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Associations between Blood Pressure and the Adherence to Fluid, Diet, and Medication among Children Undergoing Hemodialysis in the Gaza Strip

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Dedication

All the kind feelings to my father and my mother who are praying and encouraged me all the time ….

My sincere gratitude to my husband and my children who supported me all the way through this study …

Special thanks to my brothers and sisters for their support, which provided me the energy to complete this study ….

I would like to express my empathy to all the children with CKD who participated in this study … I pray for them for better health and wellness

My great appreciation to my colleagues who supported me all the way during this study.

Afaf Abdelatif Abu Nemer

Declaration

I certify that this thesis submitted for the degree of Master, is the result of my own research, except where otherwise acknowledged, and this study (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed:

Afaf Abdelatif Abu Nemer

…../…../…...

Acknowledgement

First of all, praise to Allah, the lord of the world, and peace and blessings of Allah be upon our prophet Muhammad, all thanks for Allah who granted me the capability to accomplish this thesis.

I would like to express my deepest thanks to the academic staff at Al Quds University for the knowledge and skills they provided through my study.

I had the great fortune to complete this study under the supervision, guidance and valuable instructions of Dr. Samir Al Nawajha and Dr. Mohammad Al Jerjawy.

I would like to convey my warm thanks to all the nurses who are working in the dialysis units their cooperation during data collection.

To my friends, and all those who contributed to the completion of this study, thank you very much.

Afaf Abu Nemer

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Abstract

Chronic kidney disease is a progressive and irreversible kidney damage associated with decreased glomerular filtration rate. This purpose of the study was to identify the relationship between adherence to diet, fluid, medication, and blood pressure in pediatric patients with CKD undergoing hemodialysis in governmental hospitals in Gaza Strip. The study utilized a descriptive, cross-sectional design. The population of the study consisted of 49 children, and the sample of the study consisted of 43 children with CKD and undergoing hemodialysis (census) with response rate 87.7%. The researcher developed a questionnaire for data collection. The questionnaire consisted of sociodemographic characteristics, adherence to diet, adherence to fluid restriction, measurement of Blood Pressure, role of the nurse in monitoring adherence, and Morisky Medication Adherence Scale (MMAS). The questionnaire distributed to a panel of experts for content validity, and a pilot study carried out on 20 children to check reliability of the questionnaire, and Cronbache alpha for the role of the nurses in monitoring the adherence was 0.79 and for MMAS was 0.92. The researcher used SPSS version 22 for data analysis. Statistical analysis included frequencies, percentage, means, standard deviation, independent (t) test, One way ANOVA, and Pearson correlation test. The results showed that 69.8% of study participants were male children and 30.2% were female children, with mean age 11.78±4.52 years, 44.2% had primary school education and 30.2% were preschoolers. In addition, 88.4% of study participants had hypertension, and on dialysis for 6 months to 8 years with mean 3.73±2.26 year. Furthermore, The results indicated poor adherence to diet as pre-dialysis serum K^+ ranged from 4.27 to 7.27 mg/dl (m= 5.49±0.77 mg/dl), pre-dialysis serum PO_4 ranged from 2.67 to 11.83 mg/dl (m= 6.52±1.98 mg/dl), pre-dialysis serum BUN ranged from 55.33 to 292.0 mg/dl (m= 161.04±52.42 mg/dl). Interdialytic weight gain ranged from 0.10 g to 3.83 kg (m= 1.73±0.86 kg). The results also indicated low adherence to antihypertensive medication among CKD patients with mean score 4.5 on Morisky scale with 84.2% of children lad low adherence to medication.The nurses showed high level (95.65%) of monitoring the adherence of their patients concerning diet, fluid intake, and medication. In general, the results showed that 7% of study participants were fully adhered to diet, 88.4% were fully adhered to fluids intake, and 36.8% were fully adhered to anti-hypertensive medication. Mean systolic BP at pre-dialysis phase was 129.66±19.50 mmHg and mean diastolic BP was 78.58±13.52 mmHg. There was statistically significant correlation between diastolic BP and fluid intake (P= 0.03), diet and medication (P= 0.04), and between BP and number of hours per session of dialysis. There were statistically no significant differences in SBP and DBP related to gender, age, place of residency, family income, parents' level of education, and years on dialysis, while secondary school children had significant higher DBP, and children from Al Rantesy hospital had significantly lower SBP and DBP. In addition, 12 years old and more and secondary schoolchildrenshowed higher adherence to fluid intake. Moreover, children on dialysis for less than five years had higher level of BUN and lower adherence to fluid intake. The study concluded that interventions should focus on both patient factors and system problems that compromise the patient's ability to adhere to treatment program. However, nurses' role is important in identifying barriers to adherence, and offer strategies to help patients improve adherence to treatment program.

