Assiut Scientific Nursing Journal
http://asnj.journals.ekb.eg http://www.arabimpactfactor.com
DOI: 10.21608/asnj.2025.345534.1971 http://olddrji.lbp.world/indexedJournals.aspx
https://vlibrary.emro.who.int/journals/assiut-scientific-nursing-journal

Impact of climate change on psychological status among patients with chronic kidney disease at hemodialysis unit

Shaimaa Ahmed Abdel Samie Rateb[1], Nadia Ebraheem Sayied[2], Samir Kamal Abdul Hamid[3], Mona Fawzy Hussein[4] &Yasser Abd Elmawgood Faisal[5]

[1.] Demonstrator of Psychiatric & Mental Health Nursing, Faculty of Nursing, Assiut University, Egypt.
[2.] Professor of Psychiatric& Mental Health Nursing, Faculty of Nursing, Assiut University, Egypt.
[3.] Professor of Nephrology and Transplantation Unit, Internal Medicine Department, Faculty of Medicine, Assiut University, Egypt.
[4.] Lecturer of Psychiatric and Mental Health Nursing, Faculty of Nursing, Assiut University, Egypt.
[5.] Lecturer of Nephrology and Transplantation Unit, Internal Medicine Department, Faculty of Medicine, Assiut University, Egypt.

Abstract

Background : Over the past few decades, climate change has gained international attention. In addition to having a variety of effects on the ecosystem and ecology, these climate changes also have a variety of effects on life on Earth. Even in healthy people, heat stress can cause acute kidney injury if it is severe it cause volume depletion. Acute renal damage is known to contribute to chronic kidney disease overall. **Aim:** Investigate the impact of climate change on the psychological status of patients with chronic kidney disease. **Method:** A descriptive correlational research design was used. The study was carried out at hemodialysis units at Assiut University Hospital. A purposive sample of (200) hemodialysis patients was included. **Tools:** Demographic and clinical data sheet, climate change anxiety scale, beck depression inventory II, Kessler Psychological Distress Scale. **Results:** The study finding clarified that, the majority of the studied sample (71.5%) had a low level of climate change anxiety. More than half (51.5%) of the studied sample experienced moderate to very high psychological distress. More than half (53.5%) of the studied sample had moderate to high level of depression. **Conclusion:** there was a highly significant difference between demographic data, age group and educational level with p – value (0.007, <0.001), and there was a positive correlation between Climate change anxiety , psychological distress and depression. **Recommendation:** Implement psycho- educational program for chronic kidney disease patients to manage psychological stress and depression.

keywords: Climate change, Depression, Hemodialysis & Psychological distress.

Introduction

Climate change refers to long- term shifts in temperatures and weather patterns, these changes may occur naturally as a result of significant volcanic eruptions or variations in the sun's activity. However, human activity has been the primary cause of climate change since the 1800s, mostly as a result of the combustion of fossil fuels like coal, oil, and gas. Methane and carbon dioxide are the two primary greenhouse gases responsible for climate change (**Fagodiya et al., 2023**).

One effect of global warming is an increase in the frequency and severity of heat waves. The negative impact of heat waves on human health is increasing daily due to the effects of global warming. Heat-related illnesses are caused by exposure to hot temperatures **(Romanello et al., 2021)**. Heat-related illnesses depend on a number of factors, including socioeconomic status, preexisting medical issues, and the current weather **(Vanos et al., 2020)**.

The kidneys play a crucial role in the generation of hormones, the exertion of waste, the regulation of blood ions, blood volume, and blood PH. Even in healthy people, heat stress can cause acute kidney damage if it is severe cause volume depletion. Acute renal damage is known to contribute to chronic kidney disease overall **(Tovey, 2024).**According to studies, rising temperatures result in increasing admission to the emergency room for a variety of renal conditions, such as acute kidney disease (CKD), kidney stones, and urinary tract infections (UTIs) **(Borg et al., 2017, Johnson et al., 2019)**.

Both direct and indirect effects of climate change on mental health have been observed worldwide, with differing durations. Trauma from climate catastrophes like hurricanes, earthquakes, droughts, and wildfires is one example of how climate change directly affects mental health. Numerous perceived environmental stresses caused by climate change have a direct impact on brain function and mental health, as evidenced by studies that found residents of flooded areas reported poor mental health in addition to the more frequently reported physical illnesses(**Borg et al., 2021**). Anxiety disorders, PTSD, depression, and

suicidal thoughts are common consequences of severe or persistent stressors**(Charlson etal.,2021).**

Dialysis machines and/or procedures are essential for patients with end-stage renal disease (ESRD). Additionally, they deal with issues including fluid restriction, ongoing pharmaceutical use, long, continuous treatments throughout the day, treatment-related changes in appearance, and sexual difficulties**(Atnafu et al., 2022).**This results in psychological issues like body image and self-respect (**Ok and Işı 2019**), health , income issues, and job loss. Along with compliance challenges based on the restrictive treatments, patients also experience dependency and mortality problems (**Pellizzari et al., 2022).**

According to Previous studies, psychological disorders are common in dialysis patients, with rates of depressive disorders ranging from 22.6% to 54.1%, much like those of anxiety disorders **(Ok & Işı (2019).** Additionally, studies have shown that 21.5% of patients experienced suicidal thoughts **(Singla et al.,2023).** Another study has found that 46.6% of end-stage renal disease (ESDR) patients had psychiatric disorders **(Ok & Işı (2019)**. According to a study by **Cukor et al. (2014),** which involved patients with ESRD, patients have reported psychological disorders raised mortality and treatment expenses while also lowering patients' quality of life and treatment compliance.

Furthermore, from mild emotional stress to severe psychological distress it could be a sign of a mental disorder. It is not always the psychological distress is a sign of a mental illness. Psychological distress was present in 23.3% in both sexes, 18.0% among males and 29.2% among females **(Pengpid & Peltzer, 2020).**

Significance of the study:

Egypt's geographic location and restricted access to resources for reducing the consequences of climatic shocks make it especially vulnerable to the negative effects of climate change. This is highlighted in Egypt's Vision 2030, which places a high priority on sustainable development and confronts the difficulties posed by climate change through problem-solving and scientific research **(Hussein et al ., 2023**).

Recent studies have shown that there is climate change anxiety (CCA), and even the existential danger of climate change may be linked to negative mental health consequences, especially in younger populations **(Schwartz et al., 2023).** The effects of climate change on mental health can range from mild signs of stress and distress to severe conditions like depression, anxiety, and sleep difficulties to suicidal thoughts and post-traumatic stress disorder (**Lawrance et al., 2022**).

Study by Kamel et al, 2022 who study, the prevalence of anxiety and depression in patients with end- stage renal disease (ESRD) in Egypt and found that ,anxiety and depression among hemodialysis patients with a prevalence rate of 33.7% and 51% for borderline and abnormal anxiety cases respectively, and 31.9% and 52.3% for borderline and 31.9% for abnormal depression cases respectively.

A Range of existing studies suggest that climate change and psychological status are interrelated in a complex way. So the present study aimed to investigate the effect of climate change on the psychological status of patients with chronic kidney disease.

Aim of the study:

Investigate the impact of climate change on the psychological status of patients with chronic kidney disease.

