Nursing Section

Is there a Relationship between Quality of Life, Anxiety, Physical Activity and Physical Performance among Maintenance Haemodialysis Patients?

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ABSTRACT

Introduction: The Maintenance Haemodialysis (MHD) patients often experience poor Quality Of Life (QOL), low physical activity and performance, increased anxiety level. The overlapping between these factors and its effect in life quality is incomprehensible.

Aim: To determine the relationship between QOL, anxiety, physical activity and performance in MHD Patients.

Materials and Methods: A cross-sectional, descriptive study was conducted on 68 patients selected from four Haemodialysis (HD) Unit at Shebin El-Koom city Menoufia Governorate, Egypt from February 2020 to April 2020. Total 68 MHD patients were taken according to the selected criteria. Tools of the study were demographic data sheet, Kidney Disease and Quality Of Life (KDQOL™-36), Beck Anxiety Inventory (BAI), 6 Minute Walk Test (6-MWT) and the 30 seconds Sit to Stand Test. Pearson's correlation co-efficient was used. The level of significance for all statistical tests was set at p-value <0.05.

Results: The mean±SD age of the MHD patients was 59.73±11.45 years. A 58.8% of the participants were males. Total 67.7% of patients experienced severe anxiety. The mean and standard deviation of (6-MWT) and the 30 seconds Sit to Stand Test were 191.74±97.05 meters and 7.74±2.34 cycles, respectively. The BAI was negatively correlated with KDQOL, physical activity and Physical Performance (PP) where the r and p-values were (r=-0.36, p-value= 0.03; r=-0.87, p-value=0.001; r=-0.73, p-value=0.001, respectively). There was a positive correlation between KDQOL score and physical activity (r=0.40, p-value=0.01).

Conclusion: The study concluded that there were associations between the variables and recommended that greater attention should be paid to regular evaluations of QOL, anxiety, and physical activity. It also recommended treating anxiety effectively to help improve QOL, physical activity, and performance.

INTRODUCTION

Chronic Kidney Disease (CKD) turns out to be one of the main health issues. Worldwide, the CKD patients continue to increase. A survey study for 44 countries reported that the international prevalence of CKD is 13.4% [1]. Over 2,000,000 patients were affected by End Stage Renal Disease (ESRD) and undergoing maintained dialysis [2]. It is estimated that the prevalence of ESRD will rise over the next several decades, attributed to increasing prevalence of diabetes, hypertension, and increasing average of age [3]. It is anticipated that the use of renal replacement therapy will be double to five and a half millions people by 2030 with high prevalence in Asia [4].

In Egypt, according to Annual Report of the Egyptian Renal Data System in 2018, the total number of patients with ESKD was 6,757, about 58% of them were males and 42% were females, 50% of the patients have ages ranged from 45-64 years. "The prevalence rate of end stage renal failure in Menoufia Governorate was 483 pmp. The mean age was 53.18±13.26 years "the highest percentage of patients (36.6%) was aged between 50 and 60 years" there were 61.6% male and 38.4% female patients" [5].

The individuals with chronic renal disease under Maintenance Haemodialysis (MHD) reported low level Daily Physical Activity (DPA) and PP. This is a source of distress as the low DPA and PP are linked with bad outcomes in Haemodialysis (HD) patients [6,7]. The decrease in the activity level and Physical Performance (PP) possibly will contribute to protein energy wasting muscle weakness which in turn leads to atrophy in the skeletal muscle [8,9]. Furthermore, decrease mobility and reduction in the physical function have linked to high risk of cardiovascular mortality [9].

The common psychiatric problems that are associated with renal impairment are anxiety and depression [10]. There are varieties of factors seem to trigger or aggravate level of anxiety among MHD patients. The main factors for anxiety and depression are cognitive and physical impairment, limitations in daily life, compliance with the therapeutic regime including limitations in the diet, exhaustion, the fear of death, inability to do earlier roles within the family and society also, the dependency upon treatment and health staff [11].

