

The Association of Family Function with Anxiety and Depression among Patients Undergoing Hemodialysis: a Cross-Sectional Study in Iran

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ABSTRACT

Background: Anxiety and depression are highly prevalent in hemodialysis patients. Social support can help in reducing these disorders.

Objectives: This study is aimed to examine the relationship of family functioning with anxiety and depression in hemodialysis patients.

Methods: The present cross-sectional study was conducted on 199 patients referred to the hemodialysis centers of Zanjan province, Iran, in 2019. Stratified sampling was used. A demographic questionnaire, hospital anxiety and depression questionnaire (HADS) and McMaster family assessment device (FAD) were employed as data collection tools. Data was analyzed using descriptive statistics and Pearson's correlation coefficient test.

Results: Of all study participants, 52.3% were males, 76.4% were married and 52.7% were over 60 years old. Patients' family functioning in all dimensions was within the normal range. Among the dimensions of family functioning, problem solving (mean 1.88) was the best dimension and roles (mean 2.36) the weakest one. Patients had a mean anxiety score of 9, which indicated a mild level of the condition, and 60.8% of subjects had different stages of anxiety. The mean score of depression was 9.46, which also revealed a mild level, and 68.8% of subjects had different stages of depression. With the improvement of family functioning, patients' anxiety and depression decreased.

Conclusions: A better family functioning was associated with a lower level of anxiety and depression in the investigated subjects. Therefore, it is recommended to provide educational and counseling services, effective and comprehensive social support from various support systems in the society for improving patients' family function.

Keywords: hemodialysis, family function, depression, anxiety.

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BACKGROUND

Kidney diseases are considered to be important threatening health conditions worldwide (1). The global estimated prevalence of chronic kidney disease is 13.4% (11.7–15.1%) (2). In the US, it is estimated that about 14% of adults (35.5 million people) have the disease (3). The worldwide incidence of chronic kidney disease is 510 cases *per* million individuals, while in Iran it reaches 680 *per* million, thus surpassing the global average (4). Despite the efficacy of chronic dialysis treatments in mitigating uremia and managing fluid and electrolyte imbalances, the yearly mortality rate continues to be elevated among individuals reliant on dialysis (3). Although hemodialysis increases the life span of patients, it requires suitable vascular pathways such as fistula, catheter and graft, but they are all invasive procedures and each of them cause stress and anxiety in patients (5). In fact, hemodialysis and its numerous sessions subject patients to considerable stress and affect all aspects of their life, particularly their physiological, mental and psychological state (6). The prevalence of depression in hemodialysis patients is high (7). Depression reduces life expectancy and is one of the disorders that involves a large financial burden in the treatment system (8). Studies show that anxiety has also a notable prevalence in hemodialysis patients. For example, Kumar *et al* reported that the frequency of anxiety in hemodialysis patients was 28% (6) and Nagy *et al* found anxiety and depression rates of 49.6% and 55%, respectively, in these patients (9). Anxiety is one of the most common mental disorders in hemodialysis patients, which affects the quality of life and adherence to treatment (10). These patients are prone to anxiety due to various reasons, including economic problems, prolonged treatment, dependence on the device, the need to follow a strict diet and defects in the functioning of the support system (9, 10). One of the important methods to reduce anxiety and depression in these patients is social support, which plays an important role in improving their quality of life and physical and mental health (11). With the increase of social support, the pressure of the disease on them is reduced and they can more easily deal with stress, symptoms of depression and anxiety (12).

The family unit has long been regarded as a crucial and fascinating system of human communication (13). The occurrence of a severe illness within a family typically exerts a significant impact on the dynamics of the family system, particularly affecting roles and functions within the household (4). Family functioning encompasses various aspects. There are numerous methods and approaches that the family uses to maintain its cohesion. Family functioning has different dimensions that include problem solving, communication, roles, affective responsiveness, affective involvement and behavior control (14). Examining family functioning shows how well the family works as a unit and also measures the family's ability to adapt in different situations. Therefore, measuring family function can be a suitable predictive tool for the mental health of families (15).

Evidence shows the association of social support with anxiety and depression among patients undergoing hemodialysis, with those who receive social support having better physical and psychological outcomes (12). Also, Kukihera's study showed that there was a relationship between the family function and the mental well-being of its members (16). In Jiang *et al*'s study, hemodialysis patients and their spouses were less flexible in terms of family adjustment compared to healthy individuals (2). Given the prevalence of depression and anxiety in hemodialysis patients, it is very important to identify relevant factors, and family functioning, which varies from one culture to another, could be one of them.

