

SYSTEMIC REVIEW

**A SYSTEMIC REVIEW OF PREVALENCE OF DEPRESSION
IN PATIENT TAKING LONG TERM DIALYSIS**

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ABSTRACT

Background: People living with chronic kidney disease are at high risk of depression, anxiety, frailty, high depression in chronic kidney disease patients is associated with decreased selfcare behaviour, and aim of this review is to check the association between depressions with chronic kidney disease patients. High depression prevalence is there in long term dialysis patients and affect the person life quality so our main objective of this study is to check the depression associated with the long term dialysis.

Materials and Methods: Observational, qualatative, cross sectional, longitudinal, retrospective, cohort, prospective analysis and study is hospital and renal therapy unit, dialysis center based. This study took place in between year 2018- jan to 2022- jun, involving 3235 participants. following instruments is used: sociodemographic, economic and health condition characterization and the subjective frailty assessment (SFA) and patient health questionnaire-9 (PHQ-9), depression subscale of the hospital anxiety and depression scale and HQRoL was assesed using the kidney disease of life 36 short form, cross lagged pathway analysis, univariate analysis followed by multiple regression analysis was performed for demographical parameters, clinical conditions and laboratory test, QoL (36-Item Short-Form Health Survey [SF-36]), cognitive impairment (Mini-Mental State Examination [MMSE]), depressive state (Center for Epidemiologic Studies Depression Scale [CES-D]), grip strength, and 24-h urine volume, Depressive symptoms measured using BDI-II, Quality of Life measured using the 12-item short-form health Survey (SF-12), Hospitalizations, Mortality, Beck Anxiety

Inventory, the state-trait anxiety inventory (STAI), the beck depression inventory (BDI) and the hospital anxiety and depression scale (HADS).

Results: Depression is associated with the presence of frailty among patients with CKD on hemodialysis by the finding there was occurrence of physical frailty (73.8%) and depression (93.7%), patients with poor HRQoL were at risk of more symptoms of depression, Biochemical abnormalities like abnormal serum phosphate, parathyroid hormone level are related to depression, there is high QoL and recovery by peritoneal dialysis from cognitive failure than patient on hemodialysis. Anxiety symptoms are independently associated with increased risk for mortality and 1-year hospitalization, fitting factorial structure for the Beck-Depression Inventory-II (BDI), in dialysis patients and to assess the relation of these structure dimensions with quality of life (QoL), hospitalization, and mortality by the results median follow-up time was 3.0-3.5 years, during that time 25% deaths occurred. 22% of patients had anxiety symptoms and 42% had depressive symptoms, A higher prevalence of depressive symptoms was found in immigrant compared to native patients (49% vs. 36%), Depression and anxiety were significantly associated with females, low level of education, increased patients' age, retirement, poor financial situation, marital status and co-morbidity by the result 29.4% had depression and 35.9% had anxiety, also Patients with high levels of anxiety had higher levels of depression and those with high depression scores had higher anxiety scores.

Conclusion: The evidence from eight studies gives idea about the depression related to chronic kidney disease patient on dialysis; our review gives idea about the relation depression, anxiety, frailty with the ckd patients on dialysis. High quality studies required to examine depression in dialysis patient.

Keywords: Depression, Dialysis

INTRODUCTION

Depression may impair one's nutritional state and immune system, which negatively impacts the effectiveness of treatment. Patients undergoing dialysis frequently experience it. Numerous biological parameters are impacted by patient depression, and the amount of data from the research that are currently available is insufficient to establish a link between these biological parameters and depression in the dialysis population. Finding the incidence of depression and its correlation with biochemical abnormalities in dialysis patients were the study's primary objectives.^[3]

Within the participants there was higher prevalence of females, individuals with a steady partner and retirees, and their mean age was 59.63 (\pm 15.14) years. Physical frailty (73.8%) and depression (93.7%). Depression was associated with frailty, patients with depression were 9.8 times more likely to be frail than were patients without depression (odds ratio, OR = 9.80; 95% confidence interval, CI, 1.93-49.79).^[1]

Lower levels of three out of five domains of HRQoL (physical functioning, burden of kidney disease, and symptoms of kidney disease) at T1 were associated with increases in depressive symptoms at T2. At T2 level depression were associated with decreases in four domains of HRQoL (mental functioning, burden of kidney disease, symptoms of kidney disease, and effects of kidney disease) at T3.^[2]