World Health Organisation (WHO) defined Health Related Quality of Life (HRQoL) as "the subjective assessment of the impact of disease and its treatment across the physical, psychological, and social domains of functioning and well-being" [12]. Health related quality of life is also a predictive indicator of the outcome of the disease as well as a research tool in assessing the effectiveness of therapy, patients' survival and hospitalisations [13].

Because patients with ESRD require life-long treatment as maintenance dialysis, the QOL of these patients may significantly impair [14]. Quality Of Life (QOL) is so important, because it is a predictive indicator of the outcome of the disease and degree of patient's compliance with disease and it is an essential tool to develop better plans of and recommended routine in the clinical practice [14].

The assessment of anxiety also has great importance in HD patients because the psychological state negatively impact on QOL and patient's compliance [15]. The assessment of PP and activity used as predictors of loss of independence and it is essential to predict the patient's risk and to find patients in need of exercise training to address them to community-based or rehabilitative programs [16]. The association between anxiety physical activity and performance

and QOL is recursive, and poorly recognised. In the current study the aim was to check the relationship between anxiety level, physical activity, PP and QOL in MHD patients in HD units at Shebin El-Kom city, Menoufia Governorate, Egypt.

MATERIALS AND METHODS

This cross-sectional, descriptive study was conducted from February 2020 to April 2020, where data were collected from four HD units at Shebin El-Kom city, Menoufia Governorate (Teaching Hospital, Menofia University Hospital, Teachers Hospital and Fevers Hospital). The present study was approved from the Research and Ethics Committee at the Faculty of Nursing, Menoufia University (IRB reference number: 85). Moreover, the patient who agreed to participate in the study gave oral consent after detailed explanation of purpose of the study and research methodology.

All patients of MHD from four selected Governmental Hospitals at Shebin El-Kom city that followed the selection criteria and agreed to participate in the study formed the convenient sample size of 68 patients.

Inclusion and Exclusion criteria: The MHD patients age more than 18 years, were not hospitalised in the last three months, not using any assistive device for walking and able to ambulate independently were included in the study. The patients having acute infections, current organ failure (heart failure, lung failure, liver failure), or active cancer, cognitive impairment, dementia, active psychosis or patients on dialysis since less than three months were excluded from the study.

Data Collection Tools

All selected patients were asked to fill demographic data sheet and given an appointment to be interviewed by the researchers at the Hospital HD unit on the day after HD session. Every patient was interviewed by the researchers separately to maintain confidentiality and avoid contamination. The researchers carried out four to five interviews every other day for three months. Each interview last about 45 to 60 minutes at which the following actions were taken with the same order for every patient.

Demographic data sheet

It was developed by the researcher and composed of seven questions such as age, gender, marital status, education, occupation, total income, and kind of health insurance.

Kidney Disease and Quality of Life™-36 (KDQOL™-36): The KDQOL™-36 was developed by [17] and used by the researchers to assess HD patient's QOL. The questionnaire included 36 questions organised into four subscales.

- Subscale I Physical and mental component: It included 12 questions (Q1-12) about patient general health, activity limitations, tasks accomplishment ability, anxiety feelings, level of energy and social activities.

- Subscale II Burden of kidney disease: This part includes four questions (Q13-16) about how much kidney disease alters daily life, consumes time, is frustrating, or causes the patient to feel like a burden.

- Subscale III Symptoms and problems: This part includes 12 questions (Q17-28) about how the patient feels by muscles sore, chest pain, muscle cramps, hands or feet numbness, itchy dry skin, shortness of breath, faintness, dizziness, nausea, anorexia, feeling drained, or dialysis access problems.

- Subscale IV Effect of kidney disease on Quality of Life (QOL): This part includes eight (Q29-36) about how patients bother to fluid restrictions, dietary restrictions, work house or travel limitations, sexuality limitations, dependency on staff persons, stress or worries, and appearance of changes.

