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Original Article

Prevalence of Depression among Patients with Chronic Kidney Disease (CKD) at the Kenyatta National Hospital.

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Chronic Kidney Disease, Depression, Quality of Life, PHQ 9.

ABSTRACT

Background: Depression is a common comorbidity among patients with chronic kidney disease (CKD). Preceding studies indicates that this condition causes increased mortality and is also linked to poor quality of life. The study aimed to establish the occurrence of depression among patients with chronic kidney disease in Kenyatta National Hospital in Kenya. Method: The study was carried out at the Kenyatta National Hospital in Kenya. The study was done at the renal unit and general medical wards of the hospital and was a cross-sectional descriptive study. The study enrolled 289 patients with CKD who met the inclusion criteria on follow up for kidney transplant and dialysis at the renal unit, those on outpatient follow up at the renal clinic and patients with CKD admitted in the medical wards. The participants were enrolled using systematic random sampling. They were then interviewed using a researcher designed a socio-demographic questionnaire with clinical characteristics and the Beck Depression Inventory-II. IBM Statistics Software Version 21 was used to analyse data and the results reported in narratives, tables and charts. Results: A total of 169(58.5%) participants were male, while 120 (41.5%) were female. Study participants had a mean age of 45.9 years. The prevalence of depression (borderline clinical depression to extreme depression) was found to be 28.4%. 24.9% of participants had mild mood disturbances and 46.7% did not have depression. The most common symptoms of depression among the participants were loss of energy as reported by 78.5% of them and increased fatigue which was reported by 77.9% of the research participants. Conclusion: There is a high prevalence of depression among patients with

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CKD and patients should be managed effectively for CKD and any other co-existing comorbidity to improve their health outcomes and their quality of life.

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INTRODUCTION

Chronic Kidney Disease (CKD) is a major public health concern affecting millions of people globally and its treatment presents a huge burden for these patients as they are required to make changes in life to adapt socially. This adaptation or lack thereof has been associated with increased incidences of depression with a prevalence of 19- 68% for patients who are on haemodialysis (Liu et al., 2017; Shirazian et al., 2017). Further, a double impact of CKD and depression has been reported where CKD increases the risk of depression while depression reduces the adherence to medication by patients with CKD and leads to low quality of life, which is made worse by the high costs associated with its treatment (Bautovich et al., 2014; Kokoszka et al., 2016; Da Silva Junior et al., 2017). Although renal complications are caused by multiple noncommunicable diseases, renal disease remains one of the most neglected chronic diseases with people suffering from renal disease lacking access to care (Dhondup et al., 2018). Kidney disease increases the risks associated with hypertension, heart disease, Human Immunodeficiency Virus (HIV) and infectious diseases including malaria thereby contributing to the global burden of mortality (Couser et al., 2011).

Reduced glomerular filtration rates were directly estimated to cause the loss of 18 million years of life, 19 million Disability Adjusted Life Years (DALYs) and 1.2 million deaths globally in 2015(Couser et al., 2011). Furthermore, Chronic Kidney Disease is associated with eight to ten times the prevalence of cardiovascular mortality in individuals with comorbid hypertension and diabetes. In addition, about 2 million people need a renal replacement for the sustenance of life globally (Dhondup et al., 2018). Most patients with CKD, due to symptoms that are prevalent and bothersome including impairment, mental and emotional fatigue, physical fatigue, decreased motivation and apathy, have a low quality of life. These factors are a prerequisite to the development of depression which has been found to affect about 25% of hospitalised CKD patients (Fischer et al., 2011; Palmer et al., 2013). Further, it is reported that fatigue is associated with 76- 96% of patients who have been diagnosed with clinical depression. However, in most cases, depression is not recognised for patients with CKD and therefore goes untreated (Farragher et al., 2017).