Research questions:

1. Is there a relation between climate change and psychological status of patients with chronic kidney disease?
2. Is there is a relationship between demographic, clinical data and psychological status of patients with chronic kidney disease?

Subjects & Method:

Research design:

A descriptive correlational research design.

Research setting:

The study was carried- out at the hemodialysis unit at Assiut University Hospital.

Hemodialysis unit included (A). Regular sectors consist of (31) beds for HCV-ve, HBV+ ve and HCV+ve these patients taken 3 sessions per week. (B). emergency sectors consist of 10 beds.

Sample:

The sample included (200) males and females hemodialysis patients out of a total (320) patients. Purposive sample was used .

The total numbers of patients were 320 according to admission office at hemodialysis units at Assiut University Hospital from January 2022 to December 2022, by using the software EPI/Info, version 3,3 with 95% confidence interval(CI), the estimated sample size was found to be 175 patients. To compensate for the dropout (3%) was added to the sample size.

This equation was used to calculate the sample

Total number of patients in hemodialysis units old/new × sample size / Total number of patients in hemodialysis units (New + old unit)

To calculate number of patients in old unit:

220*200 = 44,000 = 137

220 + 100 320

To calculate number of patients in new unit:
100*200 = 20,000 = 63
220 + 100 320

Inclusion criteria:

1. Adult patients (male and female) from 20 years to 60 years.
2. All patients who agree to participate in the study.
3. Duration of dialysis (from 3 years and more).

Exclusion criteria:

1. Patients who are less than 20 years or more than 65 years.
2. Patients with comorbid disease. (As the patients with liver disease, cardiovascular disease, and tumor disease)
3. Patients with psychiatric disorders.

Tools of data collection:

Tool (1):- Demographic and clinical data sheet:

This was designed by the researcher to collect the information about demographic data such as (age, gender, educational level, residence, occupation, marital status) and clinical data as (presence of edema in the lower limb, Diabetes mellitus (DM), Hypertension (HTN), family history of chronic kidney disease and duration of dialysis).

Tool (2): Climate Change Anxiety Scale (CCAS):

The Climate Change Anxiety Scale (CCAS), developed by **Clayton & Karazsia in 2020.** Consist of 13 items on a 5-point Likert scale ranging from 1 (Never) to 5 (Almost Always). The scale was categorized into 2 subscales. The first subscale, is Cognitive-Emotional Impairment subscale, has questions 1-8. The first four items measure how climate change affects emotions and concentration, while items 5-8 evaluate how unhealthy people think about climate change. The second subscale, is Functional Impairment subscale, consist of 9-13 Items which focuses on whether feelings associated with climate change interfere with daily functioning. The total score was calculated by the sum of all of the items. There are three different score categories: low (13-30 points), moderate (31-47 points), and high (48-64 points). The subscales of the Climate Change Anxiety Scale (CCAS) demonstrated high reliability, with Cronbach's alpha values of .96 and .93, respectively, as reported by **Clayton & Karazsia, 2020.**

Tool (3): Beck Depression Inventory II (BDI- II):

This scale was designed by **Beck**, which was first published in 1961. It was subsequently updated in 1969, copyrighted in 1979, and translated into Arabic by **Abdul-Khalek (1998).** 21 questions about the subject's feelings are included in the questionnaire; each question has at least four alternative answers, ranging from 0 to 3. Items from 1-13 evaluate psychological symptoms, and items from 14-21 evaluate more physical problems. Depression levels were classified as follows: (0-13) minimal depressed symptoms, (14-19) mild depression, (20-28) moderate depression, and (29-63) severe depression. The scoring system went from 0-63. The standardized alpha (Cronbach's) value of 0.92 indicated a high level of internal consistency.

Tool (4): Kessler Psychological Distress Scale (K10):

The Kessler Psychological Distress Scale was designed in English by (Kessler et al. (2002) and translated into Arabic by **Lahcene and Chafika (2020)**. using a 5-point Likert scale as a response model, ranging from 1 (never) to 5 (always).It assesses psychological distress by evaluating the anxiety and depression that a person has experienced within the last four weeks. The range of a total score is 10 to 50. (**Andrews & Slade 2001**) established the following cut-off scores to evaluate the degree of psychological distress, 10 to 15 points "low distress",16 to 21 points "moderate", 22 to 29 points "high" and 30 to 50 points "very high". K10 presented excellent Cronbach's alpha (α) (0.93) in its initial validation.

Procedure and data collection:

official permission was granted from responsible personnel tocarry- out the study after explaining the purpose of the study. An official permission was obtained from the general director of the hospital and the head of the hemodialysis unit department was taken to facilitate the data collection. Oral consent was obtained from the patients after explaining the nature and purpose of the study. In the beginning, patients and the researcher were introduced to each other. The researcher met the patients. Structured interview was conducted in the patient's sectors, demographic questions were asked and recorded by the researcher. Data were collected by using demographic and clinical data, climate anxiety scale, Kessler psychological distress scale and beck depression Inventory II. The researcher was available at the unit on (Sunday, Tuesday ,and Thursday/ week from 3pm–7pm) undergoing hemodialysis. The interview was taken from 15–20 minutes. Data collection was conducted over six months, a period extending from November 2023 till May 2024.

Pilot Study:

A pilot study was conducted on (10%) of hemodialysis patients were 20 who met inclusion criteria to investigate the feasibility, objectivity ,applicability, clarity and adequacy of the study tools. Results of the pilot study did not lead to modifications of questions and a number of pilot study added to the study sample.

Ethical consideration:

1. Research proposal was approved by the ethical committee in the faculty of nursing. Assiut University on 22. October 2023 with ID approval (1120230694).
2. There was no risk for the study subject during the application of the research.
3. Privacy was provided during data collection.
4. Confidentiality and anonymity were assured.
5. The study followed ethical principles of scientific research.
6. Study subjects had the right to refuse to participate and or withdraw from the study without any rationale at any time.
7. Verbal consent from patients to participate in the study was obtained after an explanation of the study purpose.

Statistical analysis:

The data were tested for normality using Independent T-test quantitative data between the two groups and for homogeneity variances prior to further statistical analysis. Categorical variables were described by number and percent (N, %), whereas continuous variables were described by mean and standard deviation (Mean ± SD). Comparison between continuous variables (ANOVA Test**)** One-way ANOVA test quantitative data between the three groups or more **p < 0.05** was considered statistically significant. Person Correlation was used to demonstrate the relationship between chronic kidney disease and sub –scores with demographic and clinical data for the studied patients. All analyses were performed with the **IBM SPSS 20.0** software.

