RESEARCH ARTICLE

Fatigue, Anxiety and Depression due to the Challenges faced by Patients undergoing Hemodialysis and their Caregivers during Covid-19 Pandemic

Hadiqa Jaleel[1]*, Maria Arshad[1], Saleem Pervaiz Iqbal[2], Zoya Imran[2], Zoya Azhar[2], Muhammad Ahmad[2], Muhammad Amjad[2], Muhammad Aamer[3] and Farkhanda Ghafoor[1]

1. Department of Research & Innovation, Shalamar Medical & Dental College, Lahore
2. Department of Community Medicine, Shalamar Medical & Dental College, Lahore
3. Mian Jahangir Dialysis Center, Shalamar hospital, Lahore

*hadiqa.jaleel@sihs.org.pk; hadiqa_jaleel@yahoo.com

ABSTRACT

Background: Covid-19 outbreak is found to be associated with increased levels mental health issues among the general population. The high prevalence of fatigue, anxiety and depression was also reported in patients on hemodialysis during Covid-19 pandemic as compared to pre-pandemic studies.

Aims: This article determines the level of fatigue, anxiety and depression due to the challenges faced by patients undergoing hemodialysis and their caregivers during the Covid-19 pandemic.

Methods: This descriptive cross-sectional study was carried out in hemodialysis unit of a tertiary care hospital over the period of 3 months from August to October 2021, using validated questionnaire consisted of Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F) and Hospital Anxiety and Depression Scale (HADS).

Results: Among 115 patients (age; mean 53.45 ± 13.9 S.D), fatigue was seen in 80%, anxiety in 67%, depression in 82.6%. While in their caregivers, the prevalence of fatigue was 73.6%, anxiety was 52.7%, depression was 59.1%. Logistic regression analysis showed that gender and challenges e.g. feeling additional burden while visiting the hospital and fear of getting infection and feeling of isolation/loneliness were the main risk predictors of fatigue, anxiety and depression in patients and their caregivers.

Conclusions: In Pakistan the prevalence of fatigue, anxiety and depression due to the challenges of Covid-19 pandemic was significantly high among patients undergoing hemodialysis and their caregivers as compared to pre-covid era. This study gives firm grounds for future researches, which should ascertain the suitable interventions to lessen the fatigue, anxiety, and depression due to the challenges of any future pandemic or epidemic among patients undergoing hemodialysis and their family members.

Keywords: Covid-19, Hemodialysis, Fatigue, Anxiety, Depression, Challenges, Caregivers, Pakistan

Introduction

The novel coronavirus caused by Covid-19 was first identified in December 2019 in China and has since spread globally in quick succession.[1] On March 11th, 2020 World health organization (WHO) declared it as a global pandemic.[2] There have been reported 360 million cases of Covid-19 and 5.62 million deaths globally till date.[3] The first case of Covid-19 in Pakistan was identified on 26th February, 2020 and until now 1.4 million confirmed cases of Covid-19 with 29,192 deaths have been reported.[4,5] The government took various steps to combat the spread of the virus such as closure of educational institutions, restaurants, quarantine at home/quarantine centers, lockdown in certain areas, working from home etc.[6,7]

There are studies which indicate chronic comorbidities like hypertension, cardiovascular disease and Chronic Kidney Disease (CKD) etc. might be risk factors and can affect outcome of disease in Covid-19 patients.[8,9] CKD is a condition in which there is gradual loss of kidney function over time.[10] Hemodialysis is done in patients of End Stage Kidney Disease to purify the patients' blood.[11] The prevalence of CKD in Pakistan is about 23.3%.[12,13] Patients with CKD undergoing hemodialysis are extremely susceptible to Covid-19 infection because of the high risk environment of hospital during this pandemic along with their immuno-compromised condition.[14] Several studies have reported that hemodialysis patients have a significantly increased risk of getting of Covid-19 infection and a higher mortality rate compared with the general population.[15,16] A study which collected data from 7 European countries estimated 20% Covid-19 mortality rate among patients undergoing dialysis while a particular center of Italy reported 52% mortality rate in 55 Covid-19 infected patients undergoing hemodialysis in that center.[17,18]

Research on Covid-19 virus is rapidly expanding and various studies have shown that the Covid-19 outbreak is associated with increased levels of anxiety, depression and fatigue among the general population due to prolonged lockdown.[19,20] Similarly, there is increased prevalence of fatigue, anxiety and depression in patients receiving hemodialysis during Covid-19 as compared to pre-Covid-19 studies.[21,22] Patients undergoing hemodialysis usually need care from their family members or caregivers because of their vulnerable condition and transportation for their 2-3 times visits to hospital every week for dialysis.[23] It has been published previously that chronic diseases and dialysis procedure cause distress not only in patients, but also in their families who take care for them.[24] This also provide evidence that the caregivers of patients undergoing hemodialysis have to manage several additional caregiving responsibilities due to Covid-19 lockdown and closure of transport services etc.[25] As hemodialysis center is quite an open place with medical staff and helpers, patients, and their caregivers which pose a threat for a virus spread point.[26] These situations and fear of contracting infection from that place may cause anxiety, depression and fatigue in the caregivers and patients undergoing hemodialysis.

There have been extensive studies done about the epidemiology, virology, treatment and management of Covid-19 but there is inadequate information on fatigue, anxiety and depression due to the challenges experienced by patients of CKD and specifically by their caregivers during Covid-19. Therefore, this study aims to measure some mental health parameters such as anxiety, fatigue and depression of patients undergoing hemodialysis and their caregivers during the Covid-19 pandemic in Pakistan.

