

Exploring the Quality of Life of Jordanian Children and Adolescents with End Stage Renal Disease Receiving Hemodialysis

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Abstract

Background: Depression is a common psychosocial problem that negatively affects the lives and relationships of school-age children, adolescents, and adults both in private and public.

Purpose: To explore the psychosocial well-being among Jordanian school-age children and adolescents who are complaining of end stage renal disease (ESRD) undergoing hemodialysis.

Method and Design: The study was carried out using a descriptive cross-sectional correlation design. A convenient sample of 121 school-age children and adolescent were recruited from seven major dialysis units in Jordan . The children's psychosocial well-being was measured by using a self-report questionnaire. This, however, includes demographic data, adherence to treatment, Dialysis Patient-Perceived Exercise Benefits, and Barriers Scale. Also, Pediatrics Quality of Life PedsQL 3.0 ESRD and Depression Scale for Children were used for data collection.

Result: 89.2% (n = 108) of school-age children and adolescents had depression symptoms. There was impaired level of their QoL, a large

negative correlation between their QoL, and a depression symptoms ($r = -0.56, p < .001$). There was a significant positive correlation between their QoL and age ($r = 0.326 P < 0.001$).

Conclusion: This study provides preliminary evidence to develop perceptive nursing procedure to assess and manage depression, enhance QoL, and promote adherence of the treatment of school-age children and adolescents on haemodialysis.

Keywords: children and adolescent, hemodialysis, ESRD, QoL, depression symptoms, adherence to treatment

Introduction

Despite many significant developments in medical treatment, end-stage renal disease (ESRD) remains a serious and life-threatening illness (Goldstein, 2009). In contrast to the adult population, little is known regarding health-related quality of life and exercise tolerance in children with ESRD undergoing chronic intermittent hemodialysis (Darbyshire, 2006). Thus, optimal care for children with ESRD now requires assessment of health-related quality-of-life factors. This helps to determine the impact of the disease and treatment on children's well-being to facilitate successful transition into adulthood.

Depressive symptoms are the most common mental problem, and they are independent predictor of decreased quality of life (QoL) in children and adolescents with ESRD (Bakr, Amr, Sarhan, et al., 2007). The prevalence of depression is about 3–5% in children and around 8% in adolescents, with a female predominance (Perera, 2008). The presence of depressive symptoms is about 15%. Thus, these frequencies increase in patients with chronic disease (Kimmel, 2002; Bakr, Amr, Sarhan, et al., 2007). Depressive symptoms are present in more than 30% of patients with ESRD receiving hemodialysis that causes poor quality of life (Lew & Piraino, 2005). Thus, very limited data is available regarding exercise tolerance in children with ESRD and even less on the effects of exercise training programs (Clapp, Bevington, & Smith, 2012).

In Jordan, there are lack of studies about children with chronic kidney disease. Also, there are no statistics on depression in children or adolescents. In the United States, the prevalence was mentioned in early study by Birmaher, et al. (1998). Consequently, it was stated that the major depressive disorder is approximately 1 percent of preschoolers, 2 percent of school-aged children, and 5 to 8 percent of adolescent. Depression in children does not have one specific cause. Thus, there are a number of biological, psychological, and environmental risk factors that are part of its development

(Perera, 2008). Depression is increasingly prevalent among chronic kidney disease patients such as in Taiwan (Chiang et al., 2013).

Patients with depressive symptoms report greater feelings of hopelessness. Therefore, it has a significant impact on their cognitive abilities. Hopelessness is a negative expectancy of the future that may affect an individual's skill to carry out prescribed therapies (Christensen & Ehlers, 2002). These dysfunctional beliefs add to the expectation of less effective treatment and greater feeling of fatigue that may be evidenced by decreased in quality of life, physical capacity, or nonadherence to dietary restrictions (Henkel, et al., 2002; Wing, Phelan, & Tate, 2002).

Researchers have estimated that 40% to 85% of hemodialysis adult patients are nonadherent to at least one of the treatment regimens, such as dietary nonadherence and regular exercise regimen (Krespi, et al., 2004; Stack & Murthy, 2008). However, cognitive changes associated with depressive symptoms may include impaired memory and reduced capability to focus attention on task like food preparation without distraction (Henkel, et al., 2002). Furthermore, encouragement to regular exercise training could be problematic in the presence of depressive symptoms (Milani & Lavie, 2009; Suh et al., 2002). Patients who had sleep disturbances followed no regular exercise regimen. In addition, they was diagnosed with stage three, or above, chronic kidney disease which demonstrated a significantly higher risk of depression (Chiang, et al., 2013).