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List of Abbreviations

ABPM	Ambulatory BP monitoring
ACE	Angiotensin Converting Enzymes
ANZDATA	Australia and New Zealand Dialysis and Transplant Registry
BP	Blood Pressure
BUN	Blood Urea Nitrogen
CAKUT	Congenital Anomalies of the Kidney and Urinary Tract
CDC	Centers for Disease Control and prevention
CKD	Chronic Kidney Disease
CKiD	Chronic Kidney Disease in Children
CVDs	Cardiovascular Diseases
DBP	Diastolic Blood Pressure
DW	Dry Weight
ESRD	End Stage Renal Disease
GFR	Glomerulo Filtration Rate
GS	Gaza Strip
HD	Hemodialysis
HTN	Hypertension
IDW	Interdialytic Weight
IDWG	Interdialytic weight gain
K^+	Potassium
KDIGO	Kidney Disease: Improving Global Outcomes
MMAS	Morisky Medication Adherence Scale
MOH	Ministry of Health
NGOs	Non-Governmental Organizations
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PCBS	Palestinian Center Bureau of Statistics
Pmarp	Per Million of Age-Related Population
Pmpp	Per Million Pediatric Population

PO_4	Phosphate
RRT	Renal Replacement Therapy
RVD	Renovascular Diseases
SBP	Systolic Blood Pressure
SPSS	Statistical Package for Social Sciences
UF	Ultrafiltration
UNRWA	United Nations Relief and Works Agency for the Palestinian Refugees in the Near East
WB	West Bank
WHO	World Health Organization

Chapter One

Introduction

1.1 Background

The kidney is important for body to maintain normal blood pressure (BP) and kidney failure can lead to HTN (Cui et al., 2011). HTN is highly prevalent in patients with chronic kidney disease (CKD) and the prevalence increased in patients with ESRD. In addition, 74% of pediatric patients undergoing hemodialysis (HD) in America were hypertensive. However, to control HTN among patient undergoing HD; the patient must adhere to very restricted diet and fluid intake, adherence to prescribed medications and committed to 4 hours dialysis sessions 3 times a week (Ikonomou et al., 2015).

End stage renal disease (ESRD) is that stage when kidney impairment is irreversible, cannot be controlled by conservative management alone, and requires renal replacement therapy (dialysis or kidney transplantation) to maintain life (National Kidney Foundation, 2010). According to the latest statistics, the prevalence rate of ESRD in the West Bank (WB) was 240.3 per million populations and 320 per million populations in Gaza Strip (GS) (Khader et al., 2013). In the GS, the risk factors associated with ESRD were hypertension (HTN), glomerulonephritis, obesity, and low monthly income (Abu-Odah, 2017).

Khalil and Darawad (2014) found that adherence to diet and fluid among Jordanian HD patens not exceeds 30 %. Moreover, Alsmadi, et al., (2008) found that above 70 % of dialysis patients with uncontrolled BP withheld their antihypertensive medications. Non-adherence to therapeutic recommendation affects quality of life and the mortality rate for patients with ESRD remain high because of high rate of non-adherence to dialysis session which lead to death occurs from build-up of fluids and waste products in the body (Fischbach and Zaloszyc, 2015). Adherence influenced by multiple factors related to the patient, the treatment or condition, the health care providers and the clinical care setting (Viswanathan et al., 2012). Hypervolemia considered a major pathogenic factor and better control of fluid status would more effetely prevent the damaging effects of fluid overload and hypertension. Fluid removal by ultrafiltration (UF) during hemodialysis is commonly the first-line therapy used to manage HTN in dialysis patients, however, aggressive fluid

removal may lead to interdialytic hypotension, with reduction of blood flow to vital organs (Fischbach, et al., 2015).