The selected battery of tests (clinician-administered questionnaires) were applied to dialysis patients (test cohort, n = 298) and caregivers (control cohort, n = 202) for establishing depression. The demographic and clinical conditions of participants were also collected. Univariate analysis followed by multiple regression analysis was performed for demographical parameters, clinical conditions, and laboratory results for the detection of association of them with depression.^[3]

The abnormal test considered as more than 2 SD of mean below the normal value. At least two abnormal tests were labelled moderate depression out of all tests. More than half of all aberrant values were classified as moderate depression, and all abnormal parameters were classified as severe depression. For all tests, there was a significant difference between dialysis patients and carers (P.0001 for all). Half of the dialysis patients (153 out of 298) were depressed and clinically asymptomatic. 70 (23 percent) of dialysis patients were mildly depressed, 45 (15 percent) were moderately depressed, and 38 (13 percent) were seriously depressed. Depression was directly linked with serum phosphate (P =023), parathyroid hormone level (P =021), and urea reduction rate (P =048). In the dialysis group, biochemical anomalies (serum phosphate level, parathyroid hormone, and urea reduction rate) were independent predictors of depression.^[3]

Hemodialysis and peritoneal dialysis affect the person mental behaviour. 75 patients participated in study during 2 years, in these two years patients assessed before and every twelve months. This is assessed by tools like QoL (36-Item Short-Form Health Survey [SF-36]), cognitive impairment (Mini-Mental State Examination [MMSE]), depressive state (Center for Epidemiologic Studies Depression Scale [CES-D] and 24-h urine volume (UV). End results shows high QoL and recovery by peritoneal dialysis from cognitive failure than patient on hemodialysis.^[4]

In total, there are 687 participants, model that included a general and a somatic factor provided the best-fitting structure of the BDI-II. Only the somatic dimension scores were associated with all-cause mortality (hazard ratio of 1.7 [1.2-2.5], p < .007) in the multivariable model. These parameters were associated with increased hospitalization rate and reduced QoL.^[5]

281 native and 277 immigrant dialysis patients in the Netherlands. Depression was higher in immigrant patient compare to native patient (49% vs. 36%).^[6]

In one of the studies 687 patients participated, 433 patients are prevalent and 242 are the incidental dialysis patients. Median follow-up time was 3.1 (IQR, 3.0-3.5) years, by that time 172 deaths happened. Patients with anxiety symptoms are 22% and patient with depressive symptoms are 42%.^[7]

Symptoms of anxiety were associated with mortality and 1-year hospitalization and length of stay. Total 414 participants, (29.4%, n = 122) had depression and 35.9% (n = 149) had anxiety. Depression and anxiety were significantly associated with females, low level of education, increased patients' age, retirement, poor financial situation, marital status and co-morbidities.^[8]

We have not find any systemic review on this topic, aim of this review is to check depression in chronic kidney disease.

MATERIALS & METHODS

This systematic review is reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Eligibility criteria: The review included studies that i) was any observational studies and quantitative cross-sectional, longitudinal, retrospective cohort analysis, prospective study, and clinical trials.

Inclusion criteria: The inclusion criteria decided upon were articles that have dialysis, more specifically peritoneal or hemodialysis as exposure, and depressive symptoms as an outcome. Literature published between 2017 and 2022 written in English.

Exclusion criteria: Studies that excluded individuals with depression at the start of the study or those only included patients with Chronic Kidney Disease were not included. We excluded studies that had no direct relation with the proposed theme, other review articles, as well as reports in the form of dissertations, theses, book chapters, comments, or criticism were excluded.

The procedures mentioned above were carried out in July 2022.

Information sources: PubMed database was used to search to identify studies. The date when all 8 sources were last searched was 28th July 2022.

Search Strategy: A PubMed search for the keywords "depression," "hemodialysis," "peritoneal dialysis," "chronic kidney disease," "end-stage renal disease," "parathyroid hormone," "biochemical markers," "urea reduction rate," "anxiety symptoms" and "mood disorder" was undertaken.

Limits applied to the search strategy: Dates only between 2017 and 2022 and Language only in English.