- Scoring of KDQOL: The questionnaire was scored using lyda score between 0 and 100 the higher scores indicating better QOL. The standardised breakpoints are:

  - Bad health and low QOL: 0-25

  - Moderate health and QOL: 25-50

  - Good health and high QOL: 50-100

- Validity and reliability of KDQOL were tested by [18] they concluded that reliability of each KDQOL-36™ subscale was very good (Cronbach's alpha >0.8). Construct validity was supported by the negative correlation between KDQOL subscales scores and the Beck Depression Inventory (r=-0.56 to -0.61, p-value <0.0001).

Beck Anxiety Inventory (BAI)

- BAI was developed by [19] and used by the researchers for measuring clinical anxiety. It is composed of 21 multiple choice questions. The patient evaluate each item on 4 point scale from zero "Not at all" to three "I could barely stand it" consistent with their symptoms of anxiety throughout the last week (such as fear of the worst happening, numbness and tingling and sweating not due to heat).

- Scoring of BAI: Full scores range from 0 to 63 while higher score are indicative to more sever anxiety. The standardised breakpoints are:

  - Minimal anxiety symptoms: 0-7

  - Mild anxiety symptoms: 8-15

  - Moderate anxiety symptoms: 16-25

  - Severe anxiety symptoms: 26-63

- Validity and reliability were tested [20] their results showed that the tool is reliable (r=0.84, p-value <0.01) when they used test-retest reliability at 8-10 weeks interval. Moreover, they illustrated that BAI had satisfactory validity results with the anxiety (r=0.86, p-value <0.01), somatisation (r=0.81, p-value <0.01), obsessive compulsive (r=0.60, p-value <0.01), and phobic anxiety (r=0.63, p-value <0.01).

Minute Walk Test (6-MWT)

- The 6-MWT was developed by [21] and used by the researchers to assess patient's physical activity. The test assesses the distance participants walked over a total of six minutes on a hard, flat surface. The patient walked the maximum distant in six minutes. The patient is allowed to self-pace and rest as needed as they traverse back and forth along a marked walkway.

- Validity and reliability were tested by [21] and reported a good test-retest reliability r=0.88, convergent validity with moderate correlation r=0.71, while construct validity was assessed by determining scale ability to detect differences among different age groups and level of activity which shows significant decrease across decades and high relation with reported activity level.

30 seconds Sit to Stand test

- It is the second test used by the researchers to assess patient's Physical Performance (PP). The Sit to Stand test measures number of Sit to Stand cycles completed in 30s.

- Validity and reliability were tested by [22] who found that Pearson's correlation co-effiecient between the 30s Sit to Stand test and timed up and go scale was significant (r=0.64, p-value <0.001) which means that Sit to Stand test is a valid measure of physical mobility in adults and the interclass correlation co-efficient was 0.95 which indicates excellent relative reliability of the test.

Data collection methods

- Researchers gave the patient a complete clarification of each PP test (6-MWT and sit to stand test).

- The patient was asked to start with 6-MWT and the researcher measured the distance that he/she walked going and backing along 20 meters horizontal hall during a six minutes period of time while he/ she was repetitively encouraged to hurry as possible.

- Note: Study participants could rest, stop, or slow down walking if he/she wished while the six minutes timer was kept running.

- After completion of the 6-MWT patient was allowed to rest for 2 to 3 minutes and then start Sit to Stand test. The patient was asked to rise from full seated position to full standing position and then return to the beginning full seated position as recurrently as possible over 30 seconds period with reinforcement. The researchers count number of Sit to Stand of patient's cycles completed during 30 seconds.

- The patient was allowed to sit down on a comfortable chair facing the researcher, and the researcher started to communicate with the patients ask questions aiming to take patient response that fills out Interviewing Questionnaires (KDQOL and BAI) without any interruptions or giving direction to any specific response.