Method

Study Design, Setting and Sampling Technique:

This cross sectional study was carried out by Research and Innovation Department of SMDC in Mian Jahangir Dialysis Center, Shalamar hospital Lahore over the duration of 3 months from August to October 2021. All the 126 registered patients at the center and their caregivers were recruited by convenient sampling technique. Inclusion criteria to participate in this study were; patients undergoing hemodialysis for at least 3 months and their caregivers of both genders above the age of 18. However, the patients and their caregivers, suffering from any psychological disorder or dementia were excluded from the study.

Procedure:

After the approval of SMDC-Institutional review board (IRB-324), the patients undergoing hemodialysis and their caregivers, fulfilling the inclusion criteria were recruited from Dialysis Center. The purpose and procedure of the study was explained to them, those who agreed to participate, were requested to sign an informed consent to ensure their voluntary participation. After their consent they were asked to fill the study proforma with the help of research team members. No additional lab or radiological tests were required. There was no foreseeable risk to participants apart from fatigue during filling the questionnaire based study proforma.

Study Instrument:

Two questionnaire-based study proformas, one for patient undergoing hemodialysis and other for caregiver, were used for this study. Each questionnaire had 5 sections. The first section of both questionnaires comprised of socio-demographic information. Sections 2 and 3 recorded the caregiving & clinical information and the challenges faced by caregivers and patients. Some of the questions were rephrased after pretesting and running a pilot study. Sections 4 and section 5 were consisted of fatigue (7-items) and anxiety & depression (14-items).

Fatigue:

FACIT Fatigue Scale (Version 4) consisting of 13-items was used to measure the variable of self-reported fatigue over the past seven days[27]. Responses of the scale were recorded from 0 to 4, ranging from "Not at all" to "Very much so" on a 5-point Likert scale. All 13 items were summed up to get a single score of fatigue which ranged from 0 to 52. Items were reverse scored where appropriate to offer a scale in which higher scores indicates better functioning and less or no fatigue, whereas a lower score represents more fatigue. A cut-off point of equal or less than 36 indicates clinically significant fatigue[28]. The original FACIT-F scale presented robust internal consistency & reliability (Cronbach's α= 0.93) [27,29].

Anxiety and Depression:

The Hospital associated Anxiety and Depression (HADS) consist of 14 items measuring anxiety (7-items) and depression (7-items), which were recorded on a 4-point Likert scale (from 0 to 3)[30]. The scores of each subscale of anxiety and depression were calculated by adding up the score of related items, with maximum scores of 21 for each subscale, where higher score indicates higher anxiety and depression. The cut-off value ≥8 either for anxiety or depression was indicated as clinically significant[31]. The HADS presented very decent internal consistency (Cronbach's α=0.83)[32].

Data Analysis Procedure:

For the statistical analysis, data was entered into SPSS statistical software version 20; a descriptive analysis was initially performed to calculate the means, standard deviations, frequencies, percentages of all the variables. Chi-square was used to test the levels of anxiety, depression, and fatigue with respect to demography and challenges faced. A logistic regression analysis was applied to identify the predictive risk factors for anxiety, depression, and fatigue on the basis of the independent variables (age, sex, marital status, education level, employment status, income, and challenges faced). $p > 0.05$ was considered statistically significant.

Results

All the 126 registered patients in dialysis unit were recruited for this study. Among them, 115 patients and 110 caregivers, fulfilling the inclusion criteria were enrolled, as 5 of these patients were visiting the hospital without their caregivers. Among the patients with mean age 53.45 ± 13.9 S.D and their caregivers with mean age 46.6 ±16.7 S.D, males were in majority, 60.0% (n = 69) and 54.5% (n = 60) respectively. Most of the participants were married (84.3% patients and 77.3% caregivers) having monthly income less than 220 USD (71.3% patients and 69.1% caregivers).

Clinical information of patients on dialysis and caregiving information of their caregivers reveals, most of the patients (34.8%) were on dialysis since 4 years and were having their dialysis sessions twice a week (71.3%). Only 2 patients and 8 caregivers were infected with Covid-19 infection during this pandemic, but they were not sure whether they got this infection from hospital or somewhere else. Only 9.6% patients missed their dialysis sessions due to fear of getting Covid-19 infection from Hospital. Among all 98.3% (n = 113) patients and 97.3% (n = 107) caregivers were satisfied with the SOPs followed by the medical and paramedical staff of dialysis unit during Covid-19 pandemic.

Association of Demographic Characteristics with Fatigue, Anxiety and Depression of Patients undergoing hemodialysis and their Caregivers:

Table 1 shows, in patients undergoing hemodialysis, the overall prevalence of fatigue was 80% (n = 92), anxiety was 67% (n=77), depression was 82.6% (n=95). While in their caregivers who were visiting the hospital with them, the prevalence of fatigue was 73.6% (n = 81), anxiety was 52.7% (n=58), depression was 59.1% (n=65). There was no significant difference in fatigue, anxiety and depression with respect to age, education level and employment status ($p > 0.05$) in patients and their caregivers. However, a significant difference seen in reporting fatigue level among the gender of patients ($p < 0.05$) with highest proportion of fatigue in male patients (51%) as compare to female patients (41%). Comparison showed that fatigued patients were found more prone to have anxiety (n = 74, 96.1% vs. n = 3, 3.9%) and depression (n = 90, 94.7% vs. n = 5, 5.3%) as compared to non-fatigued patients $p < 0.05$. Similarly, in fatigued caregivers of the CKD patients

were found more prone to have anxiety (n = 56, 69.1% vs. n = 25, 30.9%) and depression (n = 62, 76.5% vs. n = 19, 23.5%) as compared to non-fatigued participants (p < 0.05).