Selection of published studies: PubMed was used to identify literature published from 2017 to 2022 pertaining to the association between dialysis and depressive symptoms. A PubMed search for the keywords "depression," "hemodialysis," "peritoneal dialysis," "chronic kidney disease," "end-stage renal disease," "parathyroid hormone," "biochemical markers," "urea reduction rate," "anxiety symptoms" and "mood disorder" was undertaken. The titles and/or abstracts were reviewed to exclude any clearly irrelevant studies. 8 publications related to long-term dialysis treatment and depression was identified. These studies were reviewed independently by 6 reviewers. The inclusion criteria decided upon were articles that have dialysis, more specifically peritoneal or hemodialysis as exposure, and depressive symptoms as an outcome. We looked at the titles and/or abstracts to weed out any research that was obviously unrelated. Furthermore, if no effects estimates with enough data were reported, the publication was excluded. All 8 abstracts met the criteria and were chosen for the meta-analysis.

Data collection:

Data were tabulated keeping in mind the following headings: 1.)Citation, 2.)WHO region, 3.)Country of the study, 4.)Year of study, 5.)The aim of the study, 6.)study population characteristics, 7.)study design, 8.)study setting, 9.)sample size/sample size calculation, 10.) Sampling technique, 11.) Data source, 12.) The definition of subthreshold depression, 13.)Measures used 14.) analysis, 15.) Confounder variables adjusted, 16.) Results, 17.) Key observation. The investigation was restricted to human research. Only studies written in English were considered. The number of participants, the existence of non-dialysis CKD or

ESKD, the kind of dialysis therapy (hemodialysis [HD] vs. peritoneal dialysis [PD]), the measuring technique and criteria or cutoff used for depression diagnosis, and the type and amount of biochemical indicators were all retrieved. There was no need to contact the research authors for study details. Amount of data collected by each reviewer.

Study Risk of Bias Assessments: (Tools used to assess risk of bias in included studies).

Effect Measures: Studies reportedly used measures such as odd's ratio, and hazard ratio, with significant confidence intervals.

Reporting Bias Assessments: The research design and the risk of selection or publication bias were all examined independently by all of the authors. Any disagreements amongst the writers' reviews were settled by consensus.

RESULTS

Table 1

Citation	WHO region	Country of the study	Year of study	Aim of the study	Study population characteristics	Study Design	Study setting	Sample size/Sample size calculation
Santos et al.	Region of The Americas (AMR)	Brazil	2022 May - June	To assess frailty and its relationship with depression among patients with CKD undergoing hemodialysis.	patients with chronic kidney disease	Observational and quantitative cross-sectional	in a renal therapy unit	Total 80/ not specified
Chen et al.	Western Pacific Region (WPR)	China	2021 December	To examine the cross-lagged relationship between depressive symptoms and health-	patients receiving maintenance hemodialysis	longitudinal, observational study	Hospital based	total 204/ 204 patients at baseline (T1). Of these, 144 complet

)			related quality of life (HRQoL) in patients receiving maintenance hemodialysis.				ed the 12-month follow-up survey (T2), and 135 completed the 24-month follow-up survey (T3)
Liu et al.	Western Specific Region (WPR)	China	2020 June	To check the Prevalence and association of depression with uremia in dialysis population	patients on dialysis	retrospective cohort analysis	Hospital based	Total 500/ dialysis patients (test cohort, n = 298) and caregivers (control cohort, n = 202)
Hiramatsu et al.[4]	Western Specific Region (WPR)	Japan	2020 August	To examine the Quality of Life and Emotional Distress in Peritoneal Dialysis and Hemodialysis Patients	patients undergoing hemodialysis and Peritoneal dialysis	Observational, prospective Study	Hospital based	Total 75/ 45 HD and 30 PD patients
Schoute	Europe	Netherlands	2019	To	chronic	Observational	Dialysis	Total

n et al. ^[5]	ean Regio n (EUR)	and	Septe mber	identify the best- fitting factorial structure for the Beck- Depressio n Inventory- II (BDI) in dialysis patients and to assess the relation of these structure dimension s with quality of life (QoL), hospitaliz ation, and mortality	dialysis patients	onal, Prospecti ve study	sis cente r hospi tal based	687/not specifie d
Haverk amp etal. ^[6]	Europ ean region (EUR)	Netherl and	2020 March	aims to describe both cross- sectional and longitudin al associatio ns between religious behaviour and coping with symptoms	chronic dialysis patients	Observati onal, longitudi nal, cross sectional study	Hosp ital based	Total 588/281 native and 277 immigra nt patients

