

ORIGINAL ARTICLE

Appetite Assessment Quality of Life and Anxiety Among End-Stage Renal Disease Patients on Regular Hemodialysis

Mohamed Adel Mohamed El Boraie^a, Ehab Elsayed Eltoraby^b, Ibtihal M. A. Ibrahim^c, Mona Mohammed Tawfik^b*Department of Internal Medicine, ^aDialysis Unit, Aga Central Hospital, Dakahlia, ^bFaculty of Medicine, Mansoura University, ^cPsychiatry, Faculty of Medicine, Mansoura University, Mansoura, Egypt.***Correspondence to Ibtihal M. A. Ibrahim, Department of Psychiatry, Faculty of Medicine, Mansoura University, Mansoura, Egypt.***E-mail: drpossy2002@yahoo.com*

Background	Appetite is frequently decreased in hemodialysis patients. Anorexia contributes to poor quality of life. The aim of this study is to assess appetite in maintenance hemodialysis patients using appetite questionnaires, and to study the correlation between appetite and quality of life and anxiety.
Results	This is cross-sectional observational study. This study included a total number of 162 patients on maintenance hemodialysis. Appetite assessment, quality of life and anxiety were assessed using questionnaires. There was statistically significant difference of quality-of-life score domains among cases with diminished appetite and those with normal appetite using subjective assessment of appetite. There was statistically significant higher anxiety score mean among cases with diminished appetite than with normal appetite by subjective assessment ($p < 0.001$).
Conclusions	Hemodialysis patients with diminished appetite had significantly lower scores in all domains in quality of life than patients with normal appetite. Hemodialysis patients with diminished appetite had significant higher anxiety scores than patients with normal appetite.
Keywords	Anorexia, Anxiety, Appetite, Hemodialysis, Quality of life, Renal failure.

INTRODUCTION

Lack of appetite is a highly prevalent symptom among hemodialysis patients. This is also known as anorexia. Anorexia contributes to poor quality of life. Anorexia may be a risk factor for unfavorable outcomes such as reduced response to erythropoietin and increased hospitalization and mortality. The pathogenesis of anorexia in HD patients is essentially unknown. Factors like uremic toxins, inflammation, altered amino-acid patterns, hormones (e.g., leptin and ghrelin), and neuropeptides (e.g., neuropeptide Y) were suggested to be involved (Bossola *et al.*, 2006; Carrero *et al.*, 2007).

Non-anorexic causes of reduced nutrient intake include financial problems to purchase foods, medical or surgical illnesses affecting the ability to ingest, digest, or process the nutrients, impaired cognitive function, and other mental or physical disabilities (Dukkipati and Kopple, 2009). Also, renal diets are arguably the most restrictive of

any patient group, and many of the restrictions contradict current recommendations for healthy eating (Hollingsdale *et al.*, 2008).

Many tools have been proposed for screening of anorexia in the general population, where questionnaires and visual analogue scale (VAS) are most commonly used (Bossola *et al.*, 2004). Appetite changes may vary from day to day, with a tendency to be worse on hemodialysis treatment days (Burrowes *et al.*, 2005). Appetite assessment is widely accepted as an early warning of impending morbidity and nutritional concerns (Kalantar-Zadeh *et al.*, 2004; Carrero *et al.*, 2007).

Food intake and its patterns are potential factors affecting health outcomes in dialysis patients. Dietary restrictions usually aim at keeping fluid, serum phosphorus and potassium levels within range often result in limited

choices in food and unappetizing meals (Palmer *et al.*, 2015).

The aim of the present study is to assess appetite in maintenance hemodialysis patients using appetite questionnaires, and to study the correlation between appetite and quality of life and anxiety.

SUBJECTS AND METHODS

This is cross-sectional observational study. Patients included in this study were selected from Mansoura Nephrology and Dialysis Unit (MNDU), Mansoura University and Aga Hospital Dialysis Unit. The study was carried out over a period of 1 year from March 2019 to February 2020. This study included a total number of 162 patients with ESRD on maintenance hemodialysis. IRB approval was obtained (code MS.18.12.393).

Inclusion criteria:

- (1) Patients whose ages were above 18 and below 65 years.
- (2) Patients who were on maintenance hemodialysis for at least six months.
- (3) Patients who were clinically stable.
- (4) Patients who were able to consume food orally and does not have dysphagia.
- (5) Patients who provide informed consent.