So far, only a few researchers have examined the relationship between depressive disorders and health-related outcomes such as quality of life, adherence to dietary restrictions, and exercise training in adult patients with ESRD (Akman , et al., 2007; Suh, et al ., 2002; Koo, et al., 2003; Lee, et al., 2004; Vazquez, et al., 2005; Khalil, Lennie, & Frazier, 2010). Jordanian school-age children and adolescent with ESRD are suffering from a variety of disease-related stressors. Despite that, nothing had been established to evaluate the psychological status of those patients. This study takes the initial step into interventional studies that raise the psychosocial well being among Jordanian school-age children and adolescent with ESRD receiving hemodialysis.

The main purpose of this study is to explore depressive symptoms, quality of life, dietary nonadherence, and perceived barriers and benefits of exercise among Jordanian school- age children and adolescents who are complaining of ESRD undergoing hemodialysis.

Specific Aims: 1. To examine the relationships between depressive symptoms, quality of life, dietary nonadherence, and perceived benefits and barriers of exercise in school-age children and adolescents with ESRD without clinical depression. 2. To examine the relationship between the

depressive symptoms, quality of life, dietary nonadherence, perceived benefits and barriers of exercise with demographic, and clinical characteristics in Jordanian school-age children and adolescents with ESRD without clinical depression.

Review of Literature

The prevalence rate of ESRD exceeds 400 cases per million in Jordan (Annual Report, Jordan, 2012). The overall incidence per Million population in Jordan was obtained for age group (5-9 years) (n=13, rate=16.2/1000000), (10-14years) (n=10, rate=13.1/1000000), (15-19 years) (n=22, rate=31.4/1000000)(Annual Report, Jordan, 2012). Consequently, patients with ESRD require some form of renal substitute therapy to maintain life. Since 1968, hemodialysis has become an underpinning renal alternate therapy in Jordan. Thus, one out of ten American adult have some level of chronic kidney disease (CDC, kidney-disease-statistics, 2010).

On the other hand, hemodialysis is a stressful treatment related to its typical and multifaceted regimen, dietary and fluid restrictions, and it requires the use of numerous medications (Akman, et al., 2007). Depression and depressive symptoms are the most common psychological complexity with prevalence ranging from 20% to 90% in patients with ESRD receiving hemodialysis from a wide variety of conditions (Soykan, et al., 2004; Vazquez, et al., 2005). Subsequently, depressed patients receiving hemodialysis experience poorer outcomes such as a high mortality rate and reduced worth of life when compared to hemodialysis patients without depression (Lopes, et al., 2004). Behavioral and physiological mechanisms have been offered to explain the relationship between depression and reduced health product (khalil, et al., 2012; Kogon, et al., 2014; Hernandez, et al., 2011).

In Jordan, khalil, et al. (2012) conducted a descriptive correlational study. They used 190 Jordanian patients with end-stage renal disease on haemodialysis patients who were more likely to be men. Only 27% of the patients showed full commitment to diet guidelines, while 23% showed full commitment to fluid guidelines during the last 14 days. Depression ($M = 18.8 \pm 11.4$) had significant negative association with quality of life (khalil, et al., 2012). Result of Multiple regressions revealed a predictive model of only two variables: age and residual renal function for dietary non-adherence (khalil, et al., 2012). Furthermore, Kogon, et al. (2014) conducted a cross-sectional study in which they administered the Child Depression Inventory-2 (CDI-2) to 44 patients. These patients were aged 9–18 years with chronic kidney disease CKD stages. Relative risks (RR) and 95 % confidence intervals (CI) were calculated to determine associations between patient characteristics and depression status. Thus, their results indicate that

depression is common in children with CKD, particularly for those with longstanding renal disease and at CKD stage three.

Hernandez, et al. (2011), in their descriptive study, uses the Birleson Scale to determine the frequency of depressive symptomatology in children and adolescents with chronic renal insufficiency undergoing hemodialysis and chronic peritoneal dialysis. In this study, all of the patients with high occurrence of depressive symptomatology were female. However, none of them had a friend to confide in ($P=0.03$). Depressive symptomatology in patients with chronic peritoneal disease was associated with a lower weekly kidney function compared to those without depressive symptomatology.

