Impact of Anxiety and Depression on Quality of Life among Patients Undergoing Hemodialysis: A Scoping Review

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ABSTRACT

***Context*:** Chronic kidney disease (CKD) is a life-threatening problem of global concern. Living with CKD is associated with many psychological problems, including depression and anxiety, which can directly or indirectly affect the quality of life. Only one review in the existing literature has assessed these associations among CKD patients using different dialysis modalities. However, the experience of these symptoms could be higher among patients on hemodialysis therapy. In this purview, there is a need to narrow the previous work to be more focused on hemodialysis patients.

Aim: This scoping review aims to determine the gaps in the knowledge about the impact of anxiety and depression concerning QOL among people undergoing hemodialysis.

Methods: The studies selected were those examined the relationships between depression or/and anxiety with quality of life in adult patients on hemodialysis. The CINAHL, MEDLINE, and Pub Med databases were searched for literature published between January 2012 and December 2019. The quality of the included studies was also apprised. Eleven studies met the inclusion criteria.

Results: Six studies examined the impact of depression and anxiety on the quality of life. Five studies identified from the review have examined the relationships between depression and quality of life. It was established that the prevalence of anxiety and depression was high among hemodialysis patients, and the same was associated with low quality of life.

Conclusion: The literature review highlights the negative associations between anxiety, depression, and quality of life among hemodialysis patients. It is, therefore, essential to screen hemodialysis patients frequently for anxiety and depression using a short-form questionnaire. This screening would allow for providing early interventions, and the potential deterioration of quality of life could be prevented. Further longitudinal studies are needed to assess these relationships. Additionally, further research is needed to determine effective interventional programs to improve the overall quality of life.

Keywords: Anxiety, depression, hemodialysis, patients, quality of life

1. Introduction

Chronic kidney disease (CKD) has risen to become a health problem of global concern. The said condition leads to an irreversible decline of kidney functions, which eventually may lead to End-Stage Kidney Disease (ESKD). According to the national kidney foundation (2018), close to 10% of the world's population is affected by CKD. Recent statistics of the Saudi Organ Transplant Center (SCOT) in 2017 reveal that there are 19,659 patients with ESKD out of which 18,270 patients are undergoing hemodialysis (HD) treatment, and 1,389 patients are undergoing peritoneal dialysis (PD) treatment *(Saudi Organ Transplant Center (SCOT), 2018).*

The majority of ESKD patients are undergoing HD treatment. The HD treatment is usually administered at hospitals or dialysis centers thrice a week, with each session taking up to four hours. This long-life treatment imposes several challenges that affect different aspects of the patient's *(Seraji et al., 2018).* Although HD has significant benefits in terms of symptom reduction as well as being a lifesaving procedure in several instances, it does harm the physical functions and emotional wellbeing of the patient leading to the deterioration of the quality of life.

Quality of life (QoL) is considered an indicator of the disease's burden and a tool for evaluation of the disease's progression as well as that of the effectiveness of the treatment administered. Studies have presented the relationship between the decline of emotional and physical functioning among CKD patients and the lower quality of life *(Alqahtani et al., 2019).* The most common psychological problems among CKD patients undergoing hemodialysis are anxiety and depression. However, the symptoms of such depression in CKD patients are not easily detected. Hence, the patients may suffer for a long time without being diagnosed, which will adversly impact the quality of life *(Rebollo-Rubio et al., 2017).*

Despite the consequences of anxiety and depression in hemodialysis patients' lives, the majority of literature reviews that are available did not focus on these issues.

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However, they primarily focused on the assessment of QoL among dialysis patients *(Rebollo et al., 2015; Bonenkamp et al., 2020),* the validity of instruments used in QoL assessment *(Glover et al., 2011),* the prevalence of depression and anxiety among the patients *(Goh et al., 2018; Ravaghi et al., 2017; Cohen et al., 2016),* and the patients' physical dimensions *(Matsuzawa et al., 2017; Song et al., 2018).*

One systematic review conducted by *García-Llana et al. (2014),* comprised of studies published between 2002 to 2012, aimed to summarize the available information on the relationship between the QoL of patients undergoing both HD and PD and the presence of anxiety, depression, stress, and adherence to treatment. The review concluded that there is a negative association between anxiety, depression, stress, and QOL *(García-Llana et al., 2014).*

However, these unpleasant symptoms could vary according to the treatment modalities. Given this, there is a need to narrow the previous review to be more focused on HD patients. The findings of the current review could help on improving the knowledge and awareness in nurses' practices to be more attentive regarding relationships of these psychological problems. Additionally, it will assist in identifying high-risk groups to deliver prompt early intervention and enhance treatment adherence. In this regard, the primary aim of this scoping review is to identify and synthesize relevant research findings of depression, anxiety, and QoL relationships among hemodialysis patients.

