بسم الله الرحمن الرحيم

تم رفع هذه الرسالة بواسطة / سلوي محمود عقل

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

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FRAILTY IN HEMODIALYSIS PATEINT

Thesis

Submitted for Partial Fulfillment of
Master Degree in **Internal Medicine**

By

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2022

سورة البقرة الآية: ٣٢

Acknowledgments

First and foremost, I feel always indebted to **Allah** *the Most Beneficent and Merciful.*

My profound thanks and deep appreciations to Prof. Khaled Hussein Abou Seif, **Professor of Internal Medicine and Nephrology, Faculty of Medicine, Ain Shams University for his great support and advice, his valuable remarks that gave me the confidence and encouragement to fulfill this work.**

My profound thanks and deep appreciations to Prof. Magdy Mohamed Saied El Sharkawy, **Professor of Internal Medicine and Nephrology, Faculty of Medicine, Ain Shams University for his great support and valuable remarks, meticulous supervisionand continuous support.**

I am also thankful to Dr. Dr. Mohamed Saied, **Lecturer of Internal Medicine and Nephrology, Faculty of Medicine, Ain Shams University for his meticulous supervision, valuable advice and constructive criticism.**

I would like to express my hearty thanks to all my family for their support till this work was completed.

Last but not least my sincere thanks and appreciation to all patients participated in this study.

Ahmed Amgad

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List of Abbreviations

Abb.	Full term
AVF	Arteriovenous fistula
AVG	Arteriovenous graft
AWGS	Asian Working Group for Sarcopenia
BMI	Body mass index
BUN	Blood urea nitrogen
CGA	Comprehensive geriatric assessment
CKD	Chronic kidney disease
eFI	Electronic frailty index
EFS	Edmonton Frail Scale
eGFR	Estimated glomerular filtration rate
ESRD	End-stage renal disease
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HD	Hemodialysis
IPAQ	International Physical Activity Questionnaire
KFACS	Korean Frailty and Aging Cohort Study
KRT	Kidney replacement therapy
LMICs	Low- and middle-income countries
PMP	Permillion population
PTH	Parathyroid hormone
QoL	Quality of life
RKF	Residual kidney function

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INTRODUCTION

Frailty has been defined as a state of increased vulnerability to stressors as a consequence of degeneration in multiple systems. There remain two schools of thought with regard to frailty: one which sees frailty as a physical phenotype characterized by sarcopenia and another that views frailty as an accumulation of deficits across a variety of domains ***(Worthen & Tennankore, 2019).***

Regardless of which definition of frailty is used, it has been shown in the general population to be predictive of adverse outcomes, including falls, hospitalization, decreased quality of life, and mortality ***(Vermeiren et al., 2016).***

Frailty is highly prevalent in patients at all stages of kidney disease, with as many as two-thirds of patients with end-stage renal disease (ESRD) being identified as frail ***(Kojima, 2017).*** As in the general population, patients with kidney disease who are frail have been shown to be at increased risk of negative outcomes ***(Chowdhury et al., 2017).***

Hemodialysis (HD) is a life-sustaining procedure for patients with end-stage kidney disease ***(El Sharkawy et al., 2020).*** There are solid data suggesting that frailty in patients on hemodialysis is related to the higher risk of hospitalization ***(Bao et al., 2012),*** falls ***(McAdams-DeMarco et al., 2013),*** bone loss ***(Yoneki et al., 2019)*** and mortality ***(Bao et al., 2012;***

McAdams-DeMarco et al., 2013). With the population aging, the identification of frailty in hemodialysis is an essential and necessary emerging concept for guiding patients towards personalized treatment and maximizing their likelihood of better outcome ***(Bancu et al., 2017).*** In dialysis decision-making discussions, identification of frailty can help providers address prognostic concerns on conservative management ***(Zhao et al., 2020).***

Questions remain around the utility of frailty screening – how exactly does frailty affect patients on hemodialysis? If a patient is identified as frail, are there interventions that can modify this? How can knowing a patient is frail inform decisions around their management? Are there effective and easily implementable screening tools available?

AIM OF THE WORK

The aim of this study was to assess the prevalence of frailty among dialysis population.

HEMODIALYSIS

Kidney failure is defined by a glomerular filtration rate <15 ml/min/1.73 m^2 (KDIGO, 2013) and may be treated using KRT (which refers to either dialysis more than 3 months or transplantation) or with supportive care ***(Hole et al., 2020).***

Hemodialysis is a process of purifying the blood of a person whose kidneys are not working normally. This type of dialysis achieves the extracorporeal removal of waste products such as creatinine and urea and free water from the blood when the kidneys are in a state of kidney failure. Hemodialysis is one of three renal replacement therapies (the other two being kidney transplant and peritoneal dialysis) ***(Foster et al., 2018).***

Epidemiology of dialysis

The global prevalence of kidney failure is uncertain, but was estimated to be 0.07%, or approximately 5.3 million people in 2017 ***(Bikbov et al., 2020),*** with other estimates ranging as high as 9.7 million. Worldwide, millions of people die of kidney failure each year owing to a lack of access to kidney replacement therapy (KRT), often without supportive care. Haemodialysis is costly, and current recommendations therefore suggest that haemodialysis should be the lowest priority for low- and middle-income countries (LMICs) seeking to establish kidney care programmes ***(Himmelfarb et al., 2020).***

Worldwide, approximately 89% of patients on dialysis receive haemodialysis; the majority (>90%) of patients on haemodialysis live in HICs or the so-called upper middle-income countries such as Brazil and South Africa ***(Pecoits-Filho et al., 2020).***

The apparent prevalence of long-term dialysis varies widely by region but correlates strongly with national income. This variation in prevalence in part reflects true differences in dialysis use but also reflects the fact that wealthier countries are more likely than lower income countries to have comprehensive dialysis registries ***(Bello et al., 2019).***

Of note, the prevalence of haemodialysis is increasing more rapidly in Latin America (at a rate of ~4% per year) than in Europe or the USA (both ~2% per year), although considerable variation between territories exists in all three of these regions, which again correlates primarily (but not exclusively) with wealth ***(Luxardo et al., 2018).*** The prevalence of haemodialysis varies widely across South Asia, with relatively high prevalence (and rapid growth) in India and lower prevalence in Afghanistan and Bangladesh ***(Jha et al., 2019).***

A 2017 report suggests that haemodialysis services were available in at least 34 African countries as of 2017, although haemodialysis was not affordable or accessible to the large majority of resident candidates ***(Bello et al., 2017).***