Fluid overload between dialysis sessions measured by interdialytic weight gain (IDWG). The relationship between IDWG and BP may vary between children of different age and may be affected by growth and associated variations, and necessary fluid intake to meet nutritional needs (Zaloszyc et al., 2013). Therefore, an individualized approach to management of fluid retention and HTN in pediatric patients is necessary.

Although several studies investigated how IDWG relates to blood pressure control in dialyzed children, the effect of residual urine output on IDWG and pre-dialysis BP in these population has not been studied (Paglialonga et al., 2015). Importantly, children with chronic HD, the IDWG reflects not only water and sodium intake, but also nutritional intake that is essential for growth (Huang et al., 2014). However, dietary intake should not be reduced in an attempt to achieve a safe ultrafiltration rate.

1.2 Problemstatement

Patients and children undergoing HDmust keep their potassium levels between 3.5 and 5.5 mg/dl, excessive dietary potassium intake may lead to hyperkalemia and fatal cardiac rhythm abnormalities, they must also keep their phosphate levels between 3.4 and 4.5 mg/dl, elevated serum phosphate levels or phosphate retention can lead to renal osteodystrophy and may contribute to cardiovascular disease (Hezel et al., 2016). A study of Naalweh et al., (2017) showed that dietary adherence was observed in 24% while that of fluid restriction adherence was observed in 31% of studied patients in Palestine, but there is no previous study of adherence among children with ESRD in Palestine.

Moreover, children with CKD are limited to approximately 700 - 1000 ml of fluid per day and must keep their fluid weight gains between 0.5 and 1 kg per day, Excess fluid can result in fluid build-up around the lungs, causing shortness of breath and high blood pressure. Prolonged fluid overload is associated with HTN, pulmonary edema, congestive heart failure, and shortened patient survival. To this end, dietary and fluid adherence is of crucial importance to the quality of life and survival of HDpediatric patients (Hezel et al., 2016). Despite a high prevalence of HTN among pediatric patients with ESRD, many studies reported that BP control still inadequate.

Previous studies have showed that the adherence rates to HTN treatment have been reported to range between 30 to 60% among patients with ESRD (Denhaerynck et al., 2007). In addition, the study of Alsmadi et al., (2008) in Jordan found that 67.2% of patients treated with regular HD had uncontrolled BP. However,non-adherence is a possible reason for uncontrolled HTN in patients with ESRD that leads to unhealthy self-care behaviors such as excessive sodium and fluid intake.

More importantly, the adherence of children undergoing HD is considered a critical point in the child's life, they need supervision from the family and from the nurse or health specialist, because they are at risk for cardiovascular disease, left ventricular hypertrophy due to fluid overload, congestive heart failure, and cerebrovascular diseases. Furthermore, non-adherence to the above mentioned affects the child's quality of life (Khalil and Darawad, 2014).

The problem raises here is that; there is no specific and clear role belonging to the nurses working in HD units which adopts following up the adherence of children and the patients to diet, fluid and medications, so, this study came to examine the correlation between fluid and diet adherence and BP control in pediatric patients with ESRD undergoing HD to show whether adequate control of volume status, diet and medication and adequate estimation of dry weight would effectively normalize blood pressure. The issue of adherence among pediatric patients is ignored in HD unit, this issue needs more attention and more research as well.

1.3 Justification of the study

This study may have great benefits and significance on multi levels, this study would have its benefits for the children since the adherence to diet and fluids lead to decrease BP and decrease the risk for future complications, increase patients' life expectancy, enhance the quality of life for both "child and his/her family" as well. The results of this study also may save huge efforts spent by the nurses in the hemodialysis unity in providing specific care to those children and may decrease the number of sessions especially in the evening and night time; the issue that is considered more critical and sensitive for the nurses and nursing mangers in the Gaza Strip. Furthermore, the results of this study may save the huge burden spent by the ministry of health for those children in terms of financial costs and managerial issues. Lastly, based on the researcher's knowledge, there are no studies conducted in

Palestine especially in the Gaza Strip regarding the issue of blood pressure control among pediatric patients undergoing hemodialysis.

1.4 Aim of the study

The aim of this study is to examine the correlation between adherence to fluid, diet and medication, and blood pressure among children undergoing hemodialysis in the Gaza Strip.