Exclusion criteria:

- (1) Patients with extreme age (below 18 and above 65 years).
- (2) Patients who refused the enrolment in the study or unable to give informed consent or to complete study questionnaires.
- (3) Patients with diseases other than ESRD associated with wasting (i.e., cancer, acute or chronic infection).
- (4) Patients with repeated history of hospitalization or intercurrent illnesses in the six months prior to the recruitment.

Methodology

The study was explained to all patients. An informed consent was obtained. Demographic features as patient age, gender, residence, marital status, years of education and work were collected. Height and body weight in kilograms were measured and BMI was calculated through the following equation $BMI = \text{Weight (in kilograms)} / \text{Height}^2 \text{ (in meters)}$.

Appetite assessment

Appetite was assessed using the following appetite assessment tools:

(1) Subjective assessment of appetite: referred to the last week (Kalantar-Zadeh *et al.*, 2004; Burrowes *et al.*, 2005).

(2) The self-assessment of appetite changes during a 30-day period: patients were asked to compare their present appetite to their appetite over the last month (Arezzo di Trifiletti *et al.*, 2013).

(3) The Visual Analog Scale: patients were asked to mark their appetite on a scale ranged from zero to 100, with the starting point zero denoting “the worst appetite” and the finish point 100 denoting “the best appetite.” A score ≤ 50 indicate anorexia (Zabel *et al.*, 2009).

(4) The Functional Assessment of Anorexia/Cachexia Therapy (FAACT) score: consisted of 12 questions. Each question was on a 5-point Likert scale (0=not at all, 1=a little bit, 2=some-what, 3=quite a bit, 4=very much). A cut-off value ≤ 24 has been used to assess anorexia (Muscaritoli *et al.*, 2010).

In the current study, we translated the available English version of the above into Arabic appetite questionnaires (subjective assessment of appetite, self-assessment of appetite, FAACT score), and they were given in printed sheets for each patient separately.

Dietary assessment

Patients were given a plain sheet and they were asked to report the consumed diet over three days in a selected week. These days include a dialysis day, a nondialysis day and one optional weekend day (Fouque *et al.*, 2007). The total energy (Kcal/day) and nutrients intake calcium, phosphorous, sodium, potassium, and water were calculated. The mean energy and nutrients intake over these three days were used in statistical analysis.

Quality of life assessment

It was evaluated by using the Kidney Disease Quality of Life Short form questionnaire Arabic version (Abd ElHafeez *et al.*, 2012).

Assessment of anxiety

Anxiety was evaluated by Hamilton Anxiety Rating Scale (HARS) (Hamilton, 1959) that consisted of 14 items to evaluate the physical, psychological, and behavioral aspects of anxiety.

RESULTS

The present study was carried out on 162 cases. Their age ranged from 20 to 65 with mean of 48.72 years. Most of the studied patients were males (57.4%). One hundred and fifteen cases (71%) were from rural residence, while 47 (29%) were from urban ones. One hundred and thirty-nine cases (85.8%) were not working, 134 (82.7%) were married. 14.8% were smokers.

For the appetite assessment using subjective assessment questionnaire 44.4% of the cases reported having a good appetite, 13% reported decreased appetite using self-assessment of appetite. The Median Visual Analogue Scale score was 80. The mean score for the Functional Assessment of Anorexia/Cachexia Therapy score was 15.85 (Table 1).

Table 2 demonstrates that there was statistically significant difference of quality-of-life score domains among cases with diminished appetite and those with normal appetite using subjective assessment of appetite.

Table 3 shows that there was no statistically significant difference of quality-of-life domain scores and self-assessment of appetite.

Table 4 demonstrates that there was statistically significant positive correlation between VAS and quality of life main domains as following; Physical functioning ($p=0.002$), Role physical ($p=0.002$), Pain ($p=0.003$), General health ($p=0.023$), emotional well-being ($p=0.006$), role emotional ($p=0.014$), social functioning ($p=0.004$) and energy ($p=0.001$).

However, there was a statistically significant negative correlation between the FACCT score main and domains of quality of life as following; physical functioning ($p=0.003$), role physical ($p=0.000$), pain ($p=0.000$), emotional well-being ($p=0.000$), role emotional ($p=0.001$), social functioning ($p=0.002$) and energy ($p=0.001$).