Analysis showed that anxiety was statistically significantly higher (p<0.05) in married patients (n = 68, 88.3%) as compared to unmarried patients (n = 9, 11.7%) whereas female caregivers (n = 34, 58.6%) were more likely to have anxiety as compared to male caregivers (n = 24, 41.4%) (p < 0.05). There were significant differences in the reporting of anxiety according to fatigue (patients; n=74, 80.4% caregivers; n=56, 96.6%, p < 0.05) and depression (patients; n=76, 80% caregivers; n=49, 84.5%, p < 0.05); all of them were more likely to have anxiety compared to the non-anxiety groups. The depression group of caregivers had significantly more participants with ≤ 220USD monthly income (n=49, 75.4% vs. n=16, 24.6 %) (p≤0.05) compared to the non-depression group. Depression was more prevalent among participants with fatigue (patients; 97.8% vs. 2.2%, caregivers; 95.4% vs. 4.6%, p<0.05), anxiety (patients; 98.7% vs. 1.3%, caregivers; 75.4% vs. 24.6%, p<0.05), when compared with the non-depression group.

Association of Challenges with Fatigue, Anxiety and Depression among Patients undergoing hemodialysis:

Table 2 shows the challenges faced by the patients undergoing hemodialysis. A significant difference was found in reporting fatigue between the groups, facing additional burden while visiting hospital, fear of getting Covid-19 infection due to high risk condition, close proximity with other patients in dialysis unit and feeling loneliness since the start of the pandemic, as compared to groups without facing these challenges during Covid-19 pandemic (p < 0.05). Anxiety was prevalent among the group of patients facing additional burden while visiting hospital, facing emergency situation in last 6 months, fear of getting Covid-19 infection due to high risk condition, advanced age and close proximity with other patients in dialysis unit and feeling isolated since the start of the pandemic, Covid-19 (p < 0.05). In case of depression significant difference was found between the groups, facing additional burden while visiting hospital, fear of getting Covid-19 infection due to close proximity with other patients in dialysis unit and feeling loneliness since the start of the

pandemic, as compared to groups without facing these challenges during Covid-19 pandemic (p < 0.05).

Association of Challenges with Fatigue, Anxiety and Depression among the Caregivers of Patient undergoing hemodialysis:

Table 3 shows the challenges faced by the caregivers of the patients undergoing hemodialysis. A significant difference was found in reporting fatigue and anxiety between the groups, facing additional burden while visiting hospital & caregiving responsibilities, emergency situation for their patient in last 6 months, as compared to the groups which did not face such challenge during Covid-19 pandemic (p < 0.05). However, anxiety was also found prevalent among the group of caregivers who fear to get Covid-19 infection while visiting the hemodialysis unit (p < 0.05). Analysis showed that depression was statistically significantly higher (p<0.05) among the caregivers who faced additional burden while visiting the hospital and those who faced emergency situation for their patients during last 6 months of pandemic (p < 0.05).

Risk Predictors associated with fatigue, anxiety and depression in caregivers of patients undergoing dialysis:

Three binary logistic regression analyses were performed to identify the risk predictors of fatigue, anxiety and depression in caregivers of CKD patients on dialysis. According to the logistic regression model of fatigue in caregivers showed that caregivers with facing the challenge of additional burden of visiting the hospital were 0.31 times more likely to have fatigue (95% CI: 0.08-1.18; p >0.05) (95% CI: 0.01-0.37; p >0.05). Anxiety (OR: 0.065; 95% CI: 0.011-0.369; p >.05) and depression (OR: 0.092; 95% CI: 0.023-0.378; p >0.05) were found significant predicator of fatigue. The strongest predictor of anxiety in caregivers was gender, as female participants were 4.6 times more likely to suffer from anxiety (95% CI: 1.47-14.76; p >0.05). The second predicate of anxiety was depression; patients with depression were 1.5 times more likely to suffer from anxiety (95% CI: 0.05-0.48; p > 0.05). Participants with fatigue were 0.57 times (95% CI: 0.01-0.355; p >0.05) more likely to experience anxiety.

Table 1: Demographic Characteristics of Patients on dialysis (n=115) and their Caregivers (n=110)