2. Aim of the Study

This review aims to determine the gaps in the knowledge about the impact of anxiety and depression on QoL among people undergoing hemodialysis. It also aims to assess the instrument used to examine depression and anxiety among HD patients.

3. Methods

3.1. Studies Selection

Built on the available previous work, which included searching for literature until 2012 *(García-Llana et al., 2014),* this scoping review covered the studies published between January 2012 and December 2019. In this scoping review, the criteria used to select the studies included the research articles published in peer-reviewed journals that examined the relationships between the anxiety, depression or both with the quality of life of patients who are on hemodialysis treatment and the studies that used participants who are above 18 years of age. Qualitative, as well as quantitative articles, were included in the search. Only studies available in the English language were considered for the review. The articles that focused on different chronic kidney disease aspects such as the pre-dialysis stages, peritoneal dialysis, kidney transplantation, and younger population of children were excluded from the review.

3.2. Search strategy to identify studies

Searches for keywords were performed in the Medline, CINAHL, and Pub Med databases. The following key terms were used: "anxiety," "depression," "chronic kidney disease," "renal dialysis or hemodialysis," "quality of life," "health-related quality of life." Other sources for the search included the reference lists of selected studies wherein additional relevant articles were identified.

3.3. Selection of studies and extraction

To come up with a list of articles relevant to the current topic of review, the search involved an examination of peer-reviewed journals of full-text and English language in significant health and medicine databases. The reference lists of reviewed articles were also examined. The whole review process and results were extracted by the researcher and supervised by two independent reviewers. The search process was guided and screened by the utilize of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) flowchart.

As observed in Figure 1, a total of 602 articles were identified in CINHAL (249 articles), PubMed (150 articles), MEDLINE (200 articles), and three articles were identified from other databases. After eliminating the duplicates, a total of 261 articles were identified. The remaining articles were screened, and consequently, 197 were excluded because they were not relevant to the subject review's aim. A total of 64 full-text articles fulfilled the inclusion criteria. Of these, 64 articles were analyzed in-depth, and 53 were excluded for different reasons. Accordingly, only 11 quantitative syntheses (meta-analysis) articles remained. No studies with mixed methods or qualitative synthesis were identified in this scoping review (see Figure 1).

Data extraction comprised characteristics of the sample (i.e., sample size, age of the participants, and gender), author, country setting, study aim, design, measurements, and main findings of each study. Only findings related to the review aims were extracted. Table 2 shows the extracted data.