Results:

Table (1): Distribution of the studied hemodialysis patients according to their demographic characteristics (n=200)

Demographic data	No	%
Age group		
From 20 - < 30 years	17	8.5
From 30- <40 years	36	18.0
From 40- <50 years	53	26.5
From 50-<60 years	55	27.5
60 years and more	39	19.5
Mean ±SD(range)	**48.48±11.67**	
Gender		
Male	113	**56.5**
Female	87	43.5
Working status		
Not Working	122	**61.0**
Working	78	39.0
Marital status		
Single	16	8.0
Married	172	**86.0**
Widow	12	6.0
Residence		
Rural	109	**54.5**
Urban	91	45.5
Living status		
Live Alone	7	3.5
With Family	193	**96.5**
Educational level		
Not read and write	79	**39.5**
Read and write	46	23.0
Primary Education	12	6.0
Preparatory education	21	10.5
Secondary	20	10.0
University	22	11.0

Table (2): Distribution of the studied hemodialysis patients according to their clinical data (n=200)

Clinical data	No	%
Presence of edema in lower limb (L.L)		
No	164	**82.0**
Yes	36	18.0
Diabetes mellitus (DM)		
No	165	82.5
Yes	35	**17.5**
Hypertension (HTN)		
No	90	45.0
Yes	110	**55.0**
Family history of ckd		
No	195	**97.5**
Yes	5	2.5
Duration Of dialysis		
Less than 3 years	27	13.5
From 3-5 years	123	**61.5**
More than 5 years	50	25.0
Mean ±SD(range)	**4.47±2.04(1-10)**	

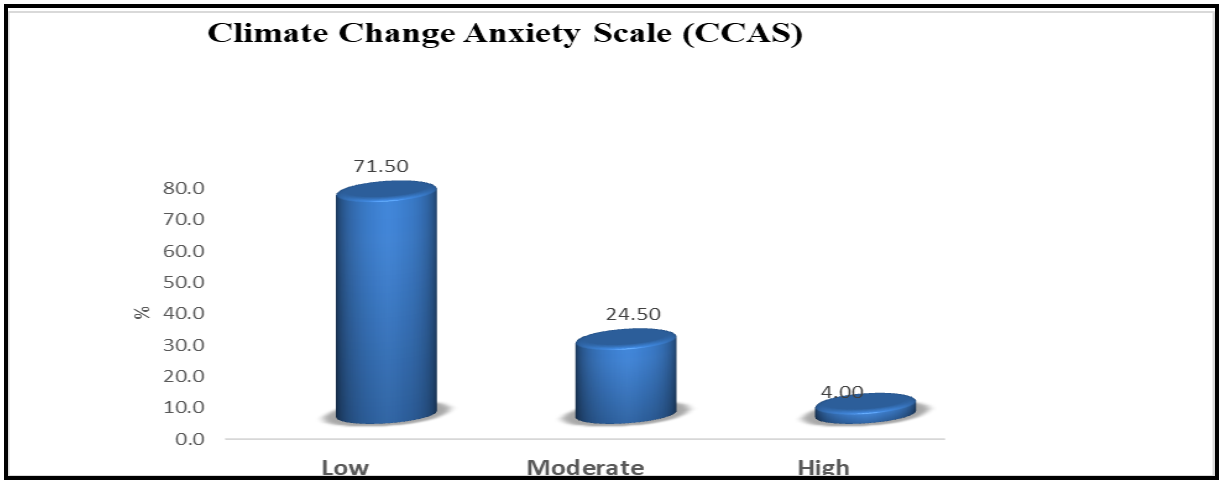

Figure (1): Total level scores of climate change anxiety of the studied hemodialysis patients (n=200)

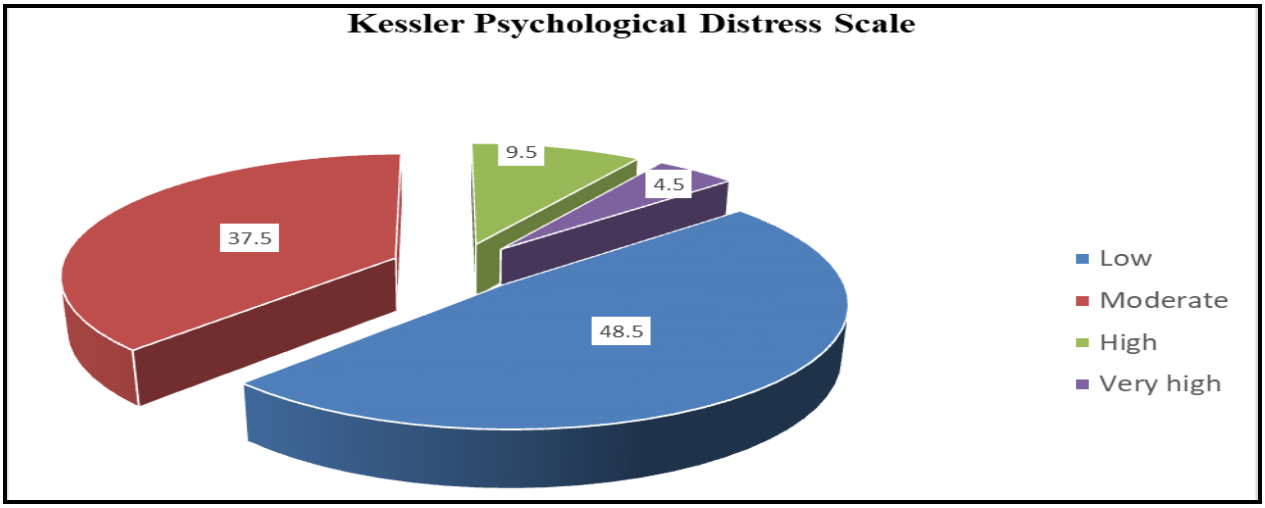

Figure (2): Total level scores of Kessler Psychological distress of the studied hemodialysis patients (n=200)

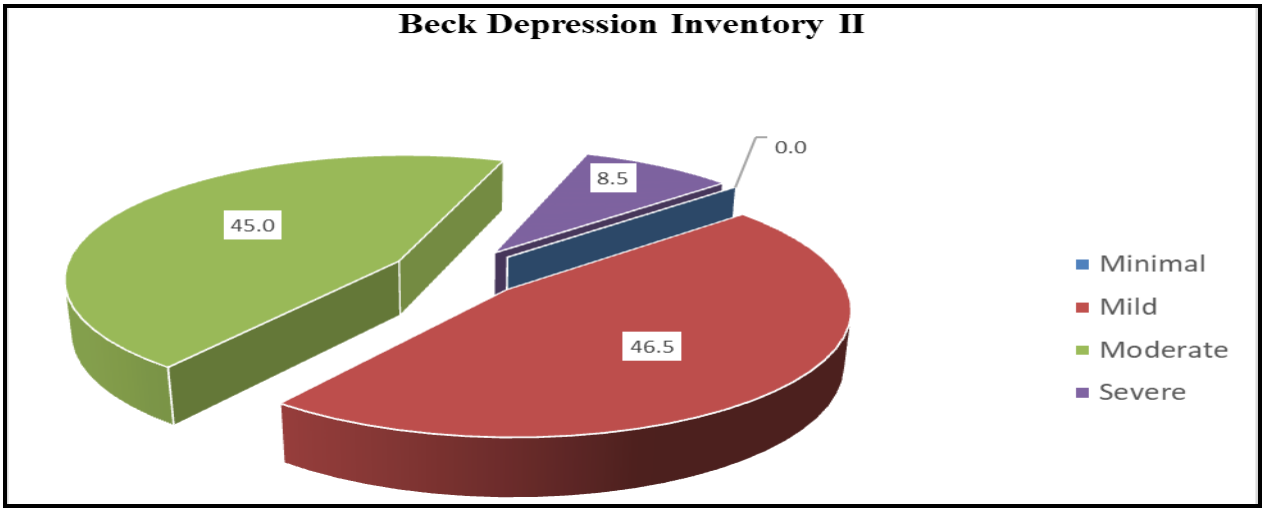

Figure (3): Total level scores of beck depression Inventory II of the studied hemodialysis patients (n=200)