	Patients												Caregivers											
	Non-Fatigued (n=23, 20%)		Fatigued (n=92, 80%)		Non-Anxiety (n=38, 33%)		Anxiety (n=77, 67%)		Non-Depression (n=20, 17.4%)		Depression (n=95, 82.6%)		Non-Fatigued (n=29, 26.4%)		Fatigued (n=81, 73.6%)		Non-Anxiety (n=52, 47.3%)		Anxiety (n=58, 52.7%)		Non-Depression (n=45, 40.9%)		Depression (n=65, 59.1%)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Age	p value=0.85				p value=0.64				p value=0.30				p value=0.97				p value=0.10				p value=0.94			
≤ 55 years	11	47.8	46	50	20	52.6	37	48.1	12	60	45	47.4	18	62.1	50	61.7	28	53.8	40	69	28	62.2	40	61.5
> 55 years	12	52.2	46	50	18	47.4	40	51.9	8	40	50	52.6	11	37.9	31	38.3	24	46.2	18	31	17	37.8	25	38.5
Gender	p value=0.04				p value=0.19				p value=0.31				p value=0.16				p value=0.00				p value=0.17			
Male	18	78.3	51	55.4	26	68.4	43	55.8	14	70	55	57.9	19	65.5	41	50.6	36	69.2	24	41.4	28	62.2	32	49.2
Female	5	21.7	41	44.6	12	31.6	34	44.2	6	30	40	42.1	10	34.5	40	49.4	16	30.8	34	58.6	17	37.8	33	50.8
Marital Status	p value=0.16				p value=0.04				p value=0.07				p value=0.21				p value=0.93				p value=0.19			
Unmarried	6	26.1	13	14.1	10	26.3	9	11.7	6	30	13	13.7	9	31	16	19.8	12	23.1	13	22.4	13	28.9	12	18.5
Married	17	73.9	79	85.9	28	73.7	68	88.3	14	70	82	86.3	20	69	65	80.2	40	76.9	45	77.6	32	71.1	53	81.5
Education	p value=0.37				p value=0.22				p value=0.35				p value=0.22				p value=0.60				p value=0.32			
Matric or less	17	73.9	59	64.1	28	73.7	48	62.3	15	75	61	64.2	13	44.8	47	58	27	51.9	33	56.9	22	48.9	38	58.5
Intermediate or Above	6	26.1	33	35.9	10	26.3	29	37.7	5	25	34	35.8	16	55.2	34	42	25	48.1	25	43.1	23	51.1	27	41.5
Employment Status	p value=0.33				p value=0.95				p value=0.67				p value=0.41				p value=0.34				p value=0.26			
Unemployed	7	30.4	38	41.3	15	39.5	30	39	7	35	38	40	9	31	32	39.5	17	32.7	24	41.4	14	31.1	27	41.5
Employed	16	69.6	54	58.7	23	60.5	47	61	13	65	57	60	20	69	49	60.5	35	67.3	34	58.6	31	68.9	38	58.5
Monthly income	p value=0.06				p value=0.52				p value=0.18				p value=0.08				p value=0.15				p value=0.05			
≤220USD	13	56.5	70	76.1	26	98.4	57	74	12	60	71	74.7	16	55.2	59	72.8	32	61.5	43	74.1	26	57.8	49	75.4
>220USD	10	43.5	22	23.9	12	31.6	20	26	8	40	24	25.3	13	44.8	22	27.2	20	38.5	15	25.9	19	42.2	16	24.6
Fatigue	-				p value=0.00				p value=0.00				-				p value=0.00				p value=0.00			
Non-Fatigued	-	-	-	-	20	87	18	19.6	18	78.3	2	2.2	-	-	-	-	27	51.9	2	3.4	26	57.8	3	4.6
Fatigued	-	-	-	-	3	13	74	80.4	5	21.7	90	97.8	-	-	-	-	25	48.1	56	96.6	19	42.2	62	95.4
HADS Anxiety	p value=0.00				-				p value=0.00				p value=0.00				-				p value=0.00			
Non-Anxiety	20	52.6	3	3.9	-	-	-	-	19	50	1	1.3	27	93.1	25	30.9	-	-	-	-	36	80	16	24.6
Anxiety	18	47.4	74	96.1					19	50	76	98.7	2	6.9	56	69.1	-	-	-	-	9	20	49	75.4
HADS Depression	p value=0.00				p value=0.00				-				p value=0.00				p value=0.00							
Non-Depression	18	90	5	5.3	19	95	19	20	-	-	-	-	26	89.7	19	23.5	36	69.2	9	15.5	-	-	-	-
Depression	2	10	90	94.7	1	5	76	80	-	-	-	-	3	10.3	62	76.5	16	30.8	49	84.5	-	-	-	-

Table 2: Challenges faced by Patients on dialysis (n=115).

	Non-Fatigued (n=23, 20%)		Fatigued (n=92, 80%)		Non-Anxiety (n=38, 33%)		Anxiety (n=77, 67%)		Non-Depression (n=20, 17.4%)		Depression (n=95, 82.6%)	
	n	%	n	%	n	%	n	%	n	%	n	%
Did you face any additional burden while visiting hospital?	p value=0.00				p value=0.00				p value=0.00			
No	19	82.6	38	41.3	31	81.6	26	33.8	16	80	41	43.2
Yes	4	17.4	54	58.7	7	18.4	51	66.2	4	20	54	56.8
Was there any complication/ emergency situation for you in last 6 months?	p value=0.08				p value=0.01				p value=0.07			
No	18	78.3	54	58.7	30	78.9	42	54.5	16	80	56	58.9
Yes	5	21.7	38	41.3	8	21.1	35	45.5	4	20	39	41.1
Did you have an easy access to doctor during pandemic?	p value=0.14				p value=0.61				p value=0.17			
No	0	0	8	8.7	2	5.3	6	7.8	0	0	8	8.4
Yes	23	100	84	91.3	36	94.7	71	92.2	20	100	87	91.6
Do you fear that you will be infected due to your highly risk condition?	p value=0.04				p value=0.01				p value=0.17			
No	15	65.2	38	41.3	24	63.2	29	37.7	12	60	41	43.2
Yes	8	34.8	54	58.7	14	36.8	48	62.3	8	40	54	56.8
Do you fear that you will be infected due to your advanced age?	p value=0.77				p value=0.00				p value=0.50			
No	14	60.9	53	57.6	29	76.3	38	49.4	13	65	54	56.8
Yes	9	39.1	39	42.4	9	23.7	39	50.6	7	35	41	43.2
Do you think you could get infected with CoVid-19 in dialysis unit due to close proximity with other patients?	p value=0.01				p value=0.00				p value=0.01			
No	16	69.6	37	40.2	25	65.8	28	36.4	14	70	39	41.1
Yes	7	30.4	55	59.8	13	34.2	49	63.6	6	30	56	58.9
Have you experienced increased emotional distress getting dialysis?	p value=0.07				p value=0.05				p value=0.09			
No	16	69.6	45	48.9	25	65.8	36	46.8	14	70	47	49.5
Yes	7	30.4	47	51.1	13	34.2	41	53.2	6	30	48	50.5
Have you experienced increased isolation or loneliness since start of the pandemic?	p value=0.00				p value=0.00				p value=0.00			
No	22	95.7	52	56.5	32	84.2	42	54.5	19	95	55	57.9
Yes	1	4.3	40	43.5	6	15.8	35	45.5	1	5	40	42.1
Do you have trouble falling asleep /staying asleep because of stress induced due to CoVid-19?	p value=0.50				p value=0.15				p value=0.93			
No	15	65.2	53	57.6	26	68.4	42	54.5	12	60	56	58.9
Yes	8	34.8	39	42.4	12	31.6	35	45.5	8	40	39	41.1
Were your biochemical tests carried out as per routine?	p value=0.25				p value=0.10				p value=0.29			
No	0	0	5	5.4	0	0	5	6.5	0	0	5	5.3
Yes	23	100	87	94.6	38	100	72	93.5	20	100	90	94.7