Regardless of the massive sequence in dialysis technology and the increase in the life anticipation of patients with ESRD, their physical prognosis and the quality of their lives are still disappointing (Zheng, et al., 2009). Thus, they are suffering from more morbidity and mortality which are caused primarily by atherosclerosis, and cardiovascular diseases caused by inflammation and stress (Moinuddin & Leehey, 2008). Also, they are more vulnerable to psychological problems such as anxiety and depression, sadness, and reduced quality of life (Hothi, et al., 2013). Although they cannot perform heavy exercises due to spontaneous myocardial infarction and death, reasonable regular exercises are known to be beneficial to them both physically and psychologically (Milani & Lavie, 2009). Through this understanding, encouraging dialysis patients to practice exercise is important for therapy cause.

Around 50% of patients with ESRD dialysis do not regularly bring out exercise (Stack & Murthy, 2008). In trial study for evaluating the effect of a 6-month walking program on ESRD adult patients, Morales Lopez, et al. (2007) found that patients' physical activity, health-related quality of life post-dialysis fatigue symptoms, and their functional status were improved. Darawad, et al. (2014) found, in their study, that an aspect that can affect dialysis patients' exercise behavior is the patients' perception of exercise benefits and barriers that is different from the general population due to the clinical course and treatment (Darawad, et al., 2014). Therefore, in this study, the Perceived Benefits and Barriers of Exercise scale was used to measure school-age and adolescents' beliefs about various positive and negative factors and outcomes which is impeding and related with exercise.

In summary, depressive symptoms found in patients with ESRD receiving hemodialysis may increase symptom burden, morbidity and mortality, and decrease functional status and quality of life through its negative effect on adherence to dietary and regular exercise regimens (Darawad, et al., 2014; Milani & Lavie, 2009). Thus, this study had contributed to our understanding of the association between the presence of

depressive symptoms and quality of life, dietary adherence, and perceived benefits and barriers of exercise in Jordanian school-age children and adolescents with ESRD.

Methods

Design and Setting

A descriptive cross-sectional correlational design was carried out in this study. A convenience sample was recruited from 7 large major pediatric hospitals (one military, two public, two private, and two teaching hospitals) at three large cities in Jordan (Amman, Zarqa, and Irbid). These cities comprises of more than 80% of the total population. This, however, ensures the recruitment of a demographically diverse study population. Also, these hospitals provides haemodialysis services for children and adolescent patients with ESRD.

Sample

185 of all the haemodialysis children who came to their appointments on the scheduled time at the documented hemodialysis units met the inclusion criteria. They were encouraged for participating. Several days of the week, according to the scheduled haemodialysis sessions, were used to make the sample representative of variety of kidney dialysis patients' population in Jordan. The sample consisted of 121 patients who agreed to take part in the study.

The criteria for inclusion include the following: 1) a registered formally diagnosed dialysis patient at one of the 7 hospitals; 2) 20 years old or less; 3) on hemodialysis for at least 3 months prior to the beginning of the study; 4) confirmed diagnosis by a physician and the child is under medical management; 5) Child who is free of major psychiatric disorders or cerebrovascular disease that affects cognitive ability as confirmed by the medical record; 6) Child able to verbally communicate with researchers; and 7) Child able to be interviewed and is willing to participate in the study. Exclusion criteria include: 1) coexisting terminal illness; 2) prescribed antidepressant medication at time of recruitment; and 3) history of missing more than one hemodialysis session in the previous two weeks or shortening a dialysis session by more than 10 minutes during the previous two weeks in the absence of a medical-related reason.

Data Collection

The researcher explained the purpose of the study and the process of self reporting using a questionnaire by the participants (adolescent 12 -20 years, or caregiver of the children less than 12 years) to respond to it at the beginning of the dialysis session (as most agreed, it is a better time for

them). The study received approval from the ethics committee of the Applied Science Private University and the ethics committees at the hospitals where the sample was recruited. Each participant signed informed consent, and all information about the participants was kept strictly confidential.

Measures

A self-report Arabic questionnaire was used in this study to obtain the intended sets of measures. Thus, it consists of five parts. The first part included sociodemographic information regarding age, gender, educational level, frequency of dialysis/week, date on the current, and perception of health status of the patient including medical information about diagnosis (ESRD), duration of illness, type of treatment, age at onset, family history, complications or other diseases.