STATISTICAL ANALYSIS

Descriptive statistics were used in explaining demographic data. Quantitative variables were summarised using mean and standard deviation while categorical variables were summarised using frequencies and percentage. Pearson's Correlation Co-efficient was used. The level of significance for all statistical tests was set at p-value <0.05. All statistical measures were performed through the Statistical Package for Social Sciences (SPSS) version 25.0.

RESULTS

The mean±SD age of the MHD patient was 59.73±11.45 years. Most of the participants have age more than 60 years. Participant characteristics are presented in the [Table/Fig-1].

Variables	Frequency N (%)
Age groups (years)	
20-39	8 (11.8%)
40-59	14 (20.6%)
>60	46 (67.6%)
Gender	
Males	40 (58.8%)
Females	28 (41.2%)
Marital status	
Married	54 (79.4%)
Unmarried	14 (20.6%)
Occupation	
Full time	22 (32.4%)
Part time	20 (29.4%)
Retired	16 (23.5%)
Out of work	10 (14.7%)
Education	
Illiterate	4 (5.9%)
Primary	18 (26.5%)
Secondary	20 (29.4%)
High	26 (38.2%)
Income by EGP (Egyptian pound)	
<1500	18 (26.5%)
1500 – 4000	30 (44.1%)
>4000	20 (29.4%)
Kind of health Insurance	
Private	14 (20.6%)
None	22 (32.4%)
Governmental	32 (47.1%)

[Table/Fig-1]: Characteristics of the participants (n=68).

Scores of Quality of Life (QOL), anxiety, physical activity and Physical Performance (PP) of the study sample

[Table/Fig-2] showed that 26 (38.2%) subjects of the MHD patients were with low QOL, 28 (41.2%) were with moderate QOL and 14 (20.6%) were with high QOL.

|	Low	Moderate	High
QOL categories	38.20%	41.20%	20.60%
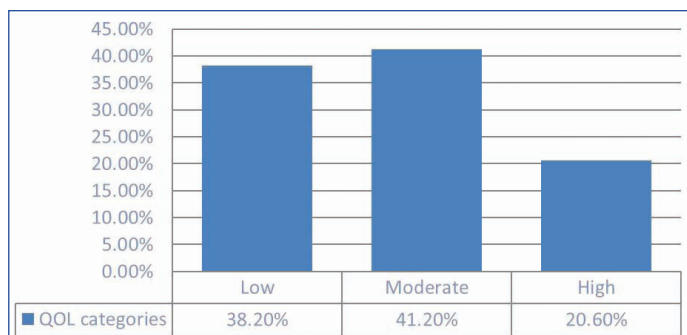
[Table/Fig-2]: Quality of Life categories among MHD patients.

[Table/Fig-3] showed the mean±SD for the total score for QOL, physical and mental component, burden of kidney disease, symptoms and problems and effect of kidney disease on QOL of the MHD patients were (37.02±21.57, 36.5±22.38, 23.52±34.09, 43.77±18.03, 44.3±17.76, respectively) that indicates moderate health and impaired QOL.

Items	Mean±SD	Interpretation
Physical and mental component	36.5±22.38	Moderate health and QOL
Burden of kidney disease	23.52±34.09	Bad health and Low QOL
Symptoms and problems	43.77±18.03	Moderate health and QOL
Effect of kidney disease on QOL	44.3±17.76	Moderate health and QOL
Total QOL score	37.02±21.57	Moderate health and QOL

[Table/Fig-3]: The mean and standard deviation of KDQOL™-36 score and its subscales (n=68).

[Table/Fig-4] revealed that 6,8.8% subjects of the MHD patients were with minimal anxiety, 4,5.9% with mild anxiety, 12,17.6% with moderate anxiety and 46,67.7% were with severe anxiety.