Table 3: Challenges faced by their Caregivers (n=110) of the Patients undergoing dialysis.

	Non-Fatigued (n=29, 26.4%)		Fatigued (n=81, 73.6%)		Non-Anxiety (n=52, 47.3%)		Anxiety (n=58, 52.7%)		Non-Depression (n=45, 40.9%)		Depression (n=65, 59.1%)	
	n	%	n	%	n	%	n	%	n	%	n	%
Did you face any additional burden while visiting hospital?	p value=0.00				p value=0.00				p value=0.00			
No	25	86.2	39	48.1	42	80.8	22	37.9	33	73.3	31	47.7
Yes	4	13.8	42	51.9	10	19.2	36	62.1	12	26.7	34	52.3
Did you face any additional burden in your care giving responsibilities?	p value=0.00				p value=0.00				0.07			
No	24	82.8	38	46.9	40	76.9	22	37.9	30	66.7	32	49.6
Yes	5	17.2	43	53.1	12	23.1	36	62.1	15	33.3	33	50.8
Was there any complication/ emergency situation for your patient in last 6 months?	p value=0.00				p value=0.00				p value=0.00			
No	27	93.1	55	67.9	47	90.4	35	60.3	40	88.9	42	64.6
Yes	2	6.9	26	32.1	5	9.6	23	39.7	5	11.1	23	35.4
Did you have an easy access to doctor for your patient during pandemic?	p value=0.41				p value=0.68				p value=0.18			
No	2	6.9	10	12.3	5	9.6	7	12.1	4	8.9	8	12.3
Yes	27	93.1	71	87.7	47	90.4	51	87.9	41	91.1	57	87.7
Do you think that you can get Covid-19 infection when going to hemodialysis unit?	0.36				p value=0.02				p value=0.68			
No	15	51.7	34	42	29	55.8	20	34.5	19	42.2	30	46.2
Yes	14	48.3	47	58	23	44.2	38	65.5	26	57.8	35	53.8
Does it concern you that your patient may get Covid-19 infection during hemodialysis?	p value=0.21				p value=0.15				p value=0.98			
No	13	44.8	26	32.1	22	42.3	17	29.3	16	35.6	23	35.4
Yes	16	55.2	55	67.9	30	57.7	41	70.7	29	64.4	42	64.6
Did you think that you or your patient may carry it to your family?	p value=0.19				p value=0.06				p value=0.77			
No	12	41.4	23	28.4	21	40.4	14	24.1	15	33.3	20	30.8
Yes	17	58.6	58	71.6	31	59.6	44	75.9	30	66.7	45	69.2
Was the dialysis team supportive and has better communication with you during this pandemic period?	p value=0.77				p value=0.20				p value=0.16			
No	3	10.3	10	12.3	4	7.7	9	15.5	3	6.7	10	15.4
Yes	26	89.7	71	87.7	48	92.3	49	84.5	42	93.3	55	84.6
Were the biochemical tests of your patient carried out as per routine?	p value=0.84				p value=0.35				p value=0.31			
No	4	13.8	10	12.3	5	9.6	9	15.5	4	8.9	10	15.4
Yes	25	86.2	71	87.7	47	90.4	49	84.5	41	91.1	55	84.6

Additional burden while visiting hospital, fear of getting Covid-19 infection from dialysis unit and facing emergency situations in last 6 months of covid-19 pandemic were also significantly predicted fatigue (p<0.05). In logistic regression model of depression in caregivers, the challenge of facing emergency situations in last 6 months of covid-19 pandemic significantly predicted depression (OR: 0.30; 95% CI: 0.09-0.833; p > 0.05). Fatigue (OR: 0.10; 95% CI: 0.024-0.40) and anxiety (OR: 0.15; 95% CI: 0.047-0.50) were also found significant predictors of depression (p > 0.05) in caregivers of CKD patients on dialysis.