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Research has shown that there is a correlation between the diagnosis of chronic disease and the development of psychiatric disorders. People who have been diagnosed with a chronic disease are 1.4-4 times more likely to develop depression, unlike the general population. Psychological distress in these patients has a prevalence of up to 52% as shown in some studies (Sfyrkou, 2015). The physical and biological changes that result from dialysis treatment for people with renal failure have been reported to cause depression. Further, people with renal failure who are not receiving dialysis treatment are three times more likely to have depression, unlike the common population (Shirazian et al., 2017).

Globally, there is a prevalence of 25% of major depressive disorder for individuals with long term kidney impairment compared to 7% prevalence for the general population (Gregg et al., 2020). In a study done in the USA for Major Depressive Episode (MDE) and renal disease, at baseline, there was a prevalence of 21% for Major Depressive Episode (MDE). After one year of follow up, the prevalence for MDE was 61% with death, dialysis initiation and hospitalisation occurring more for those with MDE (Hedayati et al., 2010). In the Netherlands, there was a 34% incidence of depression among patients with CKD, 31% occurrence of anxiety and 23% prevalence for both depression and anxiety (Loosman et al., 2015).

In Asia, a study using the Taiwanese Depression Questionnaire found a prevalence of depression of 21% at the beginning and 31% when the study ended (Chiang et al., 2015). These results were similar to studies done in China, where the prevalence of depression was between 23%- 29% for patients on haemodialysis (Liu et al., 2017). Although there are very few studies done in Africa exploring the occurrence of depression among patients with CKD, a study done in Nigeria on stages 3-5 of renal disease found a prevalence of 23%, which is similar to most of the studies done globally, compared to 2% for the general population (Amira, 2011). Research conducted in Ghana found an incidence of 45% of depression amid patients with CKD with a 19% low overall standard of life based on the World Health Organization Quality of Life (WHOQOL) instrument (Ganu et al., 2018). This study aimed to establish the frequency of depression among patients with CKD at Kenyatta National Hospital in Kenya.

METHODOLOGY

The researchers conducted a cross-sectional descriptive study at Kenyatta National Hospital, the largest Teaching and Referral hospital in Kenya. This facility started to operate in 1901 with an initial bed capacity of 40. The hospital has a total of 50 wards, 22 outpatient clinics, 24 theatres (16 specialised) and the Accident and Emergency Department. It has 8 adult medical wards situated on the seventh and eighth floors. On average, the medical wards host around 400 patients in total. Patients with renal issues who require admission are admitted to any of the medical wards. This facility has a total of 209 beds for the private wing out of a possible 1800 bed capacity. The hospital accommodates between 2,500 and 3,000 patients in its wards on any given day. The hospital takes care of over 80,000 inpatients and over 500,000 outpatients on average every year with a renal unit that was opened in 1984. Within this unit, dialysis is done daily. There is a renal transplant clinic every Tuesday and a renal clinic run every Friday morning at clinic no. 24. About 50 patients are dialysed every day and on Friday mornings at the clinic, an average of 60 patients are seen.

Ethical approval was sought from the University of Nairobi/Kenyatta National Hospital Ethics Review Committee [P491/09/2020]. Participants for this study were adult renal patients admitted to the medical wards, CKD Patients attending the renal outpatient clinic and patients on follow up for dialysis and kidney transplant at the renal unit in KNH who gave informed written consent. Those who were too sick or did not give informed consent were excluded. To calculate the study sample size, the Naing formula was used (Naing et al., 2006). 1.96 the critical value on a standard normal distribution corresponding to a 95% confidence level. 25%, the estimated proportion of patients who have a diagnosis of major depressive disorder in chronic kidney disease globally. A total of 289 patients with CKD were sampled.

A researcher premeditated questionnaire that captured data classification and appropriate demographic variables like sex, age, marital status,

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religion, educational level, occupation and the approximate amount of income was used. It also captured past psychiatric factors, substance use history, mental illness history of the family and other comorbidities.