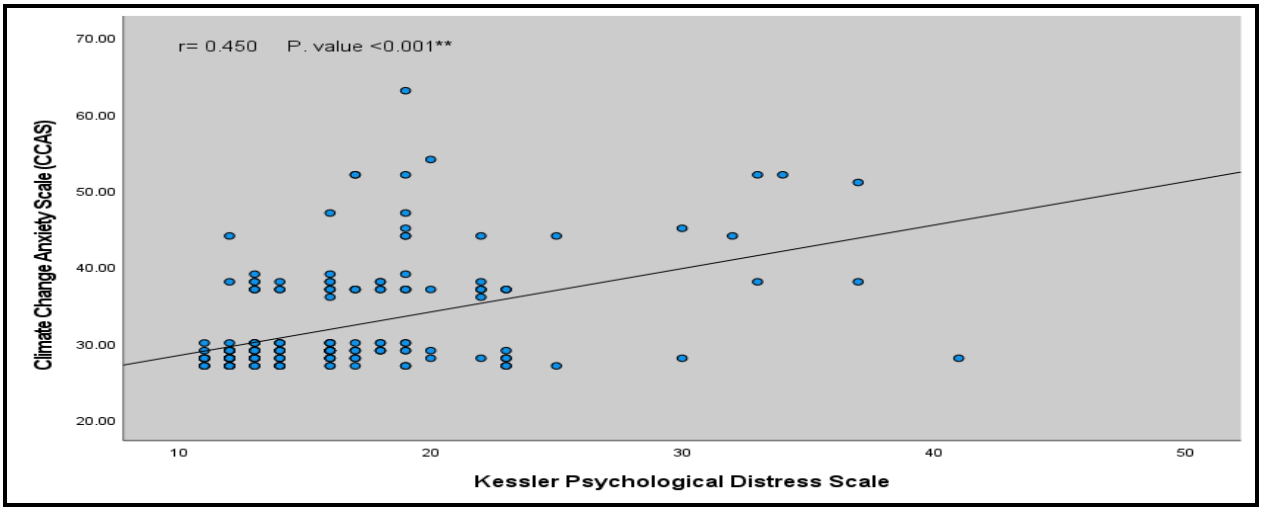

Figure (4): Correlation between climate change anxiety and psychological distress of the studied hemodialysis patients (n=200)

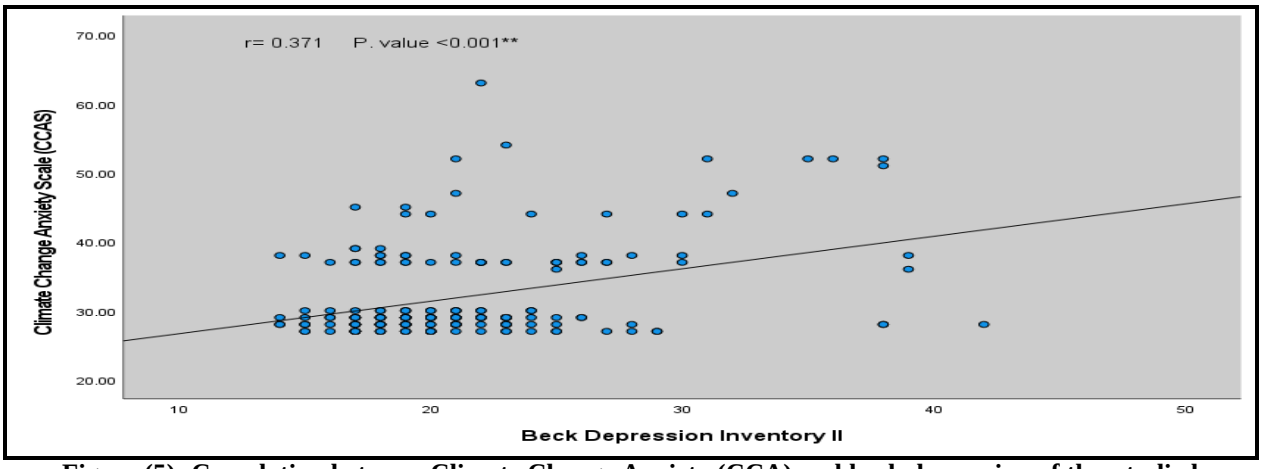

Figure (5): Correlation between Climate Change Anxiety (CCA) and beck depression of the studied hemodialysis patients (n=200)

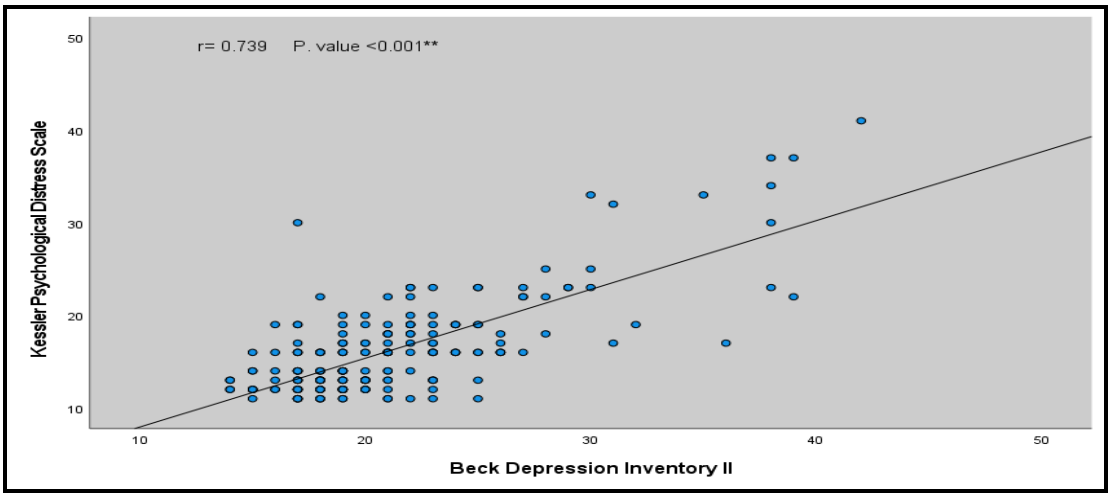

Figure (6): Correlation between Psychological distress and beck depression of the studied hemodialysis patients (n=200)

Table (3): Relation between climate change anxiety Scale (CCAS) and demographic data of the studied hemodialysis patients (N=200):