Objectives

The present study was conducted with the aim of determining the association between family functioning and anxiety and depression among hemodialysis patients in Zanjan, Iran, during the year 2019. □

METHODS

Study design

We conducted a cross-sectional study on all 199 patients undergoing hemodialysis who were referred to dialysis facilities across seven cities within the Iranian province of Zanjan in 2019. The sample size was determined using the mean formula and referring to previous study with a standard deviation (SD) of 8.74 (17).

Inclusion criteria

Patients aged 18 years and over who have been receiving hemodialysis for a minimum duration of three months, were not kidney transplant candidates and were determined to be alert and to have the ability to answer questions were all included in our study.

Study protocol

The present study employed three questionnaires, including the demographic information questionnaire, standard hospital anxiety and depression scale (HADS), and McMaster family assessment device (FAD).

A researcher-made questionnaire was used to collect data about patients' gender, age, place of residence, level of education, occupation, marital status and income.

The McMaster family assessment device is a 60-item questionnaire which was prepared based on the McMaster model by Epstein *et al* in

1938. This questionnaire assesses the structural, occupational and interactive features of families, outlining six key aspects of how they function. Additionally, the framework evaluates the family's capacity to handle responsibilities using a four-point Likert scale ranging from completely agree (1), agree (2), disagree (3) to completely disagree (4). Each dimension is scored between 1 and 4, allowing for the differentiation between healthy and unhealthy family function. The family functioning dimensions identified by using the FAD include: general functioning (13 questions), problem solving (six questions) and communication (seven questions), roles (nine questions), affective involvement (eight questions), affective responsiveness (eight questions) and behavior control (nine questions). It is important to note that the number of questions varies across these dimensions (18).

Since the number of questions in each dimension is different from other dimensions, in

Hospital Anxiety and Depression Scale (HADS)

Instructions: Doctors are aware that emotions play an important part in most illnesses. If your doctor knows about these feelings he or she will be able to help you more. This questionnaire is designed to help your doctor know how you feel. Read each item and circle the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought out response.

I feel tense or 'wound up':	A	I feel as if I am slowed down:	D
Most of the time	3	Nearly all of the time	3
A lot of the time	2	Very often	2
Time to time, occasionally	1	Sometimes	1
Not at all	0	Not at all	0
I still enjoy the things I used to enjoy:	D	I get a sort of frightened feeling like 'butterflies in the stomach':	A
Definitely as much	0	Not at all	0
Not quite so much	1	Occasionally	1
Only a little	2	Quite often	2
Not at all	3	Very often	3
I get a sort of frightened feeling like something awful is about to happen:	A	I have lost interest in my appearance:	D
Very definitely and quite badly	3	Definitely	3
Yes, but not too badly	2	I don't take as much care as I should	2
A little, but it doesn't worry me	1	I may not take quite as much care	1
Not at all	0	I take just as much care as ever	0
I can laugh and see the funny side of things:	D	I feel restless as if I have to be on the move:	A
As much as I always could	0	Very much indeed	3
Not quite so much now	1	Quite a lot	2
Definitely not so much now	2	Not very much	1
Not at all	3	Not at all	0
Worrying thoughts go through my mind:	A	I look forward with enjoyment to things:	D
A great deal of the time	3	A much as I ever did	0
A lot of the time	2	Rather less than I used to	1
From time to time but not too often	1	Definitely less than I used to	3
Only occasionally	0	Hardly at all	2
I feel cheerful:	D	I get sudden feelings of panic:	A
Not at all	3	Very often indeed	3
Not often	2	Quite often	2
Sometimes	1	Not very often	1
Most of the time	0	Not at all	0
I can sit at ease and feel relaxed:	A	I can enjoy a good book or radio or TV programme:	D
Definitely	0	Often	0
Usually	1	Sometimes	1
Not often	2	Not often	2
Not at all	3	Very seldom	3

Questions relating to anxiety are indicated by an 'A' while those relating to depression are shown by a 'D'. Scores of 0-7 in respective subscales are considered normal, with 8-10 borderline and 11 or over indicating clinical 'caseness'

FIGURE 1. Standard hospital anxiety and depression scale (HADS)

SECTION 4

This next section contains a number of statements about families. Please read each statement carefully, and decide how well it describes your own family. You should answer as to how you see your family.

For each statement there are four (4) possible responses:

Strongly Agree (SA)	Check SA if you feel that the statement describes your family very accurately.
Agree (A)	Check A if you feel that the statement describes your family for the most part.
Disagree (D)	Check D if you feel that the statement does not describe your family for the most part.
Strongly Disagree (SD)	Check SD if you feel that the statement does not describe your family at all.