Discussion

To the best of our knowledge, this is one of the primary studies to assess the prevalence of fatigue, anxiety and depression due to the challenges faced by the patients of Chronic Kidney disease (CKD) undergoing hemodialysis and their caregivers during Covid-19 pandemic in Pakistan. In this study, we analyzed the results of the total 115 patients and 110 caregivers. This analysis showed the prevalence of fatigue, anxiety and depression due to challenges faced by patients was 80%, 67% and 86.2% respectively. This prevalence was higher than the results reported in one of the previous study which showed the prevalence of fatigue, anxiety and depression among patients undergoing hemodialysis as 53.7%, 43.9% and 33.3% respectively.[21] The data published from same region of South Asia presented that depression level was as low as 45% in pre-covid era among hemodialysis patients.[33] Another study reported low level severity of mental health-related conditions such as anxiety, sadness, being worried, and nervousness as compared to our study.[34] The comparison of all these studies concludes that overall rate of anxiety, depression and fatigue has elevated among the patients undergoing hemodialysis during Covid-19 pandemic. The prevalence of fatigue, anxiety and depression in the caregivers who were visiting the hospital with CKD patient for hemodialysis, was 73.6%, 52.7% and 59.1% respectively reported by this study. Comparison with the results of previous studies regarding mental health of general populations and caregivers of the patients shows the prevalence of fatigue, anxiety and depression in present study was higher.[35-40] One explanation to this upsurge in the levels of fatigue, anxiety and depression in caregivers of CKD patients is that they have to perform different additional caregiving responsibilities due to the Covid-19 pandemic and lockdown. This present study also suggests challenges e.g. feeling additional burden while

visiting the hospital and fear of getting infection and feeling of isolation/loneliness during pandemic were the main risk predictors of increased level fatigue, anxiety and depression in patients and their caregivers as compared to pre-covid era.

Analysis of this study shows that male patients undergoing hemodialysis had greater levels of fatigue than female patients which are contrasting many studies reporting that female patients undergoing hemodialysis had highest level of fatigue, anxiety and depression in pre-covid era.[21,41] Similarly, married patients were found to be more anxious than the unmarried ones which is again contrasting many other studies.[42,43] These contradiction can be explained by the fact that many challenges due to Covid-19 lockdown, increased isolation and fear of getting Covid-19 infection caused different mental health issues which showed the direct association of marital status and anxiety due to the fear of getting Covid-19 infection while visiting the hospitals.[44] Female caregivers were found more anxious than the male caregivers according to our present study. These results were consistent to many other studies which also reported elevated levels of anxiety and stress disorders in female participants during Covid-19.[45-47] Gender was also found the strong predictor of anxiety among the caregivers of CKD patients. This shows that female individuals were more prone to fatigue and anxiety because of the different challenges faced during Covid-19.[48] The high rate of unemployment and deductions in salaries during the Covid-19 pandemic intensifies the risks of poor mental health of general population.[49] In our study monthly income was not found significantly associated with the mental health of the hemodialysis patients and their caregivers. Alternatively fatigued patients were found more prone to have anxiety and depression, and caregivers of CKD with fatigue were also more prone to have anxiety and depression. This was also reported by Zarrouq B. et al. that fatigue is significantly and positively associated with depression as well as with anxiety.[50]

Hence, these findings show that fatigue, anxiety and depression are significantly prevalent among CKD patients and their caregivers. One explanation of this can be the several additional challenges faced by the CKD patients and their caregivers during this pandemic. Many different social challenges were faced by the general population during Covid-19 pandemic such as increased loneliness, sleep deprivation, unavailability of public transport due to lockdown, increased family violence due to isolation and lack of socialization.[51-53] All these challenges increased

the depression, anxiety, poor sleep quality and fatigue in general population. It is also being reported that during Covid-19 pandemic patients while visiting the hospitals were facing different challenges and problems which caused anxiety in them.[54] As the results of current study also shows that fatigue, anxiety and depression were highly prevalent among those patients who were facing the additional burden while visiting the hospital, increased isolation and fear of getting Covid-19 due to high risk condition and close proximity of the other patients in dialysis unit. Same was reported in a another study that patients undergoing hemodialysis had to face several challenges during Covid-19 pandemic.[55] Caregivers facing emergency situations for their caregivers or additional burden while visiting the hospital and caregiving responsibilities also found as risk factors of higher anxiety and depression. This is also corresponding the results of Sousa H, et al. who reports the several challenges faced by the Caregivers of patients undergoing hemodialysis during Covid-19 pandemic.[25] Same was seen among the caregivers of patients undergoing treatment of cancer that they had to face many challenges during Covid-19 pandemic regarding caregiving responsibilities, visiting hospital and hospital stays.[56] Additional burden while visiting the hospital and facing emergency situation during lockdown, fear of getting Covid-19 from dialysis unit and increased isolation during lockdown were found significant predictors of fatigue, anxiety and depression among CKD patients and their caregivers. This is the first time these challenges were studied as the risk predictors of fatigue, anxiety and depression among CKD patients and their caregivers.

The results of this study can help in providing psychological intervention and support for CKD patients and their caregivers. Additional longitudinal and qualitative studies are recommended to provide prevalence of fatigue, anxiety and depression before, during and after pandemic and in depth understanding and solutions to these problems. This study has certain restraints as it was executed in only in Pakistan leading to limitations of generalization in other countries. This study can also differ on clinical grounds as it was based on patient's self-responding assessment questionnaire. Continuous work to acknowledge and alleviate the effect of the pandemic on population health should include patients undergoing hemodialysis, whose psychological and physical health was already vulnerable before Covid-19.

Conclusion

This study is the first to comprehend the fatigue, anxiety and depression due to the challenges faced by patients undergoing hemodialysis and their caregivers during the period of the Covid-19 pandemic in Pakistan. It will give the fundamental data which will be helpful for medical, paramedical staff of dialysis unit and researchers as they categorize the risk predictors and the levels of fatigue, anxiety and depression and develop strategies to improve these conditions among patient on hemodialysis and also their caregivers. Additionally, it gives firm grounds for future researches, which should ascertain the suitable interventions to lessen the fatigue, anxiety, and depression due to the challenges of Covid-19 pandemic among patients undergoing hemodialysis and their family members.

Declaration of interest statement
All authors declare that they have no potential conflicts of interest.

References

1. Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. New England journal of medicine. 2020.

2. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. Acta Bio Medica: Atenei Parmensis. 2020;91(1):157.

3. Organization WH. Global Statistics of Covid-19. 2022; https://covid19.who.int/. Accessed 28 January, 2022.

4. Abid K, Bari YA, Younas M, Tahir Javaid S, Imran AJAPJoPH. <? covid19?> Progress of COVID-19 Epidemic in Pakistan. 2020;32(4):154-156.

5. Dashborad C-. Statisctics of Covid-19 in Pakistan. 2022; https://covid.gov.pk/stats/pakistan.

6. Farooq S, Haider SI, Sachwani S, Parpio YN. Insight into COVID-19 responses and initiatives from Pakistan. Journal of the

College of Physicians and Surgeons--Pakistan: JCPSP. 2020.

7. Saeed U, Sherdil K, Ashraf U, Younas I, Butt H, Ahmad S. Identification of potential lockdown areas during COVID-19 transmission in Punjab, Pakistan. Public health. 2021;190:42-51.

8. Bajgain KT, Badal S, Bajgain BB, Santana MJ. Prevalence of comorbidities among individuals with COVID-19: A rapid review of current literature. American journal of infection control. 2021;49(2):238-246.

9. Ejaz H, Alsrhani A, Zafar A, et al. COVID-19 and comorbidities: Deleterious impact on infected patients. Journal of infection & public health. 2020;13(12):1833-1839.

10. Black C, Sharma P, Scotland G, et al. Early referral strategies for management of people with markers of renal disease: a systematic review of the evidence of clinical effectiveness, cost-effectiveness and economic analysis. Health Technology Assessment. 2010;14(21):1-184.

11. Himmelfarb J, Ikizler TA. Hemodialysis. New England Journal of Medicine. 2010;363(19):1833-1845.

12. Hasan M, Sutradhar I, Gupta RD, Sarker M. Prevalence of chronic kidney disease in South Asia: a systematic review. BMC nephrology. 2018;19(1):1-12.

13. Imtiaz S, Salman B, Qureshi R, Drohlia MF, Ahmad A. A review of the epidemiology of chronic kidney disease in Pakistan: A global and regional perspective. Saudi Journal of Kidney DiseasesTransplantation.` 2018;29(6):1441.

14. Corbett RW, Blakey S, Nitsch D, et al. Epidemiology of COVID-19 in an urban dialysis center. Journal of the American Society of Nephrology. 2020;31(8):1815-1823.

15. Albalate M, Arribas P, Torres E, et al. High prevalence of asymptomatic COVID-19 in hemodialysis. Daily learning during first month of COVID-19 pandemic. Nefrología. 2020;40(3):279-286.

16. Goicoechea M, Cámara LAS, Macías N, et al. COVID-19: clinical course and outcomes of 36 hemodialysis patients in Spain. Kidney international. 2020;98(1):27-34.

17. La Milia V, Bacchini G, Bigi MC, et al. COVID-19 outbreak in a large hemodialysis center in Lombardy, Italy. Kidney international reports. 2020;5(7):1095-1099.

18. Salerno S, Messana JM, Gremel GW, et al. COVID-19 Risk Factors and Mortality Outcomes Among Medicare Patients Receiving Long-term Dialysis. JAMA network open. 2021;4(11):e2135379-e2135379.

19. Meherali S, Punjani N, Louie-Poon S, et al. Mental health of children and adolescents amidst COVID-19 and past pandemics: a rapid systematic review. International journal of environmental research public health. 2021;18(7):3432.

20. Ozamiz-Etxebarria N, Dosil-Santamaria M, Picaza-Gorrochategui M, Idoiaga-Mondragon N. Stress, anxiety, and depression levels in the initial stage of the COVID-19 outbreak in a population sample in the northern Spain. Cadernos de saude publica. 2020;36.

21. Al Naamani Z, Gormley K, Noble H, Santin O, Al Maqbali M. Fatigue, anxiety, depression and sleep quality in patients undergoing haemodialysis. BMC nephrology. 2021;22(1):1-8.

22. Bartoszek A, Walkowiak D, Bartoszek A, Kardas G. Mental well-being (depression, loneliness, insomnia, daily life fatigue) during COVID-19 related home-confinement—A study from Poland. International journal of environmental research public health. 2020;17(20):7417.

23. Su K, Ma Y, Wang Y, et al. How we mitigated and contained the COVID-19 outbreak in a hemodialysis center: Lessons and experience. Infection Control Hospital Epidemiology. 2020;41(10):1240-1242.

24. Cantekin I, Kavurmacı M, Tan M. An analysis of caregiver burden of patients with hemodialysis and peritoneal dialysis. Hemodialysis International. 2016;20(1):94-97.

25. Sousa H, Frontini R, Ribeiro O, et al. Caring for patients with end-stage renal disease during COVID-19 lockdown: What (additional) challenges to family caregivers? Scandinavian Journal of Caring Sciences. 2021.

26. Feng J, Bao L, Wang X, et al. Low expression of HIV genes in podocytes accelerates the progression of diabetic kidney disease in mice. Kidney international. 2021;99(4):914-925.

27. Acaster S, Dickerhoof R, DeBusk K, Bernard K, Strauss W, Allen LF. Qualitative and quantitative validation of the FACIT-fatigue scale in iron deficiency anemia. Health quality of life outcomes. 2015;13(1):1-10.

28. Yellen SB, Cella DF, Webster K, Blendowski C, Kaplan EJJop. Measuring fatigue and other anemia-related symptoms with the Functional Assessment of Cancer Therapy (FACT) measurement system. Journal of pain symptom management. 1997;13(2):63-74.