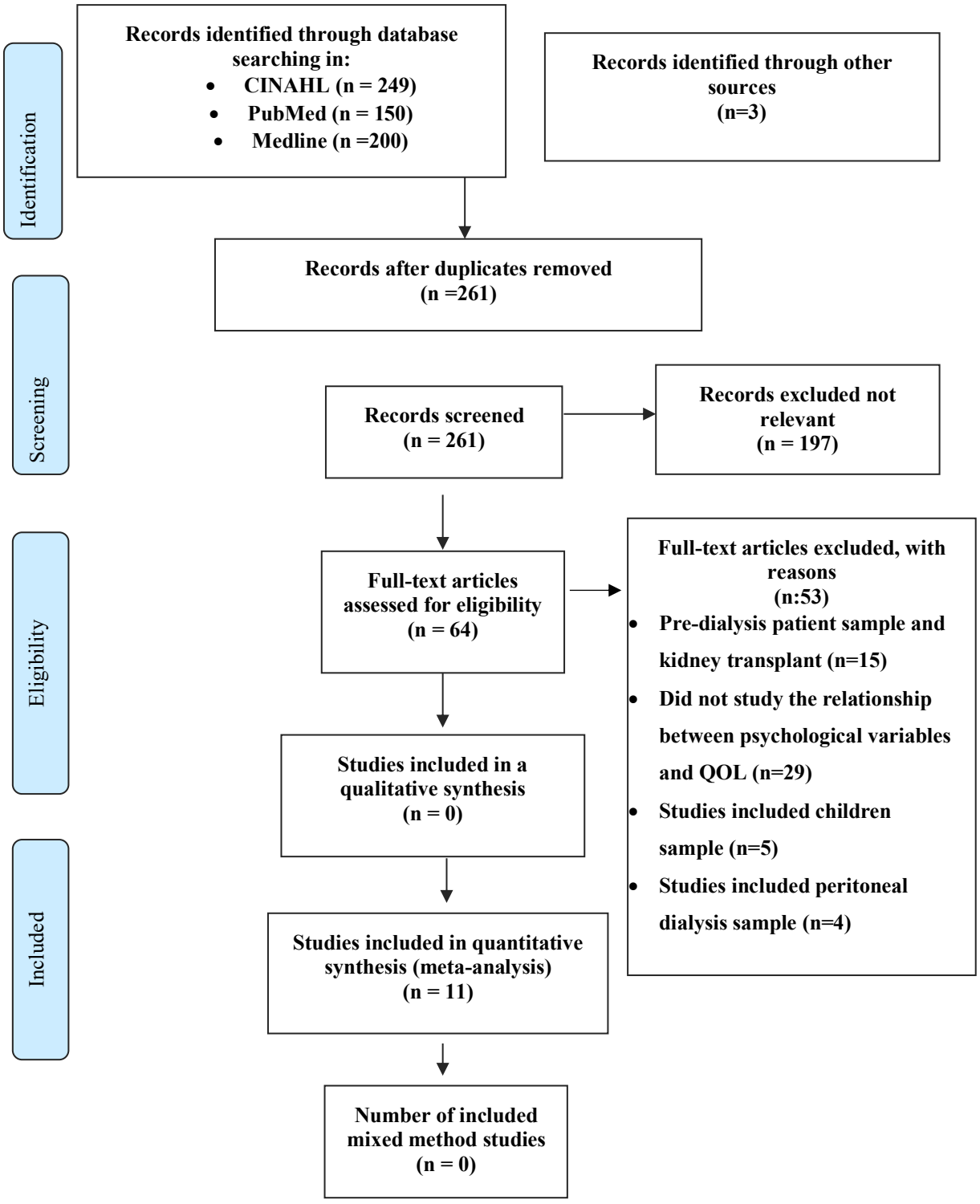

Figure 1: PRISMA Flow Diagram

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-analysis.

3.4. Evaluation of the methodology and quality of the studies

To determine the quality of the studies to be included in this review, all the 11 articles were subjected to an evaluation that involved the criteria adapted from the instrument design by *Berra et al. (2008)* instrument and used by *García-Llana et al. (2014).* The instrument design is critical for the evaluation of cross-sectional studies. The tool is used to critically appraise research papers *(Berra et al., 2008).* The tool rating process involved giving a point for each one of the quality criteria. Appendix 1 shows the specific criteria used for the appraisal. The criteria included four main aspects: research selection and design, which contains five criteria, study variables, which consist of definition and measurement (contains two criteria), method and analysis of data (contains three criteria), and results and discussion includes two criteria. Based on a 12-point scale, high-quality articles include studies with scores ranging from 9 and 12 points, the medium-quality studies having the scores of 5 and 8 points, and the low-quality articles that had been secured between 1 and 4 points *(García-Llana et al., 2014).*

3.5. Quality assessment of included studies

Table 1 shows the quality assessment of the studies included in this review. The mean score of quality appraisal for involved articles in this review was 8.9 (out of a maximum of 12). The individual study scores ranged from 7 to 10. All the studies were categorized as medium quality and above. In this review, no study was appraised as low quality. Only three of the studies *(Ottaviani et al., 2016; Barros et al., 2016; Vasilopoulou et al., 2016)* were categorized as medium (5-8), while the remaining studies were categorized as high-quality (9-12).

Four out of eleven studies have not provided information related to the number of participants who were initially selected and those who accepted to participate in the study and those who took part in the study *(Ottaviani et al., 2016; Barros et al., 2016; Shafipour et al., 2015; Vasilopoulou et al., 2016).* None of the included studies mentioned whether the data missing was properly addressed or if the quality of the data had been evaluated before conducting the analysis. Nevertheless, all the studies specified the benefits and implications of the result (see Table 1).

Table 1: Quality appraisal of the studies reviewed

Studies	1	2	3	4	5	6	7	8	9	10	11	12	Total	Quality
Ottaviani et al., 2016	+	_	+	_	_	+	+	+	+	_	+	_	7	Medium
Barros et al., 2016	+	_	+	_	_	+	+	+	+	_	+	+	8	Medium
Kizilcik et al., 2012	+	_	+	+	_	+	+	+	+	_	+	_	9	High
Ganu et al., 2018	+	_	+	+	_	+	+	+	+	_	+	+	9	High
Shafipour et al., 2015	+	+	+	_	_	+	+	+	+	_	+	+	9	High
Vasilopoulou et al., 2016	+	+	_	_	_	+	+	+	+	_	+	+	8	Medium
El Filali et al., 2017	+	_	+	+	_	+	+	+	+	_	+	+	9	High
Nabolsi et al., 2015	+	+	+	+	_	+	+	+	+	_	+	+	10	High
Li et al., 2016	+	_	+	+	+	+	+	+	+	_	+	+	10	High
Lee et al., 2015	+	+	+	+	_	+	+	+	+	_	+	+	10	High
Donia et al., 2015	+	_	+	+	_	+	+	+	+	_	+	+	9	High