Circle the response which best describes your feelings:

1. Planning family activities is difficult because we misunderstand each other.	SA	A	D	SD
2. We resolve most everyday problems around the house.	SA	A	D	SD
3. When someone is upset the others know why.	SA	A	D	SD
4. When you ask someone to do something, you have to check that they did it.	SA	A	D	SD
5. If someone is in trouble, the others become too involved.	SA	A	D	SD
6. In times of crisis we can turn to each other for support.	SA	A	D	SD
7. We don't know what to do when an emergency comes up.	SA	A	D	SD
8. We sometimes run out of things that we need.	SA	A	D	SD
9. We are reluctant to show our affection for each other.	SA	A	D	SD
10. We make sure members meet their family responsibilities.	SA	A	D	SD
11. We cannot talk to each other about the sadness we feel.	SA	A	D	SD
12. We usually act on our decisions regarding problems.	SA	A	D	SD
13. You only get the interest of others when something is important to them.	SA	A	D	SD
14. You can't tell how a person is feeling from what they are saying.	SA	A	D	SD
15. Family tasks don't get spread around enough.	SA	A	D	SD
16. Individuals are accepted for what they are.	SA	A	D	SD
17. You can easily get away with breaking the rules.	SA	A	D	SD
18. People come right out and say things instead of hinting at them.	SA	A	D	SD
19. Some of us just don't respond emotionally.	SA	A	D	SD
20. We know what to do in an emergency.	SA	A	D	SD
21. We avoid discussing our fears and concerns.	SA	A	D	SD
22. It is difficult to talk to each other about tender feelings.	SA	A	D	SD
23. We have trouble meeting our bills.	SA	A	D	SD
24. After our family tries to solve a problem, we usually discuss whether it worked or not.	SA	A	D	SD
25. We are too self-centered.	SA	A	D	SD
26. We can express feelings to each other.	SA	A	D	SD
27. We have no clear expectations about toilet habits.	SA	A	D	SD
28. We do not show our love to each other.	SA	A	D	SD
29. We talk to people directly rather than through go-betweens.	SA	A	D	SD
30. Each of us has particular duties and responsibilities.	SA	A	D	SD
31. There are lots of bad feelings in the family.	SA	A	D	SD
32. We have rules about hitting people.	SA	A	D	SD
33. We get involved with each other only when something interests us.	SA	A	D	SD

34. There's little time to explore personal interests.	SA	A	D	SD
35. We often don't say what we mean.	SA	A	D	SD
36. We feel accepted for what we are.	SA	A	D	SD
37. We show interest in each other when we can get something out of it personally.	SA	A	D	SD
38. We resolve most emotional upsets that come up.	SA	A	D	SD
39. Tenderness takes second place to other things in our family.	SA	A	D	SD
40. We discuss who is to do household jobs.	SA	A	D	SD
41. Making decisions is a problem for our family.	SA	A	D	SD
42. Our family shows interest in each other only when they can get something out of it.	SA	A	D	SD
43. We are frank with each other.	SA	A	D	SD
44. We don't hold to any rules or standards.	SA	A	D	SD
45. If people are asked to do something, they need reminding.	SA	A	D	SD
46. We are able to make decisions about how to solve problems.	SA	A	D	SD
36. We feel accepted for what we are.	SA	A	D	SD
37. We show interest in each other when we can get something out of it personally.	SA	A	D	SD
38. We resolve most emotional upsets that come up.	SA	A	D	SD
39. Tenderness takes second place to other things in our family.	SA	A	D	SD
51. We don't get along well together.	SA	A	D	SD
52. We don't talk to each other when we are angry.	SA	A	D	SD
53. We are generally dissatisfied with the family duties assigned to us.	SA	A	D	SD
54. Even though we mean well, we intrude too much into each others lives.	SA	A	D	SD
55. There are rules about dangerous situations.	SA	A	D	SD
56. We confide in each other.	SA	A	D	SD
57. We cry openly.	SA	A	D	SD
58. We don't have reasonable transport.	SA	A	D	SD
59. When we don't like what someone has done, we tell them.	SA	A	D	SD
60. We try to think of different ways to solve problems.	SA	A	D	SD

FIGURE 2. McMaster family assessment device (FAD)

order to be able to compare the scores of different dimensions with each other, the scores are calculated in two ways (zero to one hundred scale) and (zero to four scale). In this questionnaire, lower scores indicate better function. In Yoosefi's study, the cut-off point for this tool was calculated as 3.43 out of 4, with scores higher than 3.43 indicating dysfunction and those below that threshold showing healthy function (19).