Table 5 illustrates that there was statistically significant negative correlation between BMI and the general health domain of quality of life ($p=0.025$), statistically significant positive correlation between energy requirement, Carbohydrate intake and protein intake with all domains of quality of life. Fat and water intake also have statistically significant positive correlation with role emotional, social functioning and energy intake. Sodium intake have statistically significant positive correlation with general health domain while potassium has statistically significant positive correlation with the following domains; general

health, role emotional, social functioning and energy. Calcium and phosphorus have statistically significant positive correlation with social functioning.

Table 6 demonstrates that there was statistically significant higher mean HARS among cases with diminished appetite than with normal appetite by subjective assessment ($p<0.001$).

Table 1: Appetite assessment among studied cases

Subjective assessment of appetite	N=162 (%)
Very poor	5 (3.1)
Poor	15 (9.3)
Fair	51 (31.5)
Good	72 (44.4)
Very good	19 (11.7)
Self-assessment of appetite	
Increased	13 (8.0)
Decreased	21 (13.0)
Did not change	128 (79.0)
Visual Analogue Scale (VAS)	
mean±SD	69.88±25.47
Functional Assessment of Anorexia /Cachexia Therapy (FAACT) score	
mean±SD	15.85±5.11

Table 2: Association between Subjective-assessment of appetite and quality of life among studied cases

Quality of life	Subjective assessment of appetite		test of significance
	normal N=91	Diminished n=71	
Physical functioning	65 (5–95)	35 (0–90)	$z=5.09$ $p<0.001^*$
Role physical	50 (0–100)	0 (0.0–100.0)	$z=4.33$ $p<0.001^*$
Pain	57.5 (0–100)	32.5 (0–90)	$z=5.71$ $p<0.001^*$
General health	30 (0–95)	15 (0–80)	$z=4.82$ $p<0.001^*$
Emotional well being	68 (20–100)	56 (16–80)	$z=4.38$ $p<0.001^*$
Role emotional	100 (0–100)	100 (0–100)	$z=3.75$ $p<0.001^*$
Social functioning	62.5 (0–100)	25 (0–100)	$z=5.17$ $p<0.001^*$
Energy	50 (5–90)	25 (0–75)	$z=5.80$ $p<0.001^*$

Z: Mann Whitney; U test; *statistically significant; p: probability; Parameters described as median (range).

Table 3: Association between Self-assessment of appetite and quality of life among studied cases

Quality of life	Self-assessment of appetite			test of significance
	Increased N=13	Decreased N=21	Did not change N=128	
Physical functioning	40 (5–80.0)	40.0 (10.0–90.0)	52.5 (0–95)	KW $p=0.393$
Role physical	0 (0–50)	0 (0–100)	25 (0–100)	KW $p=0.07$
Pain	45 (0–90)	42.5 (0–90)	55 (0–100)	KW $p=0.27$
General health	30 (0–95)	20 (0–80)	25 (0–80)	KW $p=0.625$
Emotional well being	60 (24–92)	52 (24–96)	64 (16–100)	KW $p=0.146$
Role emotional	0 (0–100)	33.33 (0–100)	66.67 (0–100)	KW $p=0.582$
Social functioning	50 (0–100)	37.5 (0–100)	50 (0–100)	KW $p=0.267$
Energy	50 (5–80)	35 (10–75)	42.5 (0–90)	KW $p=0.641$

KW: Kruskal Wallis test; p : probability; Parameters described as median (range).

Table 4: Correlation between FAACT score, VAS score & quality of life among studied cases

	FAACT	VAS
Physical functioning		
r	-0.233*	0.246*
P	0.003	0.002
Role physical		
r	-0.399*	0.244*
P	0.000	0.002
Pain		
r	-0.282*	0.229*
P	0.000	0.003
General health		
r	-0.110	0.179*
P	0.164	0.023
emotional well being		
r	-0.310*	0.214*
P	0.000	0.006
role emotional		
r	-0.269*	0.193*
P	0.001	0.014
social functioning		
r	-0.247*	0.224*
P	0.002	0.004
Energy		
r	-0.254*	0.262*
P	0.001	0.001

r : Spearman correlation co-efficient; * Statistically significant.