4. Results

A total of 11 studies met the inclusion criteria out of which six studies examined the relationships between depression, anxiety and quality of life in patients undergoing hemodialysis *(Shafipour et al., 2015; Vasilopoulou et al., 2016; Ottaviani et al., 2016; El Filali et al., 2017; Li et al., 2016; Lee et al., 2015).* The results show that five studies focused exclusively on the impact of depression on the quality of life in patients undergoing hemodialysis *(Barros et al., 2016; Kizilcik et al., 2012; Ganu et al., 2018; Nabolsi et al., 2015; Donia et al., 2015).*

4.1. General description for characteristics of the included studies

4.1.1. Studies' location

These studies were carried out in different geographical locations. Studies were conducted in Ten countries: Brazil (2 studies), Egypt, Ghana, Greece, Iran, Jordan, USA, Morocco, Turkey, and Korea.

4.1.2. Design of the studies

Most studies used a descriptive cross-sectional design, except two. One used a correlation design *(Nabolsi et al., 2015)*, and another used a prospective cohort study *(Barros et al., 2016).*

4.1.3. Participants

The 11 reviewed studies involve a total of 1834 participants. The review indicates that the lowest number of participants included 76 participants *(Donia et al., 2015)* and that with the highest number included 395 participants *(Vasilopoulou et al., 2016).*

4.1.4. Gender

Out of the 1834 participants, there were 1053 males and 781 females. All studies included in the review reported the gender of their participants in the total samples.

4.1.5. Age

The age of the participants who took part in these studies ranged between 18-86 years of age *(Ganuet al., 2018; Barros et al., 2016; Vasilopoulou et al., 2016; Lee et al., 2015; Shafipour et al., 2015; Nabolsi et al., 2015 Kizilcik et al., 2012).* However, four studies did not specify the range of age for their participants (*Donia et al., 2015; Li et al., 2016; El Filali et al., 2017; Ottaviani et al., 2016).*

4.1.6. Duration of dialysis

The duration of dialysis was not reported in five studies *(Ottaviani et al., 2016; Vasilopoulou et al., 2016; Li et al., 2016; Ganu et al., 2018; Kizilcik et al., 2012).* The maximum duration of commencing HD was more than six months *(Nabolsi et al., 2015; Donia et al., 2015; Shafipour et al., 2015),* while the minimum duration was one month *(El Filali et al., 2017; Lee et al., 2015).* The maximum duration since commencing HD among the participants was 16 years *(Vasilopoulou et al., 2016)*, and the minimum time was eight months *(Barros et al., 2016).*

4.1.7. Instruments used to assess anxiety and depression

The instruments used across the studies to assess the relevant variables were varied. Regarding the assessment of depression, five of the studies used the Beck Depression Inventory (BDI/ BDII), which consists of 21 items with a 4-point scale *(Donia et al., 2015; Nabolsi et al., 2015; Barros et al., 2016; Kizilcik et al., 2012; Li et al., 2016).* One study utilized the Patient Health Questionnaire (PHQ-9) that comprises nine items.

Further, several studies used the Hospital Anxiety Depression Scale (HADS) to evaluate anxiety and depressive symptoms among HD patients *(Lee et al., 2015; Li et al., 2016; Ottaviani et al., 2016; Vasilopoulou et al., 2016).* This instrument was commonly used when the study aimed to investigate both depression and anxiety together. The HADS instrument consists of two sections with 14 items rating by a 4-point scale. One study used Depression, Anxiety, and Stress Scales (DASS- 21), which includes 21 items to assess depression, anxiety, and stress *(Shafipour et al., 2015).* It is considered as a valid and reliable instrument that can be used for screening the symptoms of stress, anxiety, and depression. All instruments used were a self-report except one study that used the Mini-International Neuropsychiatric Interview (MINI), a diagnostic tool used to identify symptoms among patients by interview *(El Filali et al., 2017).*

4.2. Main findings

4.2.1. Prevalence of depression and anxiety among hemodialysis patients

There are variations in reporting the prevalence of depression and anxiety across the studies. Most of the studies reported the prevalence in percentage, whereas some have reported the mean prevalence of these symptoms. Despite this, the prevalence of depression seems to be high among the HD patients, with the highest prevalence being 88.8% *(Shafipour et al., 2015),* and the lowest prevalence being 27.9% *(Kizilcik et al., 2012).* The majority of the studies had more than half of the patients having depression, with one of the studies showing more than 50% of their patient population having severe symptoms *(Nabolsi et al., 2015).* Besides, *Lee et al. (2015)* found that the mean depression level was 8.79±4.24 out of 28.