The reliability and validity of this questionnaire was evaluated after it was prepared by Epstein *et al* in 1983 on a sample of 503 people. The internal consistency of FAD was found to range between 72% and 92%, which demonstrated its reliability (20). Zadeh Mohammadi standardized this questionnaire using a sample of 494 individuals in Iran (2015). The reliability of the whole test using Cronbach's alpha method was 82%, the alpha of the subscales ranged between 66% and 73%, and its retest correlation was between 57% and 80% (21). In the present study, FAD reliability was determined using Cronbach's alpha coefficient of 89%.

The HADS was first introduced by Zigmond and Snith in 1983 as a tool for screening psychiatric disorders in outpatient clinics of public hospitals. It consists of 14 self-administered items intended to assess the occurrence and intensity of anxiety and depression symptoms in patients over recent weeks. There are seven questions related to anxiety symptoms (1, 3, 5, 7, 9, 11, 13) and seven questions related to depression symptoms (2, 4, 6, 8, 10, 12, 14). This is a 4-point Likert scale, with each component of this test being scored on a 0-3 scale. So, the scores are in the 0-21 range. A score of 3 for each item indicates a high level of anxiety or depression and a score of 0, a minimum level of anxiety or depression. Scores in the range of 0-7 are considered normal, 8-10 mild, 11-14 moderate and 15-21 severe (22). This tool has been psychometrically tested in Iran (23). In our study, the reliability of the tool was calculated using Cronbach's alpha coefficient of 76%.

Informed written consent was obtained from all participants. The present study was approved by the ethics committee of Zanjan University of Medical Sciences, Zanjan, Iran (IR.ZUMS.REC.1398.035). Data was explored using descriptive statistics and Pearson's correlation coefficient test and further analyzed in SPSS version 16. The normality of data distribution was determined using the Kolmogorov-Smirnov test. The significance level of p value was considered less than 0.05. □

RESULTS

Approximately 52.3% of the study subjects were males and 50.8% had no formal education. A significant proportion of participants (76.3%) were married and 52.7% were over 60 years of age. Most of the participants (70.4%) resided in urban areas and 83.4% owned their homes, yet they reported having inadequate monthly income (Table 1).

The mean of family function was within the normal range. Also, patients' mean anxiety and depression scores were 9 and 9.46, respectively, which meant that both conditions had a mild stage (Table 2).

About 60.8% of patients had different levels of anxiety, with 23.6% of them experiencing mild anxiety, 21.1% moderate anxiety and 16.1% severe anxiety. About 67.8% of all participants

had different levels of depression, with 26.1% of them having mild depression, 29.1% moderate depression and 12.6% severe depression (Table 3).

There was a positive and significant relationship between all dimensions of family functioning and patients' anxiety, with increase in the family functioning score (poor functioning) resulting in increased anxiety scores. Similarly,

TABLE 1. Distribution of some demographic features of the study samples

Frequency	Demographic information	Number	Percentage
Sex	Female	95	47.7
	Male	104	52.3
	Total	199	100
Age	20-29	12	6
	30-39	20	10.1
	40-49	23	11.6
	50-59	39	19.6
	60-69	54	27.1
	70 years old and over	51	25.6
	Total	199	100
	SD ± mean	57.81±15.654	
Marital status	Married	152	76.3
	Single	20	10.1
	Divorced and widow	27	13.6
	Total	199	100
Family caretaker	Yes	112	56.3
	No	87	43.7
	Total	199	100
Residence	City	140	70.4
	Village	59	29.6
	Total	199	100
Housing	Private	166	83.4
	Rent	33	16.6
	Total	199	100
Level of education	Illiterate	101	50.8
	Sub-diploma and diploma	84	42.4
	Academic degree	14	7
	Total	199	100
Job status	Housewife	89	44.7
	Unemployed	27	13.6
	State employee or student	5	2.5
	Retired or unable to work	41	20.6
	Freelancer	37	18.6
	Total	199	100
Monthly income	Sufficient	49	24.6
	Insufficient	150	75.4
	Total	199	100
Diagnosis period	1-5 years	156	78.4
	6-10 years	30	15.1
	More than 10 years	13	6.5
	Total	199	100

TABLE 2. Mean, standard deviation and confidence interval of family function, anxiety and depression scores of study samples

Variable	Mean	Standard deviation	Confidence interval of 0.95	
			Low	High
Family function	27.09	5.74	26.292	27.898
Anxiety	9	4.99	8.3	9.7
Depression	9.46	4.7	8.8	10