Depression was assessed using the Beck Depression Inventory (BDI-II) (Beck et al., 1996). This is a 21-item scale that measures the symptomatology of depression. Every question on the BDI-II is scored from 0- 3, where the higher number indicates symptom severity. From the 21 items on the questionnaire, their range of scores is between 0- 63. The clinical cut-off points include; mild mood disturbance (11-16), borderline clinical depression (17-20), moderate depression (21-30), severe depression (31-40) and extreme depression (40-63). It has high internal consistency, and Cronbach's α = .92. The BDI -II has been used in Kenya and other nations (Musyimi et al., 2017; Ndetei et al., 2009).

A total of five days of the week from Monday to Friday were set aside to interview patients for three months, starting 01/03/2021 to 31/05/2021. Monday, Tuesday and Thursday, the researchers sat at the renal unit at KNH daily from 8:00 am to 5:00 pm and interviewed those on follow up for dialysis and kidney transplant who met the inclusion criteria. On Wednesday, the researchers interviewed patients in the ward between 8:00 am to 5:00 pm who met the inclusion criteria. On Friday, the researchers sat at Renal Clinic No. 24 and interviewed those who met the inclusion criteria.

The study employed a systematic random sampling method with substitution to recruit individuals who came for follow-up as well as those admitted in the wards. The first recruitment procedure involved the researchers interviewing every third patient who came for clinic, dialysis and kidney transplant follow up at the renal unit at KNH. Any patient who did not qualify or declined to participate was replaced with the next one on the list who qualified. The second recruitment procedure involved CKD patients in the wards. The researchers interviewed every third patient that was admitted in the wards and who met the inclusion criteria. Any selected patient who declined to participate was replaced with the next patient on the list who qualified. The study was conducted at the renal unit and general medical wards in Kenyatta National Hospital. To ensure privacy and confidentiality, the interviews were done in one of the consultation rooms at the unit. In the wards, the interviews were done at the bedside of the patients.

Due to COVID-19, data collected at the follow-up clinic and in the ward was in adherence to the set public health directives, policies and recommendations. During face-to-face visits, appropriate infection prevention control measures including temperature checks, washing and sanitising of hands, wearing of a 3-ply face mask, and social distancing of 1.5 meters during the interviews was observed.

Descriptive statistics was done in areas where separate variables were put in the form of a summary with frequencies and percentages. As the main variable of interest, factors associated with depression were recognised by the use of Chi-squared tests and Fisher's exact tests for nominal variables and T-tests for continuous variables was used. Multivariate analysis was done and we attuned for confounders and effect modifiers in the model to establish independent factors related to depression by use of binary stepwise backward logistic regression. All analysis was done by use of IBM Statistics Software Version 21 and presented using tables, graphs and in prose.

RESULTS

Two hundred and eighty-nine participants were enrolled on the study. The response rate was 100%, with the mean age of participants recorded at 45.9 years.

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Table 1: Socio-demographic Data

		frequency	%
Age category	18-24	23	8.0
	25-35	56	19.4
	36-50	110	38.1
	Above 50 years	100	34.6
Sex	Male	169	58.5
	Female	120	41.5
Marital status	Single	66	23.0
	Married	206	71.8
	Separated	11	3.8
	Widowed	4	1.4
	Cohabiting	0	.0
Level of Education	Lack of formal education	5	1.7
	Primary	71	24.6
	Secondary	141	48.8
	Tertiary	72	24.9
Occupation	Student	19	6.6
	Formal employment	54	18.7
	Informal employment	38	13.1
	Businessperson	96	33.2
	Unemployed	82	28.4
	More than one category	0	.0
Income	Less than 6000	141	49.0
	6000-10000	42	14.6
	10000-40000	65	22.6
	40000-100000	34	11.8
	>100000	6	2.1
Religion	Catholic	106	36.8
	Protestant	167	58.0
	Muslim	13	4.5
	Others	2	.7