Demographic data	N	Climate Change Anxiety Scale (CCAS)		Test Used F/T	P. value
		Mean ±SD	Range		
Age group					
From 20- 30 years	17	36.12±9.25	27 - 63	3.658	**0.007****
From 30-40 years	36	33±7.23	27 - 54		
From 40- 50 years	53	32.42±6.75	27 - 52		
From 50-60 years	55	31.22±6.06	27 - 52		
More than 60 years	39	29.54±3.56	27 - 44		
Gender					
Male	113	31.55±5.75	27 - 54	-0.970	0.333
Female	87	32.46±7.54	27 - 63		
Working status					
Not Working	122	31.28±6.32	27 - 63	-1.799	0.074
Working	78	32.99±6.9	27 - 54		
Marital status					
Single	16	35.38±9.58	27 - 63	2.455	0.088
Married	172	31.69±6.17	27 - 54		
Widow	12	31±6.97	27 - 51		
Residence					
Rural	109	31.67±5.94	27 - 54	-0.646	0.519
Urban	91	32.27±7.31	27 - 63		
Living status					
Live Alone	7	31±4.58	27 - 38	-0.386	0.700
With Family	193	31.98±6.65	27 - 63		
Educational level					
Illiterate	79	30.05±4.57	27 - 52	4.333	**<0.001****
Read and write	46	31.3±5.69	27 - 52		
Primary Education	12	31.42±4.72	27 - 38		
Preparatory education	21	34.19±9.04	27 - 52		
Secondary	20	35.15±7.62	27 - 54		
University	22	35.32±8.99	27 - 63		

- Independent T-test *- One-way Anova test*
(*) statistical significant difference *(**) highly statistical significant difference*

Table (4): Relation between Kessler psychological distress Scale and demographic data of the studied hemodialysis patients (N=200)

Demographic data	N	Kessler Psychological Distress Scale		Test Used F/T	P. value
		Mean ±SD	Range		
Age group					
From 20- 30 years	17	20.47±4.3	14 - 32	10.519	**<0.001****
From 30-40 years	36	17.69±6.24	11 - 37		
From 40- 50 years	53	17.7±5.79	11 - 41		
From 50-60 years	55	14.98±4.23	11 - 33		
More than 60 years	39	13.1±1.62	11 - 18		
Gender					
Male	113	15.65±4.02	11 - 37	-1.974	0.050
Female	87	17.11±6.39	11 - 41		
Working status					
Not Working	122	15.7±5.26	11 - 41	-1.996	**0.047***
Working	78	17.21±5.06	11 - 37		
Marital status					
Single	16	21.63±6.91	12 - 37	9.889	**<0.001****
Married	172	15.84±4.64	11 - 41		
Widow	12	15.67±7	12 - 37		
Residence					
Rural	109	16.27±4.54	11 - 41	-0.071	0.944
Urban	91	16.32±5.96	11 - 37		
Living status					
Live Alone	7	16.86±5.46	12 - 23	0.292	0.771
With Family	193	16.27±5.23	11 - 41		
Educational level					
Not read and write	79	13.92±2.61	11 - 25	9.275	**<0.001****
Read and write	46	16.02±4.75	11 - 33		
Primary Education	12	19.17±9.9	11 - 41		
Preparatory education	21	18.86±5.91	12 - 37		
Secondary	20	20.3±4.77	13 - 32		
University	22	17.68±5.45	11 - 34		

- Independent T-test *- One-way Anova test*
(*) statistical significant difference *(**) highly statistical significant difference*

Table (5): Relation between beck depression inventory II and demographic data of the studied hemodialysis patients (N=200)

Demographic data	N	Beck Depression Inventory II		Test Used F/T	P. value
		Mean ±SD	Range		
Age group					
From 20- 30 years	17	24±3.76	17 - 31	4.373	**0.002****
From 30-40 years	36	22.08±6.86	14 - 39		
From 40- 50 years	53	22.26±6.28	14 - 42		
From 50-60 years	55	20.35±3.89	14 - 35		
More than 60 years	39	19.1±2.28	16 - 28		
Gender					
Male	113	20.48±4.46	14 - 39	-2.376	**0.018***
Female	87	22.22±5.9	14 - 42		
Occupation					
Not Working	122	21.06±5.27	14 - 42	-0.604	0.547
Working	78	21.51±5.1	14 - 39		
Marital status					
Single	16	26.44±7.51	14 - 39	10.072	**<0.001****
Married	172	20.68±4.61	14 - 42		
Widow	12	22.25±5.94	17 - 38		

Demographic data	N	Beck Depression Inventory II		Test Used F/T	P. value
		Mean ±SD	Range		
Residence					
Rural	109	21.02±4.83	14 - 42	-0.644	0.520
Urban	91	21.49±5.61	14 - 39		
Living status					
Live Alone	7	19.86±5.05	15 - 30	-0.713	0.476
With Family	193	21.28±5.21	14 - 42		
Educational level					
Not read and write	79	19.41±3.2	14 - 31	7.109	**<0.001****
Read and write	46	20.59±4.29	14 - 35		
Primary Education	12	24.58±9.33	16 - 42		
Preparatory education	21	22.81±5.81	17 - 38		
Secondary	20	25.4±5.92	16 - 39		
University	22	22.05±5.43	17 - 38		

- Independent T-test *- One-way Anova test*
(*) statistical significant difference *(**) highly statistical significant difference*

Table(1): Shows that, the mean age of the studied patients was(48.48±11.67),more than half of them (56.5%) are male. And **(**61%) of them do not work. As regards to marital status the majority (86%) of the studied patients were married, (54.5%) of them from rural area, and the majority (96.5%)of them live with their family. Concerning level of education more than one-third (39.5%) of the studied patients are Illiterate.

Table (2): Illustrates that, (82%) of the studied sample haven't lower limb edema and more than half of the studied sample (55%) have hypertension. While, Less than one – fifth (17.5%) of the studied sample have diabetes mellitus . The majority(97.5%) of the studied sample haven't family history. As regards to duration of dialysis (61.5%) of the studied sample are from 3-5 years and (13.5%) of them are Less than 3 years.

Figure (1): Illustrates that ,the majority(71.5%) of the studied sample have low level of climate change anxiety. (24.5%) of the studied sample have moderate level of climate change anxiety and (4%) have high level of climate change anxiety.

Figure (2): Shows that, (48.5%) of the studied sample have a low level of the psychological distress. (37.5)% of the studied sample have moderate level psychological distress, 9.5%of them have a high level of psychological distress while 4.5% of the study sample have a very high level of psychological distress.

Figure (3): Clears that,(46.5%) of the studied sample have mild level of depression, 45% of the studied sample have moderate level of depression, while 8.5% of the studied sample have severe level of depression.

Figure (4): Illustrates that, there was a significant positive correlation between Climate Change anxiety and Psychological distress ($r = 0.450$, $p < 0.001$).

Figure (5): Clears that ,there was Significant positive correlation between Climate Change anxiety and depression ($r=0.371$, $p < 0.001$).

Figure (6): Shows that ,there was a statistically significant positive correlation between depression and psychological distress ($r=0.739$, $p <0.001$).

Table (3): Reflected that, there was no significant difference between all items and climate change anxiety except in age group and educational level with p value(**0.007, <0.001**) respectively.

Table (4): Clarifies that, there were statically significant differences between Psychological distress, patient's age, occupation, marital status and educational level with p- value (0.001, 0.047, 0.001 and0.001) respectively.

Table (5): Reveals that, there were statistically significant differences between beck depression inventory and demographic data as regard (age group , gender, marital status and educational level) p- value (0.002, 0.018, <0.001, <0.001) respectively.

Discussion:

The relation between climate change and psychological status is not clear. However, there is robust evidence for it. psychological status can be affected directly especially after acute climate events in the form of higher rates of anxiety, post-traumatic stress disorder (PTSD), depression, substance abuse and domestic violence after the events **(Morganstein & Ursano, 2020)**.