Only four studies reported the frequency of anxiety among HD patients. Anxiety levels were highest in the study conducted in Iran by *Shafipour et al. (2015),* with 92.5%. A study conducted in Morocco by *El Filali et al. (2017)* had the lowest anxiety levels (25%). The mean prevalence of anxiety among HD patients was 7.21 ± 4.44 out of 28 *(Lee et al., 2015).* The review shows that there was only one study that did not report the prevalence rates of depression and anxiety *(Li et al., 2016).*

4.2.2. Relationships between depression, anxiety and the quality of life

Among the 11 articles, six of them evaluated the relationships between anxiety, depression, and quality of life. Depression and anxiety had a significant adverse effect on the overall quality of life of hemodialysis patients. Patients with anxiety or depressive symptoms were significantly had lower levels of QoL compared to those without these symptoms. The most three affected dimensions of QoL were emotional function, physical function, and general health. The results also show a negative correlation with all aspects of QoL in anxious patients, particularly the dimensions of social interaction, pain, emotional well-being, and energy/fatigue, which reported with moderate correlation.

In contrast, the depression was found to be correlated with the energy/fatigue dimension only *(Ottaviani et al., 2016).* The study by *Lee et al. (2015)* confirmed that negative correlations existed between QoL, depression, and anxiety. Among QoL aspects, the psychological and social relationship domains were most affected by depression and anxiety.

A study conducted in America by *Li et al. (2016)* aimed to examine the relationships between QoL and psychological factors, physical functions in HD patients. The study revealed that HD patients who are free from anxiety or depression have better scores in some QoL dimensions than patients who suffer from these concurrent symptoms.

Anxiety and depression symptoms were assessed using three questionnaires. The findings showed that all questionnaires were inversely correlated with almost each QoL subscales *(Li et al., 2016).* When patients have concurrent anxiety and depression symptoms, the overall mainly common for the dimension of the effects of kidney disease, symptom/problem list, emotional well-being, and mental health functioning. *Li et al. (2016)* also observed that patients who had both depression and anxiety had reduced physical performance that resulted in a lack of physical activity as compared to patients who lacked the symptoms of anxiety and depression.

El Filali et al. (2017) also showed that the marital state, pain levels, and anxiety levels had affected depression in the patient, resulting in almost 16.5% increased risks of suicidal ideation. Concerning QoL, this study shows that most patients have moderate to severe problems in usual activities, mobility, and pain/discomfort by 76%, 72%, and 59.2%, respectively. *Vasilopoulou et al. (2016)* also confirmed the association between psychological symptoms and QoL. More specifically, patients with low symptoms levels had a better QoL compared to those with moderate or high levels of the symptoms.

Most importantly, the total QOL score was 2.5, and 4.4 points decreased with moderate and high levels of depression, respectively. Among QoL domains, the symptoms and wellbeing were the most affected by the incidence of anxiety and depression *(Vasilopoulou et al., 2016).* It was evident that the higher depression levels were associated with increased anxiety and stress, thus had a significant impact on the physical and mental wellbeing of QoL in patients. The years on dialysis were also correlated with depression, and no relationship between the time of dialysis with depression or anxiety was obtained *(Shafipour et al., 2015).*

4.2.3. Relationships between depression and quality of life

Among the 11 studies, five of them have exclusively assessed depression and quality of life *(Ganu et al., 2018; Barros et al., 2016; Donia et al., 2015; Nabolsi et al., 2015; Kizilcik et al., 2012).* The QoL in patients who were depressed was significantly lower, as indicated by these studies. A study conducted by *Donia et al. (2015),* which compared the QoL among patients who are depressed and a group of patients who are not depressed, the study showed that the whole depressed group had a significantly lower QoL in all aspects, except for role limitation due to physical problems. Additionally, the QoL significantly declines with an increase in the severity of depression, for instance, the mean score of emotional problems reported between non-depressive and depressive groups as mean 74.1±38.9 and 35.1±45.2, respectively, as well, this mean score was decreased with an increase in the severity of depression to be 19.55±39.2.