The second part which is the Center for Epidemiological Studies Depression Scale for Children (CES-DC) is a 20 item self-report depression inventory with possible scores ranging from 0 to 60. Each response to an item is scored as follows :0=Not At All, 1=A Little, 2= some, 3= A Lot. Higher CES-DC scores reflect increasing levels of depression. A study by Weissman, Orvaschel, and Padian (1980) ([https:// tn.gov/ assets/ entities](https://tn.gov/assets/entities)) as well as the Guide to Clinical Preventive Services designate the cutoff score of 15 to be suggestive of depressive symptoms in children and adolescents. Therefore, this means that scores greater than 15 might indicate significant levels of depressive symptoms. The CES-DC exhibited good internal reliability ($\alpha = .86$) and test-retest reliability ($r = .85$) by Betancourt, et al. (2012).

The third part is the 34-item Pediatrics Quality of Life PedsQL 3.0 ESRD Module which encompasses 7 scales: (1) General Fatigue (4 items), (2) About My Kidney Disease (5 items), (3) Treatment Problems (4 items), (4) Family and Peer Interaction (3 items), (5) Worry (10 items), (6) Perceived Physical Appearance (3 items), and (7) Communication (5 items). The scales are composed of parallel child self-report and parent-proxy report formats for children aged 5 to 18 years. In addition, it also comprises of a parent-proxy report format for children aged 2 to 4 years. The format, instructions, Likert response scale, and scoring method are identical to the PedsQL 4.0 Generic Core Scales. This is with higher scores indicating better HRQOL. Mean score = Sum of the items over the number of items answered. Total Score: Sum of all the items over the number of items answered on all the Scales.

The fourth part which is Dialysis Diet and Fluid Nonadherence Questionnaire (DDFQ) is a scale composed of four items. Two of these items assess dietary adherence and two assess fluid adherence. The content validity of the DDFQ was established through the evaluation of the instrument by

nephrology nurse specialists and nephrologists (Vlaminck, et al., 2001). These investigators also assessed the criterion validity of the DDFQ in patients with ESRD . This is done by comparing the gold-standard measurements of dietary adherence (interdialytic weight gain, serum potassium, phosphate, and BUN) to the DDFQ responses.

The fifth part which is the perception of dialysis patients regarding exercise benefits and barriers was measured using the Dialysis Patient-Perceived Exercise Benefits and Barriers Scale (DPEBBS) (Zheng, et al., 2009). The DPEBBS consists of 24 items (divided into 12 benefits items and 12 barriers items). It uses a 4-points Likert scale, ranging from 1 “strongly disagree” to 4 “strongly agree”. The barriers items were reversed coded. The total score ranges from 24 to 96, with the lowest scores indicating a perception of more exercise benefits and less exercise barriers. In addition to the 24 items, two open-ended questions was asked; “What other benefits do you think exercise has?” and “What other factors do you think can impede exercise participation?” Furthermore, reliability and validity were well-established by the authors of this scale on Chinese patients.

Analysis Plans

Data were analyzed using the Statistical Package for Social Sciences version 22.0 (SPSS, Inc., Chicago, IL, USA). Descriptive statistics including mean scores and standard deviation (SD) were used to organize and summarize the data. Results were reported as a number (percentage), mean and SD. Inferential statistics such as Pearson correlation coefficient (r) was used to determine the correlations between selected variables. A P -value of 0.05 or less was considered to be significant. Analysis of variance (ANOVA) test alpha 0.05 was used to analyze the relationship between QoL and depression scores, and several demographic variables such as age, gender, level of education, adherence, and perceived seriousness of illness.

Results

- Sample Characteristics

The sample of the study consisted of 121 Jordanian children and adolescents on haemodialysis. Demographic characteristics of the participants are shown in Table 1. The age of the participants ranged from 6 to 20 with a mean of 41.79 years ($SD = 4.12$). 55.4% females and most of the participants were not smokers (98.3%). In the present study, the mean duration of dialysis is 42.18 month ($SD= 30.57$). The frequency of dialysis ranged from 1 time to 7 times per week, with a mean of 3.29. In addition, the sample varied based on the level of education (Table 1).