	Minimal	Mild	Moderate	Severe
Anxiety Levels	8.80%	5.90%	17.60%	67.70%
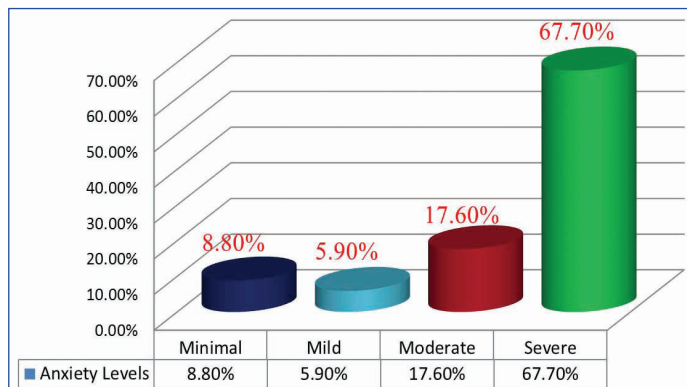
[Table/Fig-4]: Anxiety levels of study participants.

[Table/Fig-5] illustrated that, the mean±SD BAI of the MHD patients was 33.55±16.14 that indicates severe anxiety. The mean 6-MWT and the 30 seconds Sit to Stand test were 191.74±97.05 meters and 7.74±2.34 respectively.

Variables	Mean±SD	Interpretation
BAI	33.55±16.14	Sever anxiety
6-MWT	191.74±97.05	Low value
30 seconds Sit to Stand test	7.74±2.34	Low value

[Table/Fig-5]: The mean and standard deviation of BAI score, 6 minute Walk distance, 30s Sit to Stand test in the MHD patients (n=68).
SD: Standard deviation

Correlation between QOL and physical activity performance:

The correlation between 6-MWT and QOL were significant positive

moderate correlation with physical and mental component (r=0.376, p=0.02) [Table/Fig-6].

Variables	6 Minute Walk test (6-MWT)		30s sit to stand test		BAI	
	r-value	p-value	r-value	p-value	r-value	p-value
Physical and mental component	0.376	0.02*	0.242	0.16	-0.374	0.02*
Burden of kidney disease	0.371	0.03*	0.185	0.29	-0.343	0.04*
Symptoms and problems	0.377	0.02*	0.301	0.08	-0.30	0.06
Effect of kidney disease on QOL	0.403	0.01*	0.26	0.13	-0.29	0.09
Total QOL	0.406	0.01*	0.253	0.14	-0.361	0.03*
Beck anxiety inventory	-0.875	0.001*	-0.737	0.001*	-	-

[Table/Fig-6]: The correlation between QOL, anxiety and physical activity performance in the MHD patients (n=68).
r value is Pearson correlation co-efficient value; p-value is probability value
*p-value <0.05 was considered as statistically significant

Correlation between BAI and physical activity performance: The correlation between 6-MWT and BAI was significant negative strong correlation (r=-0.875, p-value=0.001). The correlation between 30s Sit to Stand test and BAI was significant negative strong correlation (r=-0.737, p-value=0.001) [Table/Fig-6].

Correlation between QOL and BAI: The correlations between BAI and QOL were significant negative moderate correlation with physical and mental components (r=-0.374, p-value=0.02), Burden of kidney disease (r=-0.343, p-value=0.04) and total QOL (r=-0.361, p-value=0.03), while were weak negative non significant correlations with symptoms and problems (r=-0.30, p=0.06) and effect of kidney disease on QOL (r=-0.29, p=0.09) [Table/Fig-6].

DISCUSSION

Chronic Kidney Disease (CKD) patients undergoing HD often have QOL, anxiety, decreased DPA, and PP [23,24]. There are little researches about the effect of these above mentioned factors in QOL in MHD. So the authors conducted the present study as a trial to investigate the degree to which QOL was associated with anxiety, level, DPA and PP.

More than two-thirds of the participants had age more than 60 years, this is in agreement with study conducted previously, which reported CKD is common in older people and its occurrence increases in parallel with age and this may be due to that Glomerular Filtration Rate (GFR) declines in with age progress [25,26]. The number of men in the study more than women, this finding in line with Thio CH et al., who decelerated that the incidence of CKD tends to be higher in females, but the disease is more severe in men, so the males have a higher prevalence of end-stage renal disease [27]. Most of the study participants are highly educated, this is different with study by Alam MB et al., where most participants with CKD had low educational level [28].