In the study conducted by *Nabolsi et al. (2015),* it was also showed moderately impaired QoL levels among depressive patients, more influenced in the socioeconomic, psychosocial, spiritual domains. Depressive symptoms adversely affected the patient's adherence to treatment and perceived seriousness of illness (*Nabolsi et al., 2015).* According to *Kizilcik et al. (2012),* depression was inversely affected all QoL domains, the highest negative correlation with depression found in the domain of physical functioning. Similarly, the study conducted by *Barros et al. (2016)* confirmed the highest negative correlation between depression and QoL in all domains. The mean score of QoL was 75.2±18.4; the lowest score was observed in the physical domain. During the two-year evaluation period, depressive and non-depressive groups differed significantly with regards to QoL over time. Other biochemical factors, including C-reactive protein and phosphorus levels, were affected in patients with depression, and this resulted in a poor quality of life and increased morbidities in the patients *(Barros et al., 2016).* A study conducted by *Ganu et al. (2018)* aimed to examine QoL and the prevalence of depression in patients on long-term hemodialysis. The study showed that depression was negatively correlated with QoL, years on dialysis treatment, and income level. Moreover, the study indicates that depression is a significant predictor of overall QoL.

5. Discussion

This review aimed to identify and synthesize relevant research findings of depression, anxiety, and QoL relationships. Few studies that focused on examining these relationships were found in the literature. Only eleven studies met the inclusion criteria. Across these studies, anxiety and depression were negatively correlated with the quality of life among hemodialysis patients. These findings are consistent with the results of the previous review, which conclude that there was a negative association between anxiety, depression, and QoL *(García-Llana et al., 2014).*

Different instruments were utilized to evaluate anxiety and depression. The HADS scale was commonly utilized to screen the depression and anxiety among HD patients. The HADS is a short instrument and easy to fill. It is a validated instrument used to assess both anxiety and depression among HD patients *(Djukanovic et al., 2017).* Other studies used a combination of several instruments to examine anxiety and depression. However, patients with HD are physically and mentally fatigued, and this may increase the burden on patients. So, using a short instrument such as HADS is more likely to be applicable for even routine screening and contributes to increasing response rates.

The review also showed the prevalence rates of depression and anxiety across the studies. It was difficult to compare these results due to the variation of instruments used in the included studies. Despite this, it seems that the rates of these unpleasant symptoms were high among patients undergoing HD. This finding is consistent with the recent study conducted among HD patients, which showed the incidence of depression and anxiety as 46 % and 30.5%, respectively *(Marthoenis et al., 2020).* These results are not surprising due to the dramatic changes that have happened in the patient's life. Many studies show that HD patient feels

hopeless owing to the fear due to the life-threatening diagnosis *(Goh & Griva, 2018)*.

Furthermore, coping with the treatment itself, engaging in self-care, managing side effects of treatment, and preventing complications that may arise from the disease processes and its treatment contribute to increasing levels of anxiety and depression *(Baker et al., 2015; Gerogianni et al., 2019; Goh & Griva, 2018)*. Hemodialysis treatment imposes more social restrictions and has financial implications that could contribute to the increasing severity of depression and anxiety *(Khan et al., 2019)*.

The findings from this review show that longer years on HD treatment are associated with increasing severity of depressive symptoms and, consequently, lower QoL. It presented as main findings in two studies *(Ganu et al., 2018; Shafipour et al., 2015)*. Therefore, years on HD could indirectly affect QoL through its influence on the severity of depression. This finding is possible because the prolonged use of dialysis treatment may also contribute to increasing the number of comorbid conditions, which may lead to an increase in the feeling of uncertainty about the future and hopelessness. This finding supports the importance of early detection of the symptoms. Nurses should pay more attention to routine screening of anxiety and depression among patients undergoing hemodialysis to facilitate early detection and provide effective interventions. Improving coping mechanisms for those patients is also needed.

6. Implications

The studies presented in the current review are informative and show that depression and anxiety are highly prevalent and should not be ignored in hemodialysis patients. Anxiety has always been underestimated since it is linked to depression symptoms *(Aggarwal et al., 2017)*. It is necessary to improve the diagnostic process and screening measures to detect these symptoms efficiently. The use of a short (forms of instruments) measure in routine practice such as HADS is useful for screening psychological symptoms, reducing the burden of patients, and encouraging them to respond accurately to the screening instrument. Healthcare professionals, especially nurses, are in a good position in the early detection of anxiety and depressive symptoms within routine care.

Further studies on the role of psychosocial aspects of hemodialysis should be considered to prevent deterioration of the patients' quality of life *(Kizilcik et al., 2012)*. Most studies were cross-sectional, and no longitudinal studies were identified in the literature. More studies should be carried out to assess the impact of severity of depression and anxiety over time.