1.5 Specific objectives

1. To determine the level of adherence to fluid, diet and medication among pediatric patients undergoing hemodialysis in the Gaza Strip.
2. To examine the correlation between blood pressure and adherence to fluid, diet and medication among pediatric patients undergoing hemodialysis.
3. To explore if there are significant differences in adherence based on (children age, gender, number of dialysis years, residence, and socioeconomic status of the family).
4. To identify the role of the nurses working in hemodialysis units in monitoring the adherence of pediatric patients to fluid, diet and medication.
5. To suggest recommendations for policy makers which may help in developing specific system to monitor the adherence of pediatric patients in the Gaza Strip

1.6 Research questions

1. What is the level of adherence to fluid, diet and medication among pediatric patients undergoing hemodialysis in the Gaza Strip?
2. What is the level of adherence to medication scale among pediatric patients with CKD undergoing hemodialysis in Gaza Strip?
3. Is there a significant relationship between blood pressure and adherence to diet, fluid and medication among pediatric patients with CKD undergoing hemodialysis in Gaza Strip?
4. Are there significant differences in adherence to diet, fluid, and medication related to (children age, gender, and number of dialysis years, residence, and socioeconomic status of the family)?
5. What is the role of nurses who are working in hemodialysis units in encouraging the adherence to diet, fluid and medication among pediatric patients with CKD in Gaza Strip?

1.7 Context of the study

1.7.1 Sociodemographic context

Palestine lies within an area of 27,000 square kilometers (Km^2), expanding from Ras Al-Nakoura in the north to Rafah in the south. Due to the Israeli occupation, the Palestinian territory is divided into three areas separated geographically; the West Bank (WB) 5.655 Km^2, GS 365 Km^2 and East Jerusalem, with estimated population about 4,95 million, of them 3,008 in WB and over 2 million in GS with male to female ration 103.4. The population density (capita/km^2) is 778 in Palestine (506 in WB and 4,986 in GS).The Palestinian population is characterized by high percentage of young age as the percentage of people younger than 5 years was 15% (13.8% in WB and 17% in GGS, and those aged between 0 – 14 years accounted for 39.4% (37.2% in WB and 43% in GS) (Palestinian Central Bureau of Statistics - PCBS, 2018).

1.7.2 Economic context

The Palestinian economy is under high pressure to create decent and productive jobs, reduce poverty and provide economic security on an equal basis for all social groups in a rapidly growing and urbanizing population. Economic status in the Palestinian territories is very low. Gross Domestic Product is estimated about 9.3%, and the workforce participation 43.6, unemployment is very high and reached a rate of 26.9% for males (15.5% in WB and 34.4% in GS) and for females unemployment rate is 44.7% (29.8% in WB and 65.2% in GS) (PCBS, 2017). Due to blockade of the strip, a significant increase in poverty rates occurred in GS from 38.8% in 2011 to 53% by the end of 2017 (United Nations Office for the Coordination of Humanitarian Affairs - OCHA, 2018).

1.7.3 Health care system

ThePalestinianhealthsystemcompose ofdifferent sectors. ThemajorgroupsofhealthprovidersaretheMOH,Non-governmental organizations (NGOs),UnitedNationsReliefandWorksAgencyforPalestinianRefugees in the Near East (UNRWA),Military Health Services, andtheprivatesector.The total number of hospitals in Palestine is 81 hospitals, 51 of them in WB including east Jerusalem. The MOH is responsible for 27 hospitals (14 hospitals in WB and 13 hospitals in GS). The number of beds allocated to admit children accounted for 19.3% of the total number of beds in MOH

hospitals (260 beds in WB and 381 beds in GS). In GS, there are four governmental hospitals that offer HD for adults (Al Shifa Medical Complex, Nasser Medical Complex, Shohada Al Aqsa Hospital, and Al Najar Hospital), and Al Rantesy Specialized Pediatric Hospital is the only one that offer HD service to pediatric patients with CKD (MOH, 2017).