There are a few studies that have been conducted on the relationship between psychological status and climate change anxiety. The present study revealed that more than one- quarter of the patients were experienced moderate to high level of climate anxiety, while about two- third of the studied group were experienced low level of climate anxiety. This

might be due to, Egypt has a more moderate climate all year round, with neither excessive heat nor cold. Egypt's moderate climate may play a role in reducing the direct effects of climate change on CKD patients. Furthermore, the primary burden on these patients is chronic kidney disease (CKD) more than climate change anxiety itself.

This result are consistent with other previous studies that conducted by **(Hussein et al., 2023)** who demonstrated that, less than half of the population reported climate anxiety in in a healthy population. The same author, reported that the majority of them accounting for more than half expressed worry related to climate change than climate anxiety. Also **(Whitmarsh et al., 2022)** who found that the majority of participants reported mild anxiety.

The present study found that climate change anxiety was most prevalent among young adults, with patients aged twenty to thirty (36.12±9.25). This finding was congruent with many previous studies as **(Hajek et al., 2023) & (Hajek et al ., 2024)** who revealed that, there was a significant association with higher climate anxiety among individuals aged eighteen to twenty-nine years. The author explained this finding that, the short, medium, and long-term effects of climate change on their own lives, as well as on their family and friends, may be of a particular concern to younger people with high levels of climate anxiety.

From the point of view of the researcher, the highest levels of climate change anxiety among young adult patients might be due to, this age group is more aware of the effects of climate change, in addition to the burden of CKD on this age has affected their capacity to work, which has resulted in financial difficulties and increased anxiety.

The present study revealed that, there was a statistically significant difference between climate change anxiety and educational level. Climate change anxiety was higher among patients were had received a university education (35.32±8.99). This finding was contradicted with the study of **(Hussein et al ., 2023)** who demonstrated a statistically significant difference between climate change anxiety and preparatory level of education (40.47±5.06). The differences between two studies might be due to the variations in study methodologies, sample characteristics, or measurement tools used to assess climate anxiety could contribute to the differences in reported percentages across studies.

The present study revealed that, more than half of the patients were experienced moderate to very high psychological distress. This might be explained by, the burden of chronic kidney often requires significant lifestyle changes, such as dietary limitations and frequent medical check-up, which can be an additional load on the patients. Also CKD patients had a higher prevalence of depression and anxiety disorders, which can lead to feelings of distress. This explanation is supported by **(Nugent et al., 2011)** who demonstrated that, the burden of chronic kidney disease which includes dietary restrictions and regular medical examinations, presents a significant challenge for developing countries.

In addition, this might be attributed to the expenses of treatment may lead to financial burden, which increases emotional distress. Financial issues of CKD patients particularly among those who are unmarried, unemployed, or have the lowest income levels, contribute significantly to increasing psychological distress. This alignment with **(Ryu& Fan 2023)** showed that, a higher degree of financial worries was significantly associated with higher psychological distress.

Also, this result supported by **(Senanayake et al ., 2018)** who found that, three- quarter of the study population were had psychological distress. In contrast **(Saklani et al., 2020)** who found that, less than half of the respondents on hemodialysis exhibit psychological stress.

The present study revealed that, the psychological distress was higher among age group from twenty-thirty years. This finding supported by a previous study **(Gondek et al., 2022)** who demonstrated that, psychological distress was higher among mid- twenty years compared with their early-mid thirty years in a healthy population.

The explanation of the present study regarding that, the psychological distress was higher among age group from twenty-thirty years may be related to the transition from a healthy to a sick identity which can be associated with the burden of symptoms, the fear of dialysis, the uncertainty of the disease's outcome, negative experiences with the healthcare system. lifestyle disruptions due to dialysis may lead to financial difficulties. Also patients feel guilty about the burden among their family members, changes in a patient's medical condition, way of life, and social position can also significantly affect their self-concept and self-esteem.

The present study showed that, psychological distress was higher among employed patients than un-employed patients. This might be related to increasing responsibilities of employed individuals, who fear that they may have to leave their families at any time because of CKD, their well-being may be further impacted by the additional workload in addition to the stress of managing their illness and health.

While, this result was inconsistent with **(Yogesh, 2024)** who showed that, psychological distress was

higher among un-employed participants with nearly half (46.7%) of the studied sample were un-employed.

The current study found that, psychological distress was higher among single patients more than married. This finding was incongruent with **(Duan et al., 2021)** who showed that, divorced patients are more likely to suffer from psychological distress than single and married patients. According to the present findings, single patients more experienced feelings of loneliness, anxiety, and depression. While married patients usually had a spouse who could support them through difficult times, which helped in reducing the psychological distress that caused by CKD.

In the same line patients with chronic kidney disease may experience more psychological stress as a result of their belief that the illness might have a major influence on many facts of life, including marriage. So single patients experienced psychological distress more than married. Single patients may experience higher feelings of isolation, which can decrease emotional stability and a sense of belonging. This sense of disconnection from others may contribute to exacerbating feelings of helplessness and despair.

The current study demonstrated that, the psychological distress was higher among patients who were on regular hemodialysis more than five years. This could be explained by, the long-term effects of hemodialysis on other organs, chronic fatigue, effect on social life and ability to engage in social activities. These factors might lead to decreased physical performance, including limits in mobility, energy levels, and independence. That will increase psychological distress burden in patients with long standing hemodialysis than other patients who shortly starting hemodialysis. This finding incongruent with **(Yogesh, 2024)** who reported that psychological distress was higher among patients who were on regular hemodialysis less than five years(from two-four years).

The current study revealed that, more than half of the studied group were had moderate to high level of depression .Whereas, this finding was congruent with (**Senanayake et al ., 2018)** who found that more than half of the studied group were had depression.

In contrast with (**Andrade et al., 2010)** who found that, more than one third of the studied group had moderate to severe depression. The difference between the present study and the study conducted by(**Andrade et al., 2010)**can be attributed to the difference in sample size. The author was used a small sample of patients were thirty-seven patients undergoing hemodialysis and one hundred sixty-five with nondialytic CKD who were followed at the outpatient clinics. In contrast the present study included two hundred only dialysis patients.

The current study revealed that, depression was higher among age group from twenty- thirty years. This could be attributed to, this age group(twenties and early thirties) is usually at a phase of life where they are establishing goals for their education, jobs, developing a social life, starting a family, and advancing in their careers. A diagnosis of CKD during this stage may be disrupt these goals, which lead to a sense of lost opportunities or a future filled with uncertainty.

This result was incongruent with **(Gadia et al., 2020)** who found no significant association between depression or anxiety and age. Also showed that, 57.6% of patients had mild depression, 28.8% had moderate depression, whereas 13.6% had severe depression.

The current study revealed that, depression was higher among females (22.22±5.9) than males (20.48±4.46). This might be due to women being typically more sensitive, which may make it more difficult for them to accept the illness and deal with its impacts. Therefore females might be more susceptible to depression than males. In addition to, women is more likely than males to assume caregiving responsibilities. Higher levels of depression may result from the strain of treating chronic kidney disease (CKD) and other caring obligations.

In addition, women's physical health may be disproportionately affected by CKD. Comorbid conditions such as anemia, bone disease, and cardiovascular problems are more common in women with chronic kidney disease (CKD), and they might have an impact on their mood and mental health. Due to the added stress of treating CKD-related concerns, women with CKD may experience problems with menopause, fertility, and pregnancy complications. These challenges can worsen depressive symptoms.