As shown in *Table 1* above, 23 (8%) of the participants were 18-24 years, 56 (19.4%) were 25-35 years, 110 (38.1%) were 36-50 years, while 100 (34.6%) were above 50 years. Additionally, as shown in Table 1 above, 169 (58.5%) of the participants were male, while 120 (41.5%) were female. Almost three-quarters 206 (71.8%) were married, 66 (23%) were single, 11(3.8%) were separated and 4(1.4%) were widowed. 5 (1.7%) participants had no formal education, 71 (24.6%) had attained education up to the Primary school level and 141 (48.8%) had attained education up to secondary school level. 72 (24.9%) had attained education up to the tertiary level. A total of 92 (31.8%) participants were employed. 96 (33.2%) of the participants were in business and those who were unemployed were 82 (28.4%). 19 (6.6%) participants were students. Almost half of the participants (141, 49%) were earning less than KES 6,000, 42 (14.6%) were earning approximately KES 6000 – 10000, 65 (22.6%) were earning KES 10000-40000, 34(11.8%) were earning KES 40000-100000 and only 6 (2.1%) were earning more than KES 100000. The most common religion was Christian with 106 (36.8%) being catholic and 167 (58.0%) being protestant. There were only 13 (4.5%) Muslims.

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Depression Symptoms

Table 2: Depression Symptoms

Depression Symptoms		N	%
Sadness	I do not feel sad	168	58.1
	I feel sad much of the time	106	36.7
	I am sad all the time	12	4.2
	I am so sad or unhappy that I can't stand it	3	1.0
Pessimism	I am not discouraged about my future	204	70.6
	I feel more discouraged about my future than I used to	72	24.9
	I do not expect things to work out for me	8	2.8
	I feel my future is hopeless and will only get worse	5	1.7
Past failure	I do not feel like a failure	219	75.8
	I have failed more than I should have	29	10.0
	As I look back, I see a lot of failures	34	11.8
	I feel I am a total failure as a person	7	2.4
Loss of pleasure	I get as much pleasure as I ever did from the things I enjoy	118	40.8
	I don't enjoy things as much as I used to	101	34.9
	I get very little pleasure from the things I used to enjoy	63	21.8
	I can't get any pleasure from the things I used to enjoy	7	2.4
Guilty feelings	I don't feel particularly guilty	207	71.6
	I feel guilty over many things I have done or should have done	67	23.2
	I feel quite guilty most of the time	14	4.8
	I feel guilty all of the time	1	.3
Punishment Feelings	I don't feel I am being punished	230	79.6
	I feel I may be punished	35	12.1
	I expect to be punished	1	.3
	I feel I am being punished	23	8.0
Self-Dislike	I feel the same about myself as ever	230	79.9
	I have lost confidence in myself	29	10.1
	I am disappointed in myself	17	5.9
	I dislike myself	12	4.2
Self-Criticalness	I don't criticise or blame myself more than usual	233	80.6
	I am more critical of myself than I used to be	33	11.4
	I criticise myself for all of my faults	15	5.2
	I blame myself for everything bad that happens	8	2.8
Suicidal Thoughts or Wishes	I don't have any thoughts of killing myself	265	91.7
	I have thoughts of killing myself, but I would not carry them out	22	7.6
	I would like to kill myself	1	.3
	I would kill myself if I had the chance	1	.3
Crying	I don't cry any more than I used to	209	72.3
	I cry more than I used to	51	17.6
	I cry over every little thing	7	2.4
	I feel like crying, but I can't	22	7.6
Agitation	I am no more restless or wound up than usual	160	55.4
	I feel more restless or wound up than usual	93	32.2
	I am so restless or agitated it's hard to stay still	29	10.0
	I am so restless or agitated that I have to keep moving or doing something	7	2.4