Table 1. Characteristics of patients receiving haemodialysis N=121

Variable	n %
Educational Level	
Elementary school	35(28.9%)
Secondary school	51(42.1%)
High school	35 (28.9%)
Smoking	
Yes	2 (1.7%)
No	119 (98.3%)
Gender	
Male	54 (44.6%)
Female	67 (55.4%)
Age: Years	
School age: 6-12	38 (31.4%)
Adolescent: 13-20	83 (68.6%)
Vascular Access	
Central line	54(44.6%)
Fistula or graft	67 (55.4%)

% frequency

Table 2. Clinical manifestation of patients receiving haemodialysis N=121

Clinical manifestation	mean	Standard deviation= SD
Frequency of dialysis/week	3.29	1.08
Duration of dialysis in months	42.18	3.57
Depression symptoms	30.50	9.82
Patients with depression symptoms >15 score	108= 89.2%	
Patients without depression symptoms <15 score	13=10.8%	
Quality of life	50.45	21.44
Perceived exercise barrier to dialysis	33.53	4.82
Perceived exercise benefits to dialysis	35.75	4.00

89.2% (M=30.50, SD=9.82) of the sample have depression symptoms, and patients perceived exercise barrier to dialysis (M= 33.53, SD=4) as shown in Table 2.

The Relationship of Psychosocial Well-being of Jordanian Children and Adolescents with ESRD under Hemodialysis

The mean score of QoL is 50.45 (SD = 9.82), which indicated impaired level of QoL. The relationships between quality of life, depression, perceived exercise benefits and perceived exercise barriers of dialysis, non adherence with fluid, and food guidelines of patients receiving renal haemodialysis were investigated using Pearson product-moment correlation coefficient. Also, preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity.

Correlation between Patient's Quality of Life and Depression Symptoms

A correlation matrix reported in table 2 showed that there was a large negative correlation between the quality of life and depression symptoms, $r = -0.56, p < .001, n = 121$.

Patient's Quality of Life and Perceived Exercise Barriers: Here, there was a small negative correlation between the quality of life and perceived exercise barriers of dialysis, $r = -0.23, p < .05, n = 121$.

Depression Symptoms and Perceived Exercise Barriers: Results showed that there was a medium of positive correlation between the depression symptoms and perceived exercise barriers, $r = 0.40, p < .001, n = 121$. Also, there was a large positive correlation between the non adherence with food and fluid guidelines, $r = 0.74, p < .001, n = 121$. However, this study showed that perceived exercise benefits of haemodialysis did not have a relationship with all examined variables.

Table 3. Correlations between QoL and study psychosocial aspects (result of Pearson r product-moment)

Variable	Quality of life r (P value)	Depression r (P value)	Perceived exercise benefits r (P value)	Perceived exercise barriers r (P value)	Non adherence with food guidelines r (P value)	Non adherence with fluid guidelines r (P value)
Quality of life	1	-0.564 ($P < 0.001$)	-	0.226($P < 0.05$)	-	-
Depression	-0.564 ($P < 0.001$)	1	-	0.396 ($P < 0.001$)	-	-
Perceived exercise benefits	-	-	1	-	-	-
Perceived exercise barriers	-	0.396 ($P < 0.001$)	-	1	-	-
Non adherence with food guidelines	-	-	-	-	1	0.738 ($P < 0.001$)
Non adherence with fluid guidelines	-	-	-	-	0.738 ($P < 0.001$)	1

Correlation between the Psychosocial Well-being and Demographic and Clinical Characteristics of Jordanian Children and Adolescents with ESRD undergoing Hemodialysis

The correlation between quality of life, perceived exercise barriers, Non adherence with food guidelines, age of the child, frequency of dialysis per week, duration of receiving dialysis, and the educational level of the participant were checked. A correlation matrix reported in table 4 showed:

1. A correlation with age: There was a significant positive correlation between quality of life and age with a medium effect size, $r = 0.326$ ($P < 0.001$). Also, a significant small negative correlation was found between perceived exercise barriers and age of the participants, $r = -0.220$ ($P < 0.05$).
2. A correlation with frequency of dialysis: A small negative correlation was reported between the quality of life and frequency of dialysis, $r = -0.249$ ($P < 0.05$). Non adherence with food guidelines and Non-adherence with fluid guidelines had a significant small negative correlation with frequency of dialysis, $r = -0.19$ ($P < 0.05$). $r = -0.23$ ($P < 0.05$) respectively. When the same variable was checked with the depression symptoms, a significant positive correlation was found between the depression symptoms and the frequency of dialysis, $r = 0.210$ ($P < 0.05$).

