GFR for initiation in the case of patients without uraemia or malnutrition<sup>[19]</sup>.

In our study the physicians considered that out of the most common medical conditions very likely improved on initiation of dialysis were hypertension and overload (90%), shortness of breath (80%), loss of appetite (70%), declining cognitive function (68%), itching (64%), fatigue (58%), hyperphosphatemia (56%) and generalized weakness (48%).

In line with our finding Mathur et al., reported that factors considered were very likely to improve with dialysis by more than two-thirds of respondents were: "Potassium not well controlled" (85.1%),



loss of appetite/nausea/vomiting (79.2%), metabolic acidosis (73.7%), “hypertension or volume not well controlled” (69.0%), and shortness of breath (67.5%).<sup>[5]</sup>.

## Conclusions:

Nearly 84% of nephrologists based their decision to initiate dialysis on eGFR alone. The eGFR threshold at which they did so was lower than has been examined in randomized controlled trials of dialysis initiation. Initiatives designed to safely delay dialysis through aggressive medical management could focus on modifiable factors that are the most important drivers of the decision to initiate dialysis.

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