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Depression Symptoms		N	%
Loss of Interest	I have not lost interest in other people or activities	192	66.4
	I am less interested in other people or things than before	71	24.6
	I have lost most of my interest in other people or things	22	7.6
	It's hard to get interested in anything	4	1.4
Indecisiveness	I make decisions about as well as ever	213	73.7
	I find it more difficult to make decisions than usual	54	18.7
	I have much greater difficulty in making decisions than I used to	17	5.9
	I have trouble making any decisions	5	1.7
Worthlessness	I do not feel I am worthless	247	85.5
	I don't consider myself as worthwhile and useful as I used to	22	7.6
	I feel more worthless as compared to others	13	4.5
	I feel utterly worthless	7	2.4
Loss of energy	I have as much energy as ever	62	21.5
	I have energy than I used to have	133	46.0
	I don't have enough energy to do very much	87	30.1
	I don't have enough energy to do anything	7	2.4
Changes in sleeping pattern	I have not experienced any change in my sleeping	106	36.7
	I sleep somewhat more than usual	34	11.8
	I sleep somewhat less than usual	80	27.7
	I sleep a lot more than usual	17	5.9
	I sleep a lot less than usual	44	15.2
	I sleep most of the day	1	.3
	I wake up 1-2 hours early and can't get back to sleep	7	2.4
Irritability	I am not more irritable than usual	153	52.9
	I am more irritable than usual	82	28.4
	I am much more irritable than usual	46	15.9
	I am irritable all the time	8	2.8
Changes in appetite	I have not experienced any change in my appetite	119	41.3
	My appetite is somewhat less than usual	90	31.3
	My appetite is much less than before	55	19.1
	My appetite is much greater than usual	16	5.6
	I have no appetite at all	6	2.1
	I crave food all the time	2	.7
Concentration difficulty	I can concentrate as well as ever	160	55.4
	I can't concentrate as well as usual	92	31.8
	It's hard to keep my mind on anything for very long	35	12.1
	I find I can't concentrate on anything	2	.7
Tiredness or fatigue	I am no more tired or fatigued than usual	64	22.1
	I get more tired or fatigued more easily than usual	144	49.8
	I am too tired or fatigued to do a lot of the things I used to do	69	23.9
	I am too tired or fatigued to do most of the things I used to do	12	4.2
Loss of interest in sex	I have not noticed any recent change in my interest in sex	99	35.7
	I am less interested in sex than I used to be	93	33.6
	I am much less interested in sex now	50	18.1
	I have lost interest in sex completely	35	12.6

	Mean	Standard Deviation	Median	Percentile 25	Percentile 75
Total Score	**12.8**	**8.7**	**11.0**	**7.0**	**18.0**

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A total of 168 (58.1%) did not report any sadness, 204 (70.6%) did not report any discouragement about the future, 219 (75.8%) did not report feeling like a failure, 118 (40.8%) reported no changes in things that gave them pleasure, 207 (71.6%) didn't report feeling guilty, 230 (79.6%) did not feel like they were being punished, 230 (79.9%) did not report self-dislike, 233 (80.6%) did not report self-criticalness, 265 (91.7%) did not report suicidal thoughts, 209 (72.3%) reported that they did not feel like crying more than before, 160 (55.4%) did not report unusual agitation, 192 (66.4%) did not report any loss of interest in other people or activities, 213 (72.7%) said they felt they were decisive, 247 (85.5%) did not report worthlessness, 62 (21.5%) reported no loss in energy, 106 (36.7%) did not report any changes in sleep patterns, 153 (52.9%) did not report increased irritability, 119 (41.3%) did not report changes in appetite, 160 (55.4%) reported no changes in concentration levels, 64 (22.1%) did not detect increased fatigue while 99 (35.7%) did not report any changes in sexual interest. The average score was 12.8 (std dev 8.7), with the most common symptoms of depression being the loss of energy (78.5%) and increased fatigue (77.9%).

Prevalence of Depression

As shown in *Table 3* below, 135 (46.7%) reported no depression, 72 (24.9%) had mild mood disturbances, 33 (11.4%) had borderline clinical depression, 37 (12.8%) had moderate depression, 8 (2.8%) had severe depression and 4 (1.4%) had extreme depression. In summary, the prevalence of depression (borderline clinical depression to extreme depression) was 82 (28.4%).