Table 4. Correlations of psychosocial aspects of patients receiving hemodialysis and the demographic characteristics of the participants (Results of Pearson r product-moment)

Variable	Age r (P value)	Frequency of dialysis per week r (P value)	Duration of dialysis in months r (P value)	Level of education r (P value)
Quality of life	0.326($P < 0.001$)	-0.249 ($P < 0.05$)	-	-
Depression symptoms	-	0.210($P < 0.05$)	-	-
Perceived exercise benefits	-	-	-0.268 ($P < 0.05$)	-
Perceived exercise barriers	-0.220 ($P < 0.05$)	-	-	-
Non adherence with food guidelines	-	-0.19 ($P < 0.05$)	-	-0.22 ($P < 0.05$)
Non adherence with fluid guidelines	-	-0.23 ($P < 0.05$)	-	-

3. Additionally, there was a significant small negative correlation between perceived exercise benefits and duration of dialysis, $r = -0.268$ ($P < 0.05$).
4. Finally, there was a negative significant correlation between the level of education and non adherence with food guidelines, $r = -0.22$ ($P < 0.05$).

Discussion

The purpose of this study was to explore the relationship between QoL, depression symptoms, dietary nonadherence, perceived barriers, and benefits of exercise among Jordanian school-age children and adolescents who are complaining of ESRD undergoing hemodialysis. Basically, some studies have been carried out on this topic in Jordan and Arab countries for adults, and not for adolescent and children (Nabolsi, Wardam & Al-Halabi, 2015; Bayoumi & Alwakeel, 2007; Ismail & Salamony, 2008;

Simic, Jovanovic, Dopsaj, et al., 2010; Lin, et al., 2011; Bakr, Amr & Sarhan, 2007).

The result of this study showed that around 90% of the school-age children and adolescent with ESRD undergoing hemodialysis have depression symptom with negative correlation on QoL. Findings congruent with the studies indicate that depression is a common issue for children with chronic kidney disease (Hood, et al., 2006; Hood, Rausch & Dolan, 2011; Kogon, et al., 2014; Berney-Martinet et al., 2009). Similar to adult study, the finding are matching previous studies which states that depression was found to be a significant factor that influenced the patients to experience lower QoL (Nabolsi, Wardam, & Al-Halabi, 2015; Bayoumi & Alwakeel, 2007; Ismail & Salamony, 2008).

However, the positive correlation between quality of life and age is radiant. This was such that school-age children and adolescent, through their personality development, requested to be independent. As they are physically, cognitive, and developmentally unable to perform many tasks associated with ESRD management, their caregiver must assume this responsibility. In addition to the physical load of administering medications, mothers are responsible for getting their school-age children and adolescents to clinic arrangements. They are also responsible for providing special diets and nutritional supplements.

In addition, there is a negative correlation between the quality of life and perceived exercise barriers of dialysis. This result is similar as several studies documented that the QoL of patients receiving dialysis was significantly impaired. Thus, this is due to several complications associated with the influence of the disease on the patients' physical, mental, and psychosocial well-being (Pakpour, et al., 2010; Watnick, et al., 2005). School-age children and adolescents with ESRD often have short stature and are less active than their peers; thus, they might have apparent cognitive difficulties (Bayoumi & Alwakeel, 2007). Consequently, adolescents who might be able to achieve more dialysis-related care than a younger child, are often those to whom the psychological duty of physical deformity is greatest. However, the caregivers for school-age children with ESRD must tolerate the emotional and psychological load of having a chronically ill child. They must handle their own feelings and thoughts. Also, they must even, more significantly, help their children to manage their own load. School-age children and adolescents who hold positive attitude about their ability to control their illness were more adherences to treatment regimen. It was also found that more of the school-age children and adolescents perceive benefits of exercise to dialysis when symptoms of depression decreased. This reflects how much they perceived about their illness. Also, it shows how much they adhere to their therapeutic regimen

and how higher is their QoL. Also, this results which are congruent with the study was conducted by Clapp, Bevington and Smith (2012).