Hemodialysis is available in five governmental hospitals in GS, of them four hospitals for adult patients (Al Shifa hospital, Shohada Al Aqsa, Nasser hospital, and Al Najar hospital) with a total of about 110 HD machines. In addition, Al Rantesy Specialized Pediatric Hospital is the only hospital that offer HD services to pediatric patients with CKD equipped with 15 HD machines. The total number of patients registered with ESRF undergoing HD is 710 patients, of them 50 patients are children (MOH, 2018).

1.7.4 The status of children in Palestine

The Palestinian community is characterized as young age population. Young age accounted for a considerable large proportion of the population as the percentage of children aged 0 - 14 years is 38.9% (36.6% in WB and 42.6% in GS), and those aged between 15 – 29 years accounted for 29.7% (29.9% in WB and 29.5% in GS) (PCBS, 2018). The number of children under the age of 18 is 2,115,370 children in Palestine according to the results of Population, Housing and Establishments Census 2017. The percentage of children in Palestine is 45.3% of the population (43.4% in WB and 48.0% in GS) (PCBS, 2018).

Concerning children's health-related statistics, 0.9% of the children have at least one form of disability (0.7% in WB and 1.2% in GS). The main causes of disability among children included congenital or genetic causes ranked first by 45.5% (43.5% males and 48.3% females), followed by causes related to pregnancy and childbirth 23.3% (22.8% males and 24.1% females), then 21.1% for pathological causes (22.2% males and 19.6% females) (PCBS, 2018).Concerning education, enrollment of children in basic education (6 – 15 years) in GS reached 94.3% for male children and 95.9% for female children. There are 443,425 children enrolled in basic education in GS (223,928 males and 219,497 females), and classroom density was 36.9 (37.1 in governmental schools and 39.0 in UNRWA schools) (PCBS, 2017).

1.8 Operational definitions

Adherence

Adherence defined as the extent to which a patient's behavior - taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider (WHO, 2019).

The researcher defined the adherence to diet operationallyby serum level of potassium < 5.5 mg/dl, serum phosphorus < 5.5 mg/dl and serum BUN < 100 mg/dl.

The researcher defined adherence to fluid restriction operationally by the amount of child's weight gain between dialysis sessions.

The researcher defined adherence to medication operationally based on the scores obtained on Morisky Medication Adherence Scale. The child will be considered having high adherence if he/she has zero score on Morisky scale, medium adherence (1 – 2) score, and low adherence (3 – 8) score.

Interdialytic weight gain

Interdialytic weight gain (IDWG) is an easily measurable parameter in the dialysis unit, routinely assessed at the beginning of the dialysis session, and used along with clinical symptoms, signs, and predialytic BP readings to make decisions regarding the amount of fluid removal during a dialysis session. IDWG is also used as a basis for fluid and salt intake recommendations(Sarkar et al., 2006).

The researcher calculated IDWG by subtracting the child's weight upon the arrival to the dialysis unit from the weight at the end of previous session.

Blood pressure control

The researcher defined the blood pressure control operationally if it is less than 140/90 mmHg before dialysis and less than 130/80 mmHg after dialysis.