Table 3: Prevalence of Depression

Prevalence of Depression		**N**	**%**
Level of depression	No depression	135	46.7
	Mild mood disturbances	72	24.9
	Borderline clinical depression	33	11.4
	Moderate depression	37	12.8
	Severe depression	8	2.8
	Extreme depression	4	1.4
Depression	No depression to Mild mood disturbances	207	71.6
	Borderline clinical depression to extreme depression	82	28.4

Factors Associated with Depression

As shown in *Table 4* below, depression scores appeared to be higher in; females (p = 0.09), those separated (p = 0.379), those with low income (0.474), and in Muslims and other religions (0.709), but the differences were not statistically significant. However, lower education (p = 0.007) and being unemployed (p = 0.031) appeared to be associated with higher depression scores and were statistically significant.

Table 4: Factors associated with depression

Factors		**Total Score**		
		Mean	**Standard Deviation**	**p-value**
Sex	Male	12.0	8.3	0.090
	Female	13.8	9.0	
Marital status	Single	12.7	9.3	0.379
	Married	12.7	8.5	
	Separated	16.9	9.6	
	Widowed	9.5	5.7	
	Cohabiting	.	.	
Education level	No formal education	20.2	2.6	0.007

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Factors		Total Score		
		Mean	Standard Deviation	p-value
	Primary	15.1	9.2	
	Secondary	11.5	8.2	
	Tertiary	12.4	8.7	
Occupation	Student	8.7	5.0	0.031
	Formal employment	12.9	9.8	
	Informal employment	12.8	7.5	
	Businessperson	11.7	8.2	
	Unemployed	14.9	9.2	
	More than one category	.	.	
Income	Less than 6000	13.0	8.5	0.474
	6000-10000	12.4	7.5	
	10000-40000	13.8	9.8	
	40000-100000	10.4	8.0	
	>100000	12.0	12.0	
Religion	Catholic	12.2	9.1	0.706
	Protestant	13.0	8.1	
	Muslim	14.7	12.3	
	Others	15.5	7.8	

Psychiatric History, Medical History, Substance Use and Depression

As shown in Table 5 below, 11 (3.8%) of the participants had a family history of mental illnesses, and 5 (1.7%) had a history of mental illness. Additionally, 201 (69.8%) had another physical illness, and 20 (7.2%) were using alcohol and other substances. There was a statistically significant relationship between the presence of other physical illnesses and depression (p = 0.005). However, there was no statistically significant association between depression and having had a history of mental illness in the family. There was also no statistically significant connection between depression and having a history of mental illness or use of substances.

Table 5: Psychiatric history, medical history, substance use and depression

				Depression				
		History		No depression to mild mood disturbance		Borderline clinical to extreme depression		
		N	%	N	%	N	%	p-value
History of mental illness in your family	Yes	11	3.8	8	72.7	3	27.3	0.934
	No	278	96.2	199	71.6	79	28.4	
History of a mental illness	Yes	5	1.7	3	60.0	2	40.0	0.561
	No	284	98.3	204	71.8	80	28.2	
Had any other physical illness?	Yes	201	69.8	134	66.7	67	33.3	0.005
	No	87	30.2	72	82.8	15	17.2	
Uses any substances e.g., alcohol, cigarettes	Yes	20	7.2	12	60.0	8	40.0	0.229
	No	259	92.8	188	72.6	71	27.4	

Further investigations on other illnesses found that depression was associated with having hypertension (p = 0.008). This means that hypertensive people were likely to report borderline to extreme depression, as in *Table 6* below.

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Table 6: Hypertension and depression

		Depression				p-value
		No depression to mild mood disturbance		Borderline clinical to extreme depression		
		N	%	N	%	
Hypertensive	No	96	80.0	24	20.0	0.008
	Yes	111	65.7	58	34.3	

DISCUSSION

Socio-Demographic

Two hundred and eight-nine participants were interviewed with the enrolment mean age of participants standing at 45.9 years. This can be explained by the fact that the risk of developing noncommunicable diseases increases with age (Dixon, 2016). Most of the participants were male even though the Kenya Demographic and Health Survey 2014 showed that females are likely to report having been diagnosed with hypertension by a health care provider up to 3 times more than men (Kenya Population and Housing Census, 2019). This high number of male respondents compared to the females may be because men tend to have poor health-seeking behaviour and they often go to the hospital when they already have complications as CKD is a complication of hypertension. Other studies were done in the USA, Asia, the Middle East and Africa and they also had higher samples of males than females (Hedayati et al., 2010; Amira et al., 2011; Chiang et al., 2017).