29. Al Maqbali M, Hughes C, Gracey J, Rankin J, Hacker E, Dunwoody L. Psychometric properties of the Arabic version of the Functional Assessment of Chronic Illnesses Therapy—Fatigue in Arabic cancer patients. Journal of Pain and Symptom Management. 2020;59(1):130-138. e132.

30. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta psychiatrica scandinavica. 1983;67(6):361-370.

31. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the Hospital Anxiety and Depression Scale: an updated literature review. Journal of psychosomatic research. 2002;52(2):69-77.

32. Terkawi AS, Tsang S, AlKahtani GJ, et al. Development and validation of Arabic version of the Hospital Anxiety and Depression Scale. Saudi journal of anaesthesia. 2017;11(Suppl 1):S11.

33. Chen C-K, Tsai Y-C, Hsu H-J, et al. Depression and suicide risk in hemodialysis patients with chronic renal failure. Psychosomatics. 2010;51(6):528-528. e526.

34. Bonenkamp AA, Druiventak TA, van Eck van der Sluijs A, van Ittersum FJ, van Jaarsveld BC, Abrahams AC. The Impact of COVID-19 on the mental health of dialysis patients. Journal of nephrology. 2021;34(2):337-344.

35. Hou T, Zhang R, Song X, et al. Self-efficacy and fatigue among non-frontline health care workers during COVID-19 outbreak: A moderated mediation model of posttraumatic stress disorder symptoms and negative coping. PloS one. 2020;15(12):e0243884.

36. Salari N, Hosseinian-Far A, Jalali R, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. Globalization health. 2020;16(1):1-11.

37. Wang C, Pan R, Wan X, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. International journal of environmental research public health. 2020;17(5):1729.

38. Wang C, Pan R, Wan X, et al. A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. Brain, behavior, immunity. 2020;87:40-48.

39. Bawazier LA, Stanley I, Sianipar W, Suhardjono S. Anxiety and depression among caregivers of hemodialysis patients at the Indonesian national referral hospital. Medical Journal of Indonesia. 2018;27(4):271-278.

40. Gerogianni G, Polikandrioti M, Babatsikou F, et al. Anxiety—depression of dialysis patients and their caregivers. Medicina. 2019;55(5):168.

41. Keskin G, Engin E. The evaluation of depression, suicidal ideation and coping strategies in haemodialysis patients with renal failure. Journal of clinical nursing. 2011;20(19-20):2721-2732.

42. Jace CE, Makridis CA. Does marriage protect mental health? Evidence from the COVID-19 pandemic. Social Science Quarterly. 2021;102(6):2499-2515.

43. Ta VP, Gesselman AN, Perry BL, Fisher HE, Garcia JR. Stress of singlehood: Marital status, domain-specific stress, and anxiety in a national US sample. Journal of Social Clinical Psychology. 2017;36(6):461-485.

44. Dilmaç B, Karababa A, Seki T, Şimşir Z, Kurnaz MF. Examining the Relationships Between Fear of Coronavirus, State Anxiety, and Relationship Happiness Among Married Turkish Individuals During COVID-19. Journal of Family Issues. 2021:0192513X211055513.

45. Adejumo OA, Iyawe IO, Akinbodewa AA, Abolarin OS, Alli EOJGMJ. Burden, psychological well-being and quality of life of caregivers of end stage renal disease patients. 2019;53(3):190-196.

46. García-Fernández L, Romero-Ferreiro V, Padilla S, et al. Gender differences in emotional response to the COVID-19 outbreak in Spain. Brain. 2021;11(1):e01934.

47. Özdin S, Bayrak Özdin Ş. Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: The importance of gender. International Journal of Social Psychiatry. 2020;66(5):504-511.

48. Zhang W, Walkover M, Wu YY. The challenge of COVID-19 for adult men and

women in the United States: disparities of psychological distress by gender and age. Public Health. 2021;198:218-222.

49. Donnelly R, Farina MP. How do state policies shape experiences of household income shocks and mental health during the COVID-19 pandemic? Social science medicine.2021;269:113557.

50. Zarrouq B, Abbas N, El Hilaly J, et al. An investigation of the association between religious coping, fatigue, anxiety and depressive symptoms during the COVID-19 pandemic in Morocco: a web-based cross-sectional survey. BMC psychiatry. 2021;21(1):1-13.

51. Zhang H. The influence of the ongoing COVID-19 pandemic on family violence in China. Journal of family violence. 2020:1-11.

52. Zoumpourlis V, Goulielmaki M, Rizos E, Baliou S, Spandidos DA. [Comment] The COVID-19 pandemic as a scientific and social challenge in the 21st century. Molecular medicine reports. 2020;22(4):3035-3048.

53. Jahrami H, BaHammam AS, Bragazzi NL, Saif Z, Faris M, Vitiello MV. Sleep problems during the COVID-19 pandemic by population: a systematic review and meta-analysis. Journal of Clinical Sleep Medicine. 2021;17(2):299-313.

54. Kalwar HA, Kamani L. Problems faced by patients and health service utilization experiences of gastrointestinal patients during lockdown due to COVID-19 pandemic. Pakistan Journal of Medical Sciences. 2022;38(3Part-I):517.

55. Iqbal S, Iqbal A, Blair KAA, et al. Challenges faced by the patients on dialysis treatment in COVID-19 era and the possible solutions. Biomed J Sci Tech Res. 2021;36:28279-28282.

56. Sannes TS, Yeh IM, Gray TFJP-o. Caring for loved ones with cancer during the COVID-19 pandemic: a double hit risk for social isolation and need for action. 2020.