The current study findings showed a negative relationship between depression and adherence to medium. Furthermore, the positive correlation between the depression symptoms and perceived exercise barriers is similar to studies done on adult patients by El-Lozi and Ahmad (1994), Khalil and Frazier (2010), and Khalil, et al. (2012). Non-adherence to the prescribed regimen such as exercise is a serious issue and a common problem among adolescents with ESRD. Thus, it is associated with increased morbidity and mortality and consequently decreased QoL. The current study and results from other studies could be indicated that depression, as a factor in school-age children and adolescents undergoing haemodialysis, decreases closeness to treatment, which in turn has a deteriorative effect on their QoL (Nabolsi, Wardam, & Al-Halabi, 2015; Bayoumi & Alwakeel, 2007; Khalil & Frazier, 2010). Depression symptoms among school-age and adolescents with ESRD on haemodialysis leads to negative perceptions about their disease condition, its treatment, and nonadherence to food or fluid like treatment (Bakr , Amr , Sarhan , et al., 2007).

Regarding the demographic characteristics, a number of factors have significant positive correlation such as children and adolescents' age and quality of life. However, this could be some how represented in a negative correlation to perceived exercise barriers to dialysis. On the other hand, a negative correlation was reported between children and adolescents' frequency of dialysis. Also, non adherence with food and fluid guidelines had a significant negative correlation with frequency of dialysis. Subsequently, a significant positive correlation was found between depression symptoms and the frequency of dialysis. A significant small negative correlation was between perceived exercise benefits and duration of dialysis. This findings, in a way, have a mild correlation with those clinical intervention and social demographic. This contradicts the study conducted in Egypt by Bakr , Amr , Sarhan , et al. (2007) in a children chronic kidney disease which include pre-ESRD 19 child and hemodialysis 19 child, assessed depression symptoms. They found a 10 % overall occurrence of depression. Therefore, they intended to study clinical and demographic factors associated with psychological disease. Also, they stated that the cause of psychiatric disorders among their study was not significantly correlated with age, sex, severity of anemia, duration of disease, or the efficacy of hemodialysis.

Results support greater emphasis on treating depression to improve QoL in haemodialysis children and adolescents. Psychosocial and physical factors associated with depression and decreased QoL are potentially

adjustable by family-centered care and health team intervention (Ismail & Salamony, 2008).

Conclusion

The results of this study have important implications for the identification of impairment that are associated with psychosocial aspects of school-age children and adolescents receiving hemodialysis with ESRD. Depression has been shown to be a contributing factor for non-adherence to medical treatment and consequently on QoL. Treating depression, in addition to modifying factors to improve ESRD children and adolescents' QoL, should be an essential component of any intervention designed to promote therapeutic regimen adherence in patients undergoing haemodialysis. Early program and management of depression among haemodialysis school-age and adolescents, therefore, requires an important effort. Additional potential studies are necessary to see whether the treatment of depression and the adjustment of patients' awareness of the importance of their disease improve adherence to treatment. This can be achieved through receiving better QoL via the development of multidisciplinary team of nephrologists, nurses, social workers, and psychologists.

Recommendation

This study is beneficial to school-age children and adolescents with end-stage renal disease receiving hemodialysis treatment in the dialysis clinics and their families. The findings of this study could be beneficial to registered pediatric nurses who are assigned to take care of school-age children and adolescents with end-stage renal disease receiving hemodialysis. National and international health care organizations that provide and develop nursing care and research can also be utilized in this current finding. Stockholders, policymakers, administrators, quality assurance committees at national and international health care organizations, and customers and health insurance companies that are concerned in this group of patients played a significant role in this current finding as a result of their position.

Strengths and Limitations

Based on our information, this is the first nationwide and population-based review of adolescent and children with ESRD in Jordan. Additionally, an applied reference levels for ESRD was derived from a large cohort of Jordanian school-age children and adolescents.

This study adds to the literature concerning depressive symptoms, quality of life, dietary nonadherence, and perceived barriers and benefits of exercise undergoing hemodialysis in Jordan. While the sample was recruited from seven major large hospitals in Jordan, the generalizability of the

findings in other culture and other sample of haemodialysis patients is limited

The study was limited by a small sample size. This was, however, led by statistical improbability for most of the associations observed.

Ethical Approval

All recognizing information regarding the study participants has been removed. This study was approved by the Academic Research Committee of the Faculty of Nursing at the Applied Science Private University. Ethical approval was also obtained from the Institutional Review Board of all hospitals that had been shared.

Conflict of Interest

The author(s) declared that there are no conflicts of interest with respect to the research, authorship, and/or publication of this article.

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