Table 5: Correlation between quality of life domains and dietary intake, Body Mass Index among studied cases

	General health	Emotional well being	Role emotional	Social functioning	Energy
Body Mass Index(BMI), kg/m ²					
<i>r</i>	-0.177*	-0.088	-0.003	-0.081	-0.102
<i>P</i>	0.025	0.267	0.965	0.308	0.197
Energy, kcal/kg/day					
<i>r</i>	0.274**	0.205**	0.263**	0.427**	0.345**
<i>P</i>	<0.000	0.009	0.001	0.000	0.000
Protein, g/day					
<i>r</i>	0.190*	0.173*	0.187*	0.356**	0.284**
<i>P</i>	0.015	0.028	0.017	0.000	0.000
Fat, g/day					
<i>r</i>	0.119	0.128	0.193*	0.188*	0.173*
<i>P</i>	0.132	0.105	0.014	0.017	0.027
Carbohydrate, g/day					
<i>r</i>	0.245**	0.174*	0.210**	0.400**	0.355**
<i>P</i>	0.002	0.026	0.007	0.000	0.000
Calcium, mg/day					
<i>r</i>	0.146	0.043	0.014	0.211**	0.130
<i>P</i>	0.064	0.586	0.863	0.007	0.100
Phosphorus, mg/day					
<i>r</i>	0.125	0.140	0.123	0.332**	0.176*
<i>P</i>	0.114	0.076	0.119	0.000	0.025
Sodium, mg/day					
<i>r</i>	0.161*	0.081	0.149	0.126	0.142
<i>P</i>	0.040	0.303	0.058	0.109	0.071
Potassium, mg/day					
<i>r</i>	0.183*	0.063	0.193*	0.304**	0.271**
<i>P</i>	0.019	0.424	0.014	0.000	0.000
Water, g/day					
<i>r</i>	0.152	0.114	0.203**	0.259**	0.274**
<i>P</i>	0.054	0.148	0.009	0.001	0.000

r: Spearman correlation co-efficient; *Statistically significant.

Table 6: Association between Subjective-assessment of appetite and Hamilton Anxiety Rating Scale (HARS) among studied cases

	Subjective assessment of appetite		
	normal N=91	Diminished n=71	test of significance
HARS	19.24±6.10	24.03±6.22	T = 4.91 <i>p</i> <0.001*

t: Student *t* test; *statistically significant.

DISCUSSION

Appetite assessment in 162 End stage renal disease patients on maintenance hemodialysis using subjective appetite assessment tool, showed that patients who reported very good/good appetite were 56.1%, those who had fair appetite were 31.5%, those who had poor/very appetite were 12.4%. Bossola *et al.*, who reported that in 90 HD patients, appetite was constantly very good/good in 47.8% patients, fair in 24.4% patients, poor/very poor

in 27.8% patients (Bossola *et al.*, 2013). Also, Burrowes *et al.*, demonstrated that in 1846 HD patients, those who reported very good/good appetite were 67.3%, fair appetite were 23.8%, poor/very poor appetite in 8.8% (Burrowes *et al.*, 2005).

While appetite assessment using self-appetite assessment tool showed that patients who reported increased appetite were 8%, decreased appetite were

13%, no change in appetite were 79%. These findings correlate with the findings of Kalantar-Zadeh *et al.*, who reported that patients who showed improved appetite were 7%, worsened appetite were 13%, no change in appetite were 80% (Kalantar-Zadeh *et al.*, 2004). Molfino *et al.*, reported that anorexia prevalence among HD patients was 12% by self-assessment of appetite (Molfino *et al.*, 2016). The mean VAS among studied cases was (69.88). Zabel *et al.*, reported that the mean VAS of 62 HD patients was 49 (Zabel *et al.*, 2012).

We found that patients with diminished appetite had significantly lower scores in all domains in QoL than patients with normal appetite, as assessed by subjective assessment of appetite and this agreed with Zabel *et al.*, who concluded that HD patients with reduced appetite had significant lower in all domains in QoL (Zabel *et al.*, 2012). Also, Sahathevan *et al.*, who reported that patients with poorer appetite ratings had significantly lower SF-36 total scores (Sahathevan *et al.*, 2015).