Chapter Two

Conceptual framework and literature review

2.1 Conceptual framework

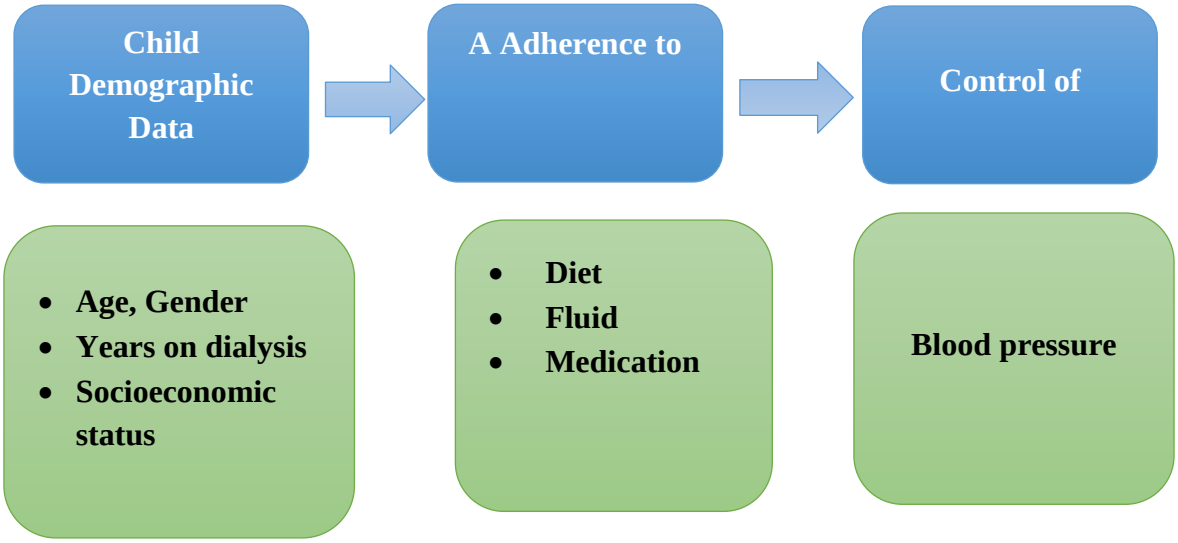

Figure (2.1): Diagram of conceptual framework

Figure (2.1) illustrates the conceptual framework for the study; the framework consists of three domains, the first domain which is the child demographic data such as age, gender, years of dialysis and socioeconomic status of the family, this domain is considered independent for the child adherence to diet, fluid and medication. The second domain is the child adherence to diet, fluid and medication which is considered as independent for the last dependent domain which is blood pressure control.

2.2 Literature review

2.2.1 Background

Chronic kidney disease is a major health problem worldwide. CKD is a progressive and irreversible kidney damage associated with decreased glomerular filtration rate (GFR). The filtration and renal regulation failure generates the accumulation of toxic substances in the body, triggering water, electrolyte, acid-base, endocrine and metabolic disorders (Kalantar et al., 2016). Due to the complex and demanding medical regimen, these patients require extensive life-style changes, including adherence to prescribed medications, caring for

vascular access, dietary recommendations that include selecting food low in sodium, potassium and phosphorus, maintaining adequate protein intake, and limiting daily fluid intake (Smith et al., 2010). On the other hand, noncompliance to these dietary recommendations may lead to accumulation of metabolic by products and excess fluid in the circulatory system, leading to increased morbidity and mortality for renal failure patients (Ahrari et al., 2014).

2.2.2 Etiology and risk factors of chronic kidney disease in children

Chronic kidney disease is a clinical syndrome characterized by a gradual loss of kidney function over time. According to the Kidney Disease: Improving Global Outcomes (KDIGO) guidelines, CKD is identified by the presence of kidney damage, either functional or structural, or by a decline in GFR below 60-mL/min/1.73 m^2 of body surface area for more than 3 months (KDIGO 2013).

In fact, the primary causes of CKD in pediatric patients vary from those causes that are responsible for the adult onset of the disease. Common predisposing factors for CKD in pediatric patients include steroid-resistant nephrotic syndrome accounting for (49.1%) of cases, chronic glomerulonephritis (10.4% lupus nephritis, 8.1% Alport syndrome), and renal ciliopathies (5.3%) of cases (Vivante and Hildebrandt, 2016; Harambat et al., 2012; Smith et al., 2010). Moreover, less common causes of CKD include thrombotic microangiopathies especially atypical hemolytic uremic syndrome, nephrolithiasis, Wilms tumor (a type of cancer that starts in the kidneys), infectious and interstitial diseases (Vivante and Hildebrandt, 2016).

Furthermore, structural causes such as renal hypoplasia or posterior urethral valves are clearly predominate in children, and the incidence of glomerulonephritis increases in those >12 years old. In addition, reductions in nephron numbers observed in low-birth weight and small for gestational age newborns are considered as predisposing factors to CKD in pediatrics (Cain et al., 2010; Schreuder, 2012). In a recent report about causes of CKD, the most common causes were congenital causes, including congenital anomalies of the kidney and urinary tract (CAKUT) accounted for 48% of cases, glomerulonephritis accounted for 14% of cases, and hereditary nephropathies accounted for 10% of the cases. Furthermore, CAKUT was more common among younger patients, while glomerulonephritis was more common among children older than 12 years of age (Harambat et al., 2012).