This finding is in alignment with **(Gadia et al ., 2020)** who found depression was more prevalent in female patients (86%) as compared to male patients (57%) and this difference was statistically significant.

The present study showed that, the mean score of depression was higher among secondary level of education. This result was in contrast with (**Kumar et al., 2018)**who studied, "depression and anxiety in patients with chronic kidney disease undergoing hemodialysis" and found that no a significant relationship between education and depression, despite 55.9% of patients with depression were illiterate, 78.9% were educated up to primary .Also **(Gadia et al., 2020)** who found that no statistically

significant association between education and depression.

From the opinion of the researcher, depression was higher among patients who had secondary school this might be due to, have low health literacy, which makes it difficult for them to comprehend medical terminology, treatment regimens, and the consequences of their illness. This lack of knowledge can cause them to feel confused, anxious, and powerless over their health, all of which can increase depression. In addition to inadequate compliance with recommended therapies, such as dialysis schedules, dietary restrictions, or medication regimens. Non-adherence can worsen health outcomes, increasing feelings of frustration and hopelessness which result in increasing depression.

The present study showed that, depression was higher among single patients. This finding was consistent with **(Anggana et al., 2022)** who found that, depressive symptoms were higher among unmarried subjects than married subjects. Explained that, the marital status can improve an individual's psychological condition, marital status can decrease the prevalence of depression by 6.78% point in males and 6.23% point in females.

The present study was incongruent with **(Gadia et al., 2020)** who found that, no significantly associated between depression and marital status.

According to correlation, the current study revealed that, there was a positive correlation between climate change anxiety and psychological distress. This might be related to increasing the awareness of climate change and its impacts on own health leading to increase psychological distress. This results were similar with previous studies (**Lukacs et al., 2023)** who demonstrated that climate change anxiety was strongly correlated with psychological distress.

Also **(Thomson& Roach, 2023)** who found that, psychological distress variables (depression, anxiety, and stress) and climate change anxiety were all highly correlated with each other.

The current study showed that, there was a positive correlation between climate change anxiety and depression. This finding was alignment with (**Dziubek et al., 2021)** who showed that, a high level of depression was significantly associated with higher values of anxiety.

In the same line, **(Hajek& König, 2023)** who found that, a higher climate anxiety was associated with a higher of probable depression.

In addition to **(Wullenkord et al., 2021)** who found that, climate anxiety correlates positively with general anxiety and depressiveness.

The present study revealed that, there was a positive correlation between depression and psychological distress **.** This finding was similar to **(Thakre et al., 2022)** who showed that ,there was a significant association between the levels of psychological distress and depression.

In addition to **(Varma et al., 2021)** who demonstrated that, higher levels of perceived stress were strongly associated with both depression and anxiety.

Limitations of the study:

- Some of patients were fatigued and tired during the interview.
- Some of patients were taken long time to respond to the researcher because of alteration in their psychological status related to CKD.
- Privacy wasn't provided in the place where a large number of patients were presented in the same place without a barrier between them in the old hemodialysis unit.

Conclusion:

Climate change anxiety, psychological distress and depression were higher amongst younger age groups. However there was a highly significant difference between demographic data , age group and educational level with p value(0.007, <0.001), there was a positive correlation between climate change anxiety , psychological distress and depression.

Recommendations:

1. Conduct longitudinal studies to monitor changes in the psychological status of patients with chronic kidney disease, during times of extreme conditions or extended climate-related stress.
2. Implement psycho educational program for CKD patients to manage psychological stress and depression.
3. Teach CKD patients the potential impacts of climate change on their psychological status as well as coping mechanisms for overcoming stressors associated with it.

Acknowledgement:

Firstly want to express my gratitude to the hemodialysis unit's chronic kidney disease patients for their participation and helpful feedback. Additionally, thanks every one, whose work in analyzing and reviewing data was essential to the integrity of this study.

Funding: None.

References:

- **Abdul-Khalek, I., Kittelson, D., Graskow, B., Wei, Q., & Brear, F. (1998)**: Diesel exhaust particle size: measurement issues and trends. SAE transactions, 683-696

- **Andrade, C., Cruz, M., Urrutia, M., Pereira, O., Draibe, S., Nogueira-Martins, L., & Sesso, R. (2010):** Evaluation of depressive symptoms in patients with chronic renal failure. JN journal of nephrology, 23(2), 168.
- **Andrews, G., & Slade, T. (2001):** Interpreting scores on the Kessler psychological distress scale (K10). Australian and New Zealand journal of public health, 25(6), 494-497.
- **Anggana, A., Aviliani, A., Badrudin, P., & Sihaloho, E. (2022):** Marital Status and Its Effect on Depression in Indonesia: A Case Study of the 2014 Indonesian Family Life Survey. Disease Prevention and Public Health Journal, 16(2), 93-99.
- **Atnafu, R., Selfako, A., Mishna, F., Regehr, C., Soklaridis, S., & Kotecho, M. (2022):** Challenges of End-Stage Renal Disease Patients in Ethiopia. Health and Social Work, 47(4), 292-300.
- **Beck, A.T., Ward, C.H., Mendelson, M., Mock, J., & Erbaugh, J. (1961):** An inventory for measuring depression. Archives of General Psychiatry, , 4, 561-571.
- **Borg M, Bi P, Nitschke M, Williams S, McDonald S. (2017):** The impact of daily temperature on renal disease incidence: an ecological study.
- **Borg, FH, GreibeAndersen, J, Karekezi, C, Yonga, G, Furu, P, Kallestrup, P, (2021):** Climate change and health in urban informal settlements in lowand middle-income countries - a scoping review of health impacts and adaptation strategies. Glob Health Action 14(1): 1908064.
- **Charlson, F, Ali, S, Benmarhnia, T, Pearl, M, Massazza, A, Augustinavicius, J, (2021):** Climate change and mental health: a scoping review. IntJ Environ Res Public Health ; 18(9): 4486.
- **Cukor D, Ver Halen N, Asher DR, Coplan JD, Weedon J, Wyka KE, (2014):** Psychosocial intervention improves depression, quality of life, and fluid adherence in hemodialysis. J Am Soc Nephrol;25:196–206 EnvironHealth.Oct;16(1):114.
- **Clayton, S., & Karazsia, B. (2020):** Development and validation of a measure of climate change anxiety, Journal of Environmental Psychology, 69, 101434.
- **Duan, Y., Wang, L., Sun, Q., Liu, X., Ding, S., Cheng, Q., & Cheng, A. (2021):** Prevalence and determinants of psychological distress in adolescent and young adult patients with cancer: a multicenter survey. Asia-Pacific Journal of Oncology Nursing, 8(3), 314-321.
- **Dziubek, W., Pawlaczyk, W., Rogowski, L., Stefanska, M., Golebiowski, T., Mazanowska, O., & Kowalska, J. (2021):** Assessment of depression and anxiety in patients with chronic kidney disease and after kidney transplantation—a comparative analysis. International Journal of Environmental Research and Public Health, 18(19), 10517.
- **Fagodiya, R., Verma, K., & Verma, V. K. (2023):** Climate Resilient Agricultural Practices for Mitigation and Adaptation of Climate Change. Social Science Dimensions of Climate Resilient Agriculture.
- **Gadia, P., Awasthi, A., Jain, S., & Koolwal, G. D. (2020):** Depression and anxiety in patients of chronic kidney disease undergoing haemodialysis: A study from western Rajasthan. Journal of Family Medicine and Primary Care, 9(8), 4282-4286.
- **Gondek, D., Bann, D., Patalay, P., Goodman, A., McElroy, E., Richards, M., & Ploubidis, G. (2022):** Psychological distress from early adulthood to early old age: evidence from the 1946, 1958 and 1970 British birth cohorts. Psychological Medicine, 52(8), 1471-1480.
- **Hajek, A., & König, H. (2023):** Do individuals with high climate anxiety believe that they will die earlier? First evidence from Germany. International Journal of Environmental Research and Public Health, 20(6), 5064.
- **Hajek, A., & König, H. (2024):** Belief in science and climate anxiety: findings from a quota-sample. Journal of Public Health, 1-8.
- **Hussein, M. F., Osman, S. R., Abd El Megied, N., Goda, S. M., & Sayed Hassan, S. M. (2023).** Relation between Climate Changes, Quality of Life and Psychological Status among Assiut Population: Online Based Survey. Assiut Scientific Nursing Journal, 11(40), 364-373.
- **Johnson, R., Sánchez-Lozada, L., Newman, L., Lanaspa, M., Diaz, H., Lemery, J., & Roncal-Jimenez, C. (2019):** Climate change and the kidney. Annals of Nutrition and Metabolism, 74 (Suppl. 3), 38-44**.**
- **Kamel R., Fouad M., Goda1 T., (2022): Anxiety and Depression** among Hemodialysis Patients in Egypt, ZUMJ-2109-2361(R2)DOI.10.21608/zumj.2021.98028.2361. Volume 28, Issue 3, May 2022, Page 594 -604.
- **Kessler, R., Andrews, G., Colpe, L., Hiripi, E., Mroczek, D., Normand, S. & Zaslavsky, A. (2002):** Short screening scales to monitor population prevalencesand trends in non-specific psychological distress. Psychological medicine,32(6),959-976. Lancet. Feb;391(10120):581–630.
- **Kumar, V., Khandelia, V., & Garg, A. (2018):** Depression and anxiety in patients with chronic kidney disease undergoing hemodialysis. Annals of Indian Psychiatry, 2(2), 115-119.