The mean total QOL score among subjects of the study was 37.02±21.57 which pointed to moderate health QOL for the participants and the percentage of those with impaired QOL (<50) were 79.4% QOL. In similar study done by Alam MB et al., for subjective valuation of the QOL of HD patients and understanding the distribution of scale component scores among the selected sample, they reported that the HD patient included with impaired life style were 97.7% of the study subjects and they got on low score in all QOL domains [28]. The study results were also supported by study done by Joshi U et al., and Mollaoğlu M, as concluded that HD affects the life style of the patients and their families. So the physical, psychological, socioeconomic, and environmental aspects of life are affected negatively and lead to compromised QOL, thus patients with CKD on dialysis had overall low QOL scores in all four domains. The low QOL among HD patients usually because the HD

treatment is costly, time consuming, and long-term HD treatment often results in loss of freedom, dependence on caregivers, defect in marital relations, alteration in the social role, decreased financial income or an inability to spend [14,29].

The mean BAI score of studied subjects in the present study was 33.55 and more than two-thirds of them (67.7%) had severe anxiety. This agreed with study findings done by Sharma M, to assess the state anxiety among (MHD) patients concluded that 34.3% of patients had extreme level of state anxiety, 21.4% had severe level of state anxiety patients [30].

The mean 6-MWT was 191.74±97.05; the value is low when compared with the standard level in the healthy individuals (571±90 m), study done by Sharma M and Casanova C et al., to identify new reference values for better interpretation of 6MWD [30,31]. The results also showed that the 30s Sit to Stand test was (7.74±2.34) and this is a low value when compared healthy individuals. The mentioned findings were in line with studies conducted by Kim JC et al., and Painter P and Marcus RL, to measure physical activity throughout the day and physical function in adult MHD patients, and concluded that the DPA and PP are noticeably impaired in HD patients [24,32].

In present study, BAI and QoL showed presence of significant negative moderate correlation with the total score of KDQOL, physical and mental components, burden of kidney disease and which suggested that anxiety may be reason for the impaired QOL in HD patients. These results were similar to study done by Li YN et al.,that showed showed BAI score inversely correlated with the overall score, physical health and mental health components scores of KDQOL [23]. The results also were also supported by study done by Rebollo RA et al., that assured presence of a statistically significant relationship between anxiety amount and QOL in HD patients [33].

In regards to the association of physically active and PP with the QOL and anxiety; there were significant positive moderate correlation between 6-MWT and all components of QOL. The findings also indicated a significant negative strong correlation between 6-MWT, the 30s Sit to stand test and BAI. Study done by Zhang M et al., concluded that higher BAI score was associated with impaired physical activity and performance in HD patients [34,23]. The results also agreed these findings in a study to examine the association between QOL PP, physical activity, anxiety and depression they told that PP score correlated with several KDQOL components. These data recommends that managing the anxiety for the patients with MHD patients may improve their QOL, physical activity and possibly PP.

Limitation(s)

The sample size was small as many patients in the selected setting did not meet the inclusion criteria or refused to participate and this limited ability to generalise study results. Most of the study participants aged more than 60-year-old which may have affected patient\physical activity and performance.

CONCLUSION(S)

The study findings indicated impaired QOL, low PP and high anxiety level among MHD patients. It showed presence of negative moderate correlation for BAI score with KDQOL, physical activity and PP score it also displayed that KDQOL had positive moderate correlation with 6-MWT. The study recommended that, evaluation of QoL, anxiety level, physical activity and performance in MHD patients in a regular manner to ensure patient compliance and detect any deterioration early and investigate associated factors, provide great attention for management of anxiety because this may improve QOL and PP in MHD patients and replication of the study to confirm and generalised results.

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