				of depression for 281 native and 277 immigrant dialysis patients				
Schouten et al. ^[7]	European region (EUR)	Netherlands	2019 August	To examine the association of anxiety symptoms with hospitalization and mortality in patients receiving maintenance dialysis.	patients on dialysis	Prospective cohort study	Dialysis center	Total 687/433 prevalent and 242 incident dialysis patients
Gerogianni et al. ^[8]	European region (EUR)	Greece	2018 January	aim of this study was to evaluate the prevalence of depression and anxiety in hemodialyzed patients	patients on hemodialysis	observational, cross sectional study	Dialysis center	Total 414/262 males & 152 females

Table 2

Data source	Definition of subthreshold depression	Measures used	Confounder variables adjusted	Results	Key observation
Data is from patients attending renal therapy unit in year 2019	PHQ-9 score of 10-14	sociodemographic, economic and health condition characterization and the Subjective Frailty Assessment (SFA) and Patient Health Questionnaire-9 (PHQ-9)	age, sex	Among the patients, there was higher prevalence of females, individuals with a steady partner and retirees, and their mean age was 59.63 (\pm 15.14) years. There was high prevalence of physical frailty (73.8%) and depression (93.7%). Depression was associated with frailty, such that patients with depression were 9.8 times more likely to be frail than were patients	Depression was associated with the presence of frailty among patients with CKD on hemodialysis.

Data is from patients attending two public hospitals	Lower levels of three out of five domains of HRQoL (physical functioning, burden of kidney disease, and symptoms of kidney disease)	Depression subscale of the Hospital Anxiety and Depression Scale, and HRQoL was assessed using the Kidney Disease Quality of Life 36 short form. Cross-lagged path analysis	Age	Lower levels of three out of five domains of HRQoL (physical functioning, burden of kidney disease, and symptoms of kidney disease) at T1 were associated with increases in depressive symptoms at T2. Moreover, higher depressive symptoms at T2 were associated with decreases in four domains of HRQoL (mental functioning, burden of kidney disease, symptoms of kidney disease, and effects of kidney disease) at T3.	patients with poor HRQoL were more likely to report more subsequent depressive symptoms
Data is	The	Univariate	Age, sex	The half (153	Biochemical

from patients attending hospital	abnormal test considered as more than 2 SD of mean below the normal value. Out of all tests, at least 2 abnormal tests were considered as mild depression. More than half of abnormal parameters among all tests were considered as moderate depression and all abnormal parameters were considered as severe depression.	analysis followed by multiple regression analysis was performed for demographical parameters, clinical conditions, and laboratory test		out of 298) of dialysis patients were depressive and clinically asymptomatic. 70 (23%) dialysis patients were mild depressive, 45 (15%) dialysis patients were moderate depressive, and 38 (13%) dialysis patients were severely depressive. Serum phosphate (P = .023), level of parathyroid hormone (P = .021), and urea reduction rate (P = .048) were directly associated with depression	abnormalities (serum phosphate level, parathyroid hormone, and urea reduction rate) were independent predictors of depression in the dialysis population
Data is from patients attending hospital, Patients were assessed	MMSE score below 25 CES-D score of 16-23	QoL (36-Item Short-Form Health Survey [SF-36]), cognitive impairment (Mini-Mental State	Age, sex	Physical and social component scores of the SF-36 significantly improved in PD patients	Peritoneal dialysis is associated with higher QoL and recovery from cognitive failure