TABLE 3. Leveling of anxiety and depression in study samples

Level	Anxiety			Depression		
	Frequency	Percentage	Cumulative frequency percentage	Frequency	Percentage	Cumulative frequency percentage
Normal	78	39.2	39.2	64	32.2	32.2
Mild	47	23.6	62.8	52	26.1	58.3
Medium	42	21.1	83.9	58	29.1	87.4
Severe	32	16.1	100	25	12.6	100
Total	199	100	-	199	100	-

TABLE 4. Relationship of family function dimensions with participants' anxiety and depression

Dimensions of family function	Anxiety		Depression	
	r(Pearson)	p	r(Pearson)	p
Problem solving	.176	.013	.334	.000
Communications	.147	.038	.302	.000
Roles	.280	.00	.356	.000
Affective responsiveness	.174	.014	.280	.000
Affective involvement	.328	.000	.272	.000
Behavioral control	.328	.000	.310	.000
General function	.347	.000	.369	.000

there was a positive and significant relationship between all dimensions of family functioning and patients' depression, with increase in the family performance score (poor performance) resulting in increased depression scores (Table 4). ■

DISCUSSION

The present study was aimed to examine the relationship between family functioning and anxiety and depression of hemodialysis patients. Our findings showed that the mean scores of family functioning dimensions were in the normal range in all dimensions. In Ahlberg's study, most families exhibited good performance (24). Contrary to our results, in a study of Jiang *et al* the families of hemodialysis patients did not perform well (2). In the above-mentioned studies, a questionnaire was employed for data gathering, which involved limitations related to recall bias, exaggeration and dishonesty in responding.

Also, our patients' mean anxiety score showed a mild level of the health condition, which was in line with the findings described by Alshelle (25). However, Jiang *et al* found moderate levels of anxiety in hemodialysis patients (2). Also, some studies have reported that these patients had a prevalence of moderate to severe anxiety ranging between 13% and 28% (26, 27). The variability in study results can be explained by the fact that studies used different tools. Multiple factors, such as low life expectancy and death

anxiety, numerous food restrictions, 100% dependence of one's life on the hemodialysis machine etc, could be each a reason for anxiety in these patients.

Also, 67.8% of participants in our study were in the depression spectrum and the mean depression score was in the mild range. The prevalence of depression in hemodialysis patients was found to reach 62% (28) by Ravaghi *et al*, 22.5% by Alencar *et al* (29) and 62.1% by Takaki *et al* (30), which was in agreement with our findings, while Salehi *et al* (20) and Hashemi *et al* (8) found 50% and 39.2%, respectively. Authors of the cited studies used a questionnaire to collect data from patients, which involved limitations such as recall bias, exaggeration and dishonesty in responding.

Differences in the results of various studies can be caused by the type of measuring instrument, family functions and differences in ethnicities, people's lifestyles, cultures and social support for patients.

There was a statistically significant relationship between all dimensions of family functioning and the anxiety of hemodialysis patients, as shown by the fact that the improvement of family functioning resulted in decreased anxiety scores. In line with the results of the present study, Kukihara *et al* demonstrated a relationship between functioning of hemodialysis patients' families and the mental well-being of its members (16).

Also, there was a significant relationship between all dimensions of family functioning and patients' depression; thus, the improvement of family functioning resulted in decreased depression scores. In this regard, other studies had similar results (16, 24). For example, Rodriguez also found that the support of hemodialysis patients' families was effective in improving the quality of life as well as the physical and mental health of these patients (31).

Given that we conducted a cross-sectional study and data collection was based on the usage of a questionnaire, the present study has limitations related to the type of study and the use of questionnaires. Also, because the study population was limited to hemodialysis patients in the Iranian province of Zanjan, our findings cannot be generalized to other populations. In addition, the lack of clinical data (main comorbidities, etiology of chronic kidney disease, chronic pre-

scribed medication – especially the number of daily pills, main laboratory data such as serum hemoglobin, nutrition indices, mineral metabolism abnormalities, the type of vascular access) is a major limitation of the present study. □

CONCLUSION

A better family function was associated with a lower level of anxiety and depression in the investigated subjects. As we aimed to investigate that relationship, a correlation test was used and therefore, causality cannot be inferred from it. It is recommended to provide educational and counseling services, effective and comprehensive social support from various support systems

in the society for improving the function of patients' families. □

Authors' contributions: All authors were involved in the study design. Data collection was performed by R. M. The first draft of the manuscript was written by R. M and N.J. The analysis was performed by Z. G. The final editing was done by N. J and M.P.

Ethical approval: The present study was approved under the ethical approval code of IR.ZUMS.REC.1398.035.

Conflicts of interest: none declared.

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