In the United States, CAKUT and hereditary nephropathies were the most common causes of CKD in the young patients, while CAKUT accounting for 34 to 43% of pediatric CKD cases in Europe, Japan, Australia, and New Zealand (Lewis et al., 2010).

In Turkey and other countries in the Middle East, CAKUT were the leading cause of CKD accounting for 47 - 62% with predominance of uropathies over hypodysplasia. In addition, hereditary nephropathies accounted for 17 to 30%,neuropathic bladder accounted for 15% of cases in Turkey, while it accounted for about 4% in Italy and Belgium (Harambat et al., 2012).

In 2008, the proportion of CKD caused by glomerulonephritis was lower in Europe according to the ESPN/ERA-EDTA registry (15%) compared with a Japanese study (22%) and the Australia and New Zealand Dialysis and Transplant Registry (ANZDATA; 29%). The ANZDATA Registry showed a decline in glomerulonephritis as a cause of ESRD over time. However, this may be due to the age distribution of patients, with fewer young patients being treated for CKD at that time. There was also a decline in the proportion of ESRD caused by reflux nephropathy, while obstructive uropathy and hypodysplasia increased (Orr et al., 2009). This trend may be explained by a change in reporting the primary diagnosis, since the combined proportion of hypodysplasia and reflux nephropathy has remained stable over the past 30 years.

A study carried out in Spain found that structural anomalies was the primary cause of pediatric CKD accounted for 59% of the cases, glomerular diseases was very low accounted for 3% of cases, and male children were higher and represented 66% of cases (Trapote et al., 2010). In Sub-Saharan Africa, Cameron, the most common causes of CKD were chronic glomerulonephritis accounted for 56.2% of cases and urologic malformations mainly posterior urethral valves accounted for 43.8% of cases (Halle et al., 2017).

Moreover, a study carried out in Egypt reported that the most common causes of CKD included obstructive uropathy (21.7%) of cases, primary glomerulonephritis (15.3%), reflux/urinary tract infection (14.6%), aplasia/hypoplasia (9.8%), familial/metabolic diseases (6.8%), and unknown causes (20.6%) of the cases (Safouh et al., 2015).

2.2.3 Epidemiology of Chronic kidney disease in children

There is limited information on the epidemiology of the early stages of CKD in the pediatric population as it is often asymptomatic and therefore under-diagnosed and under-

reported. Although some pediatric CKD registries are beginning to emerge, only a few reports on the epidemiology of CKD stages 2 to 5 in children are available, and even less is known about low-income countries (Harambat et al., 2012).

In Europe, it has been reported that the incidence of pediatric CKD around 11 - 12 per million of age-related population (pmarp) for stages 3 to 5, while the prevalence was around 55 - 60 pmarp (Harambat et al., 2012; ESPN/ERA-EDTA registry, 2016). In Spain, the incidence of pediatric CKD was 8.66 per million pediatric population (pmpp) and the prevalence was 71.06 pmpp (Trapote et al., 2010). In Brazil, the incidence of children with CKD on dialysis treatment was 6.6 pmarp, and the prevalence of pediatric CKD was 20 pmarp (Konstantyner et al., 2015).

In the United States of America (USA), the prevalence of CKD stages 1 - 4 estimated at 15.5% - 18.3% (Centers for Disease Control and prevention – CDC, 2017). In Sub-Saharan Africa, CKD accounted for 15.5% and stage 5 was the most frequent (Halle et al., 2017). In Egypt, children with CKD stage 1 and 2 accounted for 4.4% of the cases, while those with stage 3, 4 and 5 accounted for 19.7%, 18.3% and 57.6%, respectively (Safouh et al., 2015).

Reports from governmental hospitals in GS indicated that there are 50 children with CKD and on regular hemodialysis during the year 2018 (Al Rantesy Pediatric Hospital, 2018).

2.2.4 Hypertension in pediatric patients with chronic kidney disease

Kidney function is vital to the maintenance of BP because the kidney is the primary regulator of blood volume, thus, decreased kidney function may be directly related to increased BP (Gallibois et al., 2017).

Hypertension is highly prevalent in both adult and pediatric CKD patients on HD. Kramer et al., (2011) found that HTN is more prevalent in younger age HD because they are less adherent to diet and fluids than older age. However, the etiology of HTN in these patients is complex with extracellular volume playing a major role in addition to increased vascular constriction.