Also we found that patients with diminished appetite had significant higher anxiety scores than patients with normal appetite suggesting that anxiety could lead to diminished appetite, which is in agreement with Bossola *et al.*, who reported a significant association between poor appetite and symptoms of anxiety (Bossola *et al.*, 2012). Evidences show that appetite may be suppressed by stress which can produce a brain inflammatory response (Wallis and Hetherington, 2009).

CONCLUSION

Hemodialysis patients with diminished appetite had significantly lower scores in all domains in QoL than patients with normal appetite. Hemodialysis patients with diminished appetite had significant higher anxiety scores than patients with normal appetite.

ACKNOWLEDGEMENTS

None.

CONFLICTS OF INTEREST

There are no conflicts of interest.

REFERENCE

- Abd ElHafeez S, *et al.*, (2012). Cultural adaptation and validation of the 'Kidney Disease and Quality of Life-Short Form (KDQOL-SF) version 1.3' questionnaire in Egypt. *BMC Nephrol* 13:170.
- Arezzo di Trifiletti A, *et al.*, (2013). Comparison of the performance of four different tools in diagnosing disease-associated anorexia and their relationship with nutritional, functional and clinical outcome measures in hospitalized patients. *Clin Nutr* 32:527–32.
- Bossola M, *et al.*, (2004). Anorexia and serum leptin levels in hemodialysis patients. *Nephron Clin Pract* 97:c76–82.
- Bossola M, *et al.*, (2006). Anorexia in hemodialysis patients: an update. *Kidney Int* 70:417–22.
- Bossola M, *et al.*, (2012). Relationship between appetite and symptoms of depression and anxiety in patients on chronic hemodialysis. *J Ren Nutr* 22:27–33.
- Bossola M, *et al.*, (2013). Appetite course over time and the risk of death in patients on chronic hemodialysis. *Int Urol Nephrol* 45:1091–1096.
- Burrowes JD, *et al.*, (2005). Self-reported appetite, hospitalization and death in haemodialysis patients: findings from the Hemodialysis (HEMO) Study. *Nephrol Dial Transplant* 20:2765–74.
- Carrero JJ, *et al.*, (2007). Comparison of nutritional and inflammatory markers in dialysis patients with reduced appetite. *Am J Clin Nutr* 85:695–701.
- Dukkipati R, Kopple JD. (2009). Causes and prevention of protein-energy wasting in chronic kidney failure. *Semin Nephrol* 29:39–49.
- Fouque D, *et al.*, (2007). EBPG guideline on nutrition. *Nephrol Dial Transplant* 22 (Suppl 2):ii45–87.
- Hamilton M. (1959). The assessment of anxiety states by rating. *Br J Med Psychol* 32:50–5.
- Hollingdale R, Sutton D, Hart K. (2008). Facilitating dietary change in renal disease: investigating patients' perspectives. *J Ren Care* 34:136–42.
- Kalantar-Zadeh K, *et al.*, (2004). Appetite and inflammation, nutrition, anemia, and clinical outcome in hemodialysis patients. *Am J Clin Nutr* 80:299–307.
- Molfino A, *et al.*, (2016). Validating appetite assessment tools among patients receiving hemodialysis. *J Ren Nutr*. 26:103–10.
- Muscaritoli M, *et al.*, (2010). Consensus definition of sarcopenia, cachexia and pre-cachexia: joint document elaborated by Special Interest Groups (SIG) 'cachexia-anorexia in chronic wasting diseases' and 'nutrition in geriatrics'. *Clin Nutr* 29:154–9.
- Palmer SC, *et al.*, (2015). Dietary and fluid restrictions in CKD: a thematic synthesis of patient views from qualitative studies. *Am J Kidney Dis* 65:559–73.
- Sahathevan S, *et al.*, (2015). Assessing protein energy wasting in a Malaysian haemodialysis population using self-reported appetite rating: a cross-sectional study. *BMC Nephrol*. 16:99.
- Wallis DJ, Hetherington MM. (2009). Emotions and eating. Self-reported and experimentally induced changes in food intake under stress. *Appetite* 52:355–62.
- Zabel R, *et al.*, (2009). Assessment of subjective appetite sensations in hemodialysis patients. Agreement and feasibility between traditional paper and pen and a novel electronic appetite rating system. *Appetite* 52:525–7.
- Zabel R, *et al.*, (2012). Relationships between appetite and quality of life in hemodialysis patients. *Appetite* 59:194–9.