before and every 12 months after starting dialysis for 24 months		Examination [MMSE]), depressive state (Center for Epidemiologic Studies Depression Scale [CES-D]), grip strength, and 24-h urine volume		at 24 months compared with those observed at baseline (42.8 vs. 39.4; $P < 0.05$ and 46.4 vs. 37.3; $P < 0.05$, respectively); however, scores remained unchanged in HD patients. MMSE scores were significantly decreased at 12 and 24 months in HD patients (29.0 vs. 26.0, 25.0; $P < 0.05$), but remained unchanged in PD patients. Moreover, CES-D scores significantly worsened at 24 months in HD patients (12.8 vs. 16.5), but remained unchanged in PD	compared with HD.
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Data from patients attending 10 dialysis center of 5 hospital between the year of 2012 to 2017	BDI score of 20-28	- Depressive symptoms measured using BDI-II - Quality of Life measured using the 12-item short-form health Survey (SF-12) - Hospitalizations - Mortality	Age, sex	Somatic dimension scores were associated with all-cause mortality (hazard ratio of 1.7 [1.2-2.5], $p < .007$) in the multivariable model.	BDI-II in dialysis patients was associated with all-cause mortality, increased hospitalization rate, and reduced QoL.
Data is from patients attending hospital	depressive symptoms	-Depressive symptoms	Age, sex	A higher prevalence of depressive symptoms was found in immigrant compared to native patients (49% vs. 36%)	Strong significant cross-sectional associations were found between negative religious coping items and depressive symptoms in both groups, while no longitudinal associations were found.
Data from patients treated at 10 dialysis centers Between the year of 2012 to 2016	BDI score of 20-28 BAI score of 19-29	Beck Anxiety Inventory and Beck Depression Inventory	Age, sex	172 deaths occurred. 22% of patients had anxiety symptoms and 42% had depressive symptoms.	Anxiety symptoms are independently associated with increased risk for mortality and 1-year hospitalization.

Data from patients participated in 24 dialysis centers	BDI score of 20-28 STAI score of 39-40 HADS score of 11-14	the state-trait anxiety inventory (STAI), the beck depression inventory (BDI) and the hospital anxiety and depression scale (HADS)	Age	(29.4%, n = 122) had depression and 35.9% (n = 149) had anxiety. Patients with high levels of anxiety had higher levels of depression and those with high depression scores had higher anxiety scores.	Depression and anxiety were significantly associated with females, low level of education, increased patients' age, retirement, poor financial situation, marital status and co-morbidities.
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DISCUSSION

This is the review to depression associated with the dialysis, our review includes eight studies involving 3235 participants. Study by Santos et al. gives evidence about depression is associated with the presence of frailty among patients with CKD on hemodialysis by the results high prevalence of physical frailty (73.8%) and depression (93.7%).^[1]

Study by Chen et al. showed that patients with poor HRQoL were more likely to report more subsequent depressive symptoms.^[2]

Liu et al. study key observation is Biochemical abnormalities (serum phosphate level, parathyroid hormone, and urea reduction rate) were independent predictors of depression in the dialysis population.^[3]

The study by Haramitsu et al. gives evidence about Peritoneal dialysis is associated with higher QoL and recovery from cognitive failure compared with hemodialysis.^[4]

Schouten et al. Findings suggest that Anxiety symptoms are independently associated with increased risk for mortality and 1-year hospitalization.^[5]

The findings from the study by Schouten et al. Confirm that fitting factorial structure for the Beck-Depression Inventory-II (BDI) in dialysis patients and to assess the relation of these structure dimensions with quality of life (QoL), hospitalization, and mortality by the results median follow-up time was 3.0-3.5 years, during that time 25% deaths occurred. 22% of patients had anxiety symptoms and 42% had depressive symptoms.^[6]

Havercamp et al. findings reveals that A higher prevalence of depressive symptoms was found in immigrant compared to native patients (49% vs. 36%).^[7]

The study by Gerogianni et al. confirm that Depression and anxiety were significantly associated with females, low level of education, increased patients' age, retirement, poor financial situation, marital status and co-morbidity by the result 29.4% had depression and

35.9% had anxiety, also Patients with high levels of anxiety had higher levels of depression and those with high depression scores had higher anxiety scores.^[8]

Based on these findings and the various key observations in these eight studies, we concluded that there is increase in depression in the patients of dialysis. All eight studies are hospital & dialysis center based. Hence, the findings cannot be generalized to the community population with chronic kidney diseases.

CONCLUSION

From this data it is confirm that there is higher prevalence of depressive symptoms in patients with CKD is associated with dialysis. Further investigating the relationships between depression and dialysis also reveal the symptoms like Anxiety, frailty, emotional distress. Also these factors decrease the quality of life and increase mortality and hospitalisation in dialysis patients.

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