7. Conclusion

The literature review highlights the negative associations between anxiety, depression, and QoL. It is crucial to screen HD patients frequently for anxiety and depression using a short measure to provide early interventions that could reduce the potential deteriorations on QoL. Further longitudinal studies are needed to assess these relationships.

8. Conflict of Interests

No conflict of interest has been declared by the authors.

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Appendix 1: Criteria for study appraisal

Research Selection and Design:
1. Patient inclusion and/or exclusion criteria are indicated
2. The sample selection method is specified
3. The research design is clearly specified in the text
4. The number of patients potentially eligible and/or those initially selected, hose who accepted, or those who finally participated or responded is reported
5. If groups are compared, the information in point 4 is indicated for each group

Definition and Measurement of the Study Variables
6. The study variables are clearly defined
7. Validated instruments are used for all the main study variables

Method and Analysis of Data:
8. The samples evaluated are equal to or greater than 30 patients
9. The statistical tests used are specified
10. The loss of participants and/or data were correctly addressed (or at least indicated in the text that the data quality has been reviewed before statistical analysis)

Quality of the Results and Discussion:
11. The results are reported following the study objectives
12. The study considers the practical implications of the results and potential benefits for patients

Quality:
1-4 points: low; 5-8 points: medium; 9-12 points: high *(García-Llana et al., 2014).*

Table 3: Characteristics and results of the 11 studies included in the review

No.	Author/ year	location	Study aim	Study design	Sample and gender	Age	Instrument used to assess anxiety and depression	Number of instrument items	Prevalence of depression/anxiety in percentage	Impact of depression and anxiety on quality of life
Anxiety + depression +QOL										
1	El Filali et al. (2017)	Morocco	Identify the prevalence of depression, anxiety, suicidal ideation, and QOL among HD patients.	A cross-sectional	103 HD. M=56 F=47	____	MINI	It is not reported.	ANX= 25.2% DEP=34%.	- DEP was associated with three factors: (ANX, living alone, and pain). - There is an association between ANX, age, and QOL. - Suicidal ideation reported in 16.5% and associated with the QOL.
2	Lee et al. (2015)	Korea	To identify the factors influencing QOL of HD patients with ESKD.	A cross-sectional	141 HD M=81 F=60	18-65Y	HADS	14 (7 for anxiety + 7 for depression),4-point score.	Not reported	- A significant negative correlation between anxiety, depression, fatigue, and QOL was revealed. - Among QOL aspects: psychological and social relationship domains were most affected by symptoms incidence. - The mean QOL score of the subjects was 8.24 ±13.11. The mean anxiety score was 7.21±4.44. The mean depression score was 8.79 ±4.24.
3	Li et al. (2016)	USA	To examine the association between QOL and anxiety, depression, physical activity, and physical performance in HD patients.	A cross-sectional	111 HD=72, 39=control group. M=73 F=38	_____	- BAI. - HADS. - BDI-II	- Twenty-one items,4-point scale. - 14 items ,4-point scale. - Twenty-one items,4-point scale.	Not reported	- Anxiety and depression questionnaires were inversely correlated with almost each QOL subscale. - QOL reduced in HD patients versus the healthy control group. - Patients without either ANX or DEP had a significantly high QOL score.

										- QoL scores significantly lower in patients with both ANX and DEP, decrease in symptom/problem list, sleep, effects of kidney disease, mental health composite score, emotional well-being, and fatigue. - Lower QOL significantly associated with ANX, DEP, decrease daily physical activity, and physical performance.
4	Ottaviani et al. (2016)	Brazil	Assess the relationship between anxiety, depression, and QOL in HD patients.	A cross-sectional	100 HD. M=66 F=34	___	HADS	14 items, 4-point score.	ANX=33%. DEP=16%.	- QoL scores significantly low in patients with ANX and\or depressive symptoms compared to those without symptoms. - A negative and moderate correlation between anxiety and dimensions of pain, social interaction, energy/fatigue, and emotional well-being were revealed. - The mean score of QOL dimensions was low in physical functions, emotional functions, and general health. - The mean score of ANX was 5 ±3.25 - The mean DEP score was 4.8 ±3.43.
5	Shafipour et al. (2015)	Iran	Identify the relationship between QOL, depression, anxiety, and stress in HD.	Descriptive, analytical study	160 HD M=80 F=80	25-79Y	DASS-21	21 items, Depression 7, Anxiety 7, and Stress 7 questions. With a score.	- ANX=92.5%. severe. - DEP=88.8 %	- Increased levels of DEP lead to increased ANX and stress. - A significant inverse correlation between the physical and mental domains of QOL with ANX and DEP. - No significant correlation observed between the time of dialysis and DEP, ANX. - Significant correlation between the duration of