Most participants were Christians. Additionally, there were more Protestants than Catholics. This can be explained by the fact that the most recent national census in Kenya done in 2019 showed that 85.5 % of the population are Christians and that among them, 33.4% are Protestants, 20.4% are affiliated with Evangelical churches and 20.6% are Catholic (Kenya Population and Housing Census, 2019). The majority of the participants had completed secondary education. A significant number of them were either employed or business owners. Slightly more than a quarter were unemployed. Of those who were employed or in business, the majority were earning below 6,000.

Depression Symptoms

The most common symptoms of depression reported by the participants were fatigue (77.9%) and loss of energy (78.5%). While these are symptoms of depression, they are also very common symptoms of CKD itself (Ndetei et al., 2009). That explains why most of the participants reported them in this study.

Prevalence of Depression

The prevalence of depression was found to be 28.4%. This is similar to studies done in the USA, Europe, Asia, Middle East and one study done in Africa, despite the use of different research tools [1, 8,14]. In Asia, a study done in Malaysia found a much higher incidence of depression in CKD patients of 71-84% (Khan et al., 2019). This study used Becks Depression Inventory (BDI) as the screening tool for depression, and the tool was administered to hypertensive CKD patients on dialysis on three different visits. With every dialysis visit, the prevalence of depression got higher in that sample population (Khan et al., 2019). Similarly, another study done in the Middle East found an equally high prevalence of 70% using the Hamilton rating scale for depression (HAM-D) (Hawamdeh et al., 2017). A study was done in Ghana and established a 44% frequency of depression which is higher than what this study found. The screening tool used in that study was the PHQ-9, while this study used the BDI-II (Ganu et al., 2018).

Factors associated with depression

In the study, being unemployed (p = 0.031) was reported to be related to high depression risk. This is similar in other studies as well. For instance, a study done in Saudi Arabia found that depression was higher in patients on haemodialysis with a lower socioeconomic status (Mosleh et al., 2020).

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This association can be explained by the fact that treatment for CKD is very expensive and causes a lot of economic strain on these patients and their families [26]. The connection between lower education level and having depression was statistically significant (p = 0.007). This is similar to what has been demonstrated in other studies including a study in Ghana by (Ganu et al., 2018). Knowledge of one's chronic illness has been reported to be associated with better coping mechanisms in those who are educated as opposed to those who are not educated.

Medical History and Depression

This study shows that having a physical illness together with chronic kidney disease is associated with having depression (p = 0.005). Having hypertension particularly was linked to a higher chance of having depression (p = 0.008). This has also been demonstrated in other studies globally (Bahall et al., 2020; Jahrami et al., 2020).

CONCLUSION

There is a high occurrence of depression among patients with CKD. Further, lower education, unemployment and having another illness such as hypertension are significantly associated with depression.

Recommendations

- Patients should be managed effectively for CKD and any other co-existing comorbidity to improve their health outcomes.
- Health care workers managing patients for CKD need to be keen to look for depression in them and manage it to give holistic care.
- There is a need to come up with local guidelines on how to effectively manage CKD patients who also have depression in our country to better their standard of life.
- There is a need for a follow-up study on the most efficacious treatment for depression among patients with chronic kidney disease in our local setup in Kenya.

Strengths and Limitations of the study

A strength of this study was the fact that it was carried out at a National Teaching and Referral hospital in Kenya and so the patients recruited were from all over the country. Patients were diverse and so the results give a picture of the situation in the country. Another strength of the study was the fact that there were many patients and the target sample size was achieved with ease. One limitation of the study was that the other physical illnesses reported by the patients in the study other than hypertension were not analysed.

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