- **Lawrance, E., Thompson, R., Newberry Le Vay, J., Page, L., & Jennings, N. (2022):** The impact of climate change on mental health and emotional wellbeing: a narrative review of current evidence, and its implications. International Review of Psychiatry, 34(5), 443-498.
- **Lukacs, J., Bratu, A., Adams, S., Logie, C., Tok, N., McCunn, L., & Card, K. (2023):** The concerned steward effect: Exploring the relationship between climate anxiety, psychological distress, and self-reported climate related behavioral engagement. Journal of Environmental Psychology, 90, 102091.
- **Morganstein JC, Ursano RJ. (2020):** Ecological disasters and mental health: causes, consequences, and interventions. Front Psychiatry;11:1.
- **Nugent, R., Fathima, S., Feigl, A., & Chyung, D. (2011):** The burden of chronic kidney disease on developing nations: a 21st century challenge in global health. Nephron Clinical Practice, 118(3), c269-c277.
- **Ok, E., & Işı, Ö. (2019):** Assessment of the mental status of patients with chronic kidney disease. Journal of Psychiatric Nursing/Psikiyatri Hemsireleri Dernegi, 10(3).
- **Pellizzari, J. (2022):** Psychological Aspects of Adaptation to Critical Care Nephrology, Dialysis, and Transplantation for the Patient and the Caregiver. Psychonephrology: A Guide to Principles and Practice, 253-267.
- **Pengpid, S., & Peltzer, K. (2020)**: Prevalence and associated factors of psychological distress among a national sample of in-school adolescents in Morocco. BMC psychiatry, 20(1), 475.
- **Romanello, M., McGushin, A., Di Napoli, C., Drummond, P., ughes, N., Jamart, L., & Hamilton, I. (2021):** The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future. The Lancet, 398(10311),1619-1662.
- **Ryu, S., & Fan, L. (2023):** The relationship between financial worries and psychological distress among US adults. Journal of Family and Economic Issues, 44(1), 16-33.
- **Saklani, L., Agnihotri, L., Yadav, L., Verma, L. K., Alam, L., & Neha, L. (2020):** Assessment of Level of Stress and Anxiety among Patients Suffering from CKD in a Tertiary Care Hospital.
- **Schwartz, S., Benoit, L., Clayton, S., Parnes, M. F., Swenson, L., & Lowe, S. (2023)**: Climate change anxiety and mental health: Environmental activism as buffer. Current Psychology, 42(20), 16708-16721.
- **Senanayake, S., Gunawardena, N., Palihawadana, P., Suraweera, C., Karunarathna, R., & Kumara, P. (2018):** Depression and psychological distress in patients with chronic renal failure: Prevalence and associated factors in a rural district in Sri Lanka. Journal of psychosomatic research, 112, 25-31.
- **Singla, H., Avasthi, A., Gupta, K., & Grover, S. (2023):** Psychiatric Morbidity and its Impact on Quality of Life in Patients of Chronic Kidney Disease Undergoing Hemodialysis. Journal of Mental Health and Human Behaviour, 28(1), 27-36.
- **Thakre, M., Sathe, H., & Talapalliwar, M. (2022)**: Psychometric properties of Kessler's Psychological Distress Scale (K10) in cancer patients. Archives of Mental Health, 23(2), 101-106.
- **Thomson, E., & Roach, S. (2023):** The relationships among nature connectedness, climate anxiety, climate action, climate knowledge, and mental health. Frontiers in psychology, 14, 1241400.
- **Tovey, L. (2024):** Assessment and Management of Kidney Function. Critical Care Manual of Clinical Nursing Procedures, 292.
- **Vanos, J., Baldwin, J., Jay, O., & Ebi, K. (2020):** Simplicity lacks robustness when projecting heat-health outcomes in a changing climate. Nature communications, 11(1), 6079.
- **Varma, P., Junge, M., Meaklim, H., & Jackson, M. (2021):** Younger people are more vulnerable to stress, anxiety and depression during COVID-19 pandemic: A global cross-sectional survey. Progress in Neuro-Psychopharmacology and Biological Psychiatry, 109, 110236.
- **Whitmarsh, L., Player, L., Jiongco, A., James, M., Williams, M., Marks, E., & Kennedy-Williams, P. (2022)**: Climate anxiety: What predicts it and how is it related to climate action?. Journal of Environmental Psychology, 83, 101866.
- **Wullenkord, M., Tröger, J., Hamann, K., Loy, L., & Reese, G. (2021):** Anxiety and climate change: A validation of the Climate Anxiety Scale in a German-speaking quota sample and an investigation of psychological correlates. Climatic Change, 168(3), 20.
- **Yogesh Kumar, Y. (2024):** A Study to Evaluate Psychological Distress and Self-Esteem Among Patients with Hemodialysis. International Journal of Innovative Science and Research Technology (IJISRT) IJISRT24MAR1998,2491-2501