										dialysis and DEP.
6	Vasilopoulou et al. (2016)	Greece	Explore the impact of anxiety and depression on the QOL of HD patients	A cross-sectional	395 HD M=222 F=173	18-80Y	HADS	14, (7 for anxiety + 7 for depression),4-point score.	- ANX= 47.8% had high levels. - DEP =38,2 % had high level and 41.8% had low levels.	- QoL scores associated with ANX and DEP levels. - The average total score of QOL was found to be 17.14 (The average total score ranged from 0 to 30). Most affected by symptoms, well-being, and transcendent. - The total QOL score was 2.5 and 4.4 points low for subjects with moderate to high DEP levels, respectively**,** compared to subjects with low levels of DEP.
					Depression +QOL					
7	Barros et al. (2016)	Brazil	Prospectively evaluate depression Symptoms and their relationship with nutritional status, , quality of life, and mortality in a cohort of ESKD patients undergoing HD	A prospective cohort study.	104 HD M=63 F=41.	18-60Y	BDI	21 items.	DEP= 34 %	- Patients who had DEP symptoms significantly low in QOL compared with the no DEP symptoms. - The mean score of QOL was 75.2; the lowest score was observed in the physical domain. - A moderate to strong negative association between DEP and all QOL domains. - DEP was also assessed at each follow-up time, the DEP and non-DEP groups differed significantly with concerns to QOL over time. - It found that 34 deaths overall occur among 32% DEP group, but no statistically significant difference in mortality rate was detected between the groups.

8	Donia et al. (2015)	Egypt	Assess depression and other clinical aspects and QOL among HD patients.	A cross-sectional	76 HD M=54 F=22	____	BDI-II	Twenty-one items were scoring (0 to 3).	DEP=76.3 %. Of them, 32.9 % had severe DEP.	- All QOL aspects significantly lower among the whole DEP group compared to the non-DEP group. - Among the QOL domains, the role limitation due to emotional problems, general health, and fatigue was the most affected by the severity of DEP.
9	Ganu et al. (2018)	Ghana	Examined QOL and prevalence of depressive symptoms and explored the impact of socio-demographic characteristics on depression and QOL.	A cross-sectional	106 HD. M=63 F=43	21-79Y	PHQ-9 for depression.	Nine items (4 points, Likert scale).	DEP= 45%.	- 81% of patients had high scores on QOL while remaining had low scores. - Low scores of QOL reported in, psychological well-being and social relationship well-being. - A significant negative correlation between QOL, duration of dialysis treatment, income level with DEP. - Depressive symptoms emerged as a significant predictor of overall QOL.
10	Kizilcik et al. (2012)	Turkey	Study depression prevalence and determine its effect on QOL.	A cross-sectional	294 HD. M=160 F=134	19-86Y	BDI	27 items.	DEP=28%	- DEP significantly higher in women, older age, with a lower level of education and unemployed patients. - Mean scores from all domains in QOL were significantly lower in depressive patients. - A moderately negative relationship between all the QOL domains and depression. - The highest negative correlation with depression found in the domain of physical functioning.
11	Nabolsi et al. (2015)	Jordon	Explore the relationship between QOL, depression,	A descriptive, correlation design	244 HD M=135 F=109.	18-65Y	BDI-II	21 items.	DEP = 74%, more than 50% reported moderate to severe DEP.	- Higher levels of DEP symptoms found among women than men. - Moderate impaired levels of QOL (mean score 20, The

		perception of the seriousness of the illness, and adherence to treatment in HD patients.	scoring of the QOL range from 0-30). - The most QOL subscales affected by the symptoms are health and functioning subscale, psychosocial, spiritual, and socioeconomic. - Education, gender, marital status significantly associated with DEP. - A negative correlation between OOL and DEP. - Negative association between DEP and QOL, adherence to treatment and perceived seriousness of illness.

Abbreviations: ANX: Anxiety; BDI-I: Beck Anxiety Inventory- version, I; BDI-II: Beck Depression Inventory version II; DASS-21: Depression Anxiety Stress Scales, DEP: Depression, ESKD: Stage kidney Disease; F: females; HADS: Hospital Anxiety Depression Scale; HD: Hemodialysis; M: male; MINI= Mini international neuropsychiatric interview; PHQ-9: Patient Health Questionnaire-9; QOL: Quality of life; STAI: State-Trait Anxiety Inventory.