Secondary forms of arterial HTN predominate in infancy and childhood. Renal HTN is the most common (approximately 85%) identifiable secondary HTN in children. It is one of the earliest and most prevalent complications of pediatric CKD. Over a half of all children

have HTN even in early CKD, increasing up to 50-75% in CKD stage five (Peco-Antic and Paripovic, 2014).

Management of HTN in pediatric HD patients should include the establishment and maintenance of the appropriate dry weight through limitation of interdialytic sodium/fluid intake and adequate removal of these substances during HD. Pharmacologic therapy should include Angiotensin Converting Enzymes (ACE) inhibitors or Angiotensin Receptors Blockers as first-line agents, also these medications improve left ventricular hypertrophy and pulse wave velocity. Therefore, it is likely that increased dialysis time through either daily or nocturnal HD allows for better control of BP (Hinkle and Cheever, 2013).

There is no confirmed evidence to base what BP target should be achieved, the current recommendations are to achieve systolic BP < 140 mmHg pre-HD or <130 mmHg post-HD in adults and at least a BP $<90^{th}$ percentile of the age, sex, and height appropriate level in the pediatric population (Peter et al., 2012). However, Kramer et al., (2011) reported that poor control of HTN presented in 69.4 % of HD, 68.6 % of peritoneal dialysis, and 66.9 % of transplant recipients.

Blood pressure in HD pediatric patients have to be measured carefully and consistently, so that reliable BP data will be available to guide treatment. Ambulatory BP monitoring (ABPM) may also play important role in BP assessment in this population. In addition, twenty-four-hour ABPM is known to better predict cardiovascular morbidity than casual BP measurement and 24-h ABPM had better delineate cardiovascular morbidity in pediatric hemodialysis patients (Katsoufis et al., 2014). However, greater efforts should be made to control BP among pediatric ESRD patients, particularly within the first year of their starting RRT. Early control of HTN may be particularly important in reducing future cardiovascular risk. No specific antihypertensive group used to control BP in pediatric HD patients and individualized approach to HTN management is necessary (Peter et al., 2012).

In the pediatric CKD patients, HTN often goes unrecognized or is inadequately controlled (Halbach and Flynn, 2015; Mitsnefes et al., 2010).

Among children, HTN is a rare condition with prevalence of 3% to 9%, but in children with renal disorders, it can be present from the earliest stages of the disease and its prevalence increases as GFR progressively declines, and the prevalence of HTN rises up to 50% of pediatric patients (Samuels et al., 2012; Mitsnefes, 2012). Moreover, Mitsnefes et

al., (2010) reported that HTN was present in 54% of patients and 48% of the children had high BP levels despite the use of antihypertensive medications, while Agarwal et al., (2014) reported that 76% of children on chronic dialysis had HTN.

2.2.5 Association between blood pressure and fluid restriction and diet

The main cause of HTN among HD patients is fluid overload. In this regard, Marsenic et al., (2016) found a positive relationship between IDWG and pre-dialysis BP in pediatric patients. Moreover, children undergoing chronic HD are at risk of CVDs and often develop left ventricular hypertrophy due to fluid overload. The role of IDWG in HTN is poorly defined; while some reported that over hydration as the main cause of HTN, others find that it is frequently not associated with HTN, in both adults and children (Zaloszyc, et al., 2013; Van & Inrig, 2012). Removal of fluid during HD is the first-line treatment to manage HTN in dialysis patients. However, aggressive fluid removal may lead to interdialytic hypotension, with reduction of blood flow to vital organs (Daugirdas et al., 2015; Fischbach, et al., 2015).

The relationship between IDWG and BP may vary between children of different ages and size, and may be affected by growth and associated variations in total body water, dry weight (DW), and necessary fluid intake to meet nutritional needs, as well as nonadherence to medications and fluid restriction (Zaloszyc et al., 2013). Therefore, an individualized approach to management of fluid retention and HTN in pediatric patients is necessary. In this regard, Koc et al., (2011) found that increased IDWG lead to elevated BP, and Paglialonga et al., (2015) reported that increased fluid volume leads to IDWG, elevated BP, and eventually causes the risk for left ventricular hypertrophy increases.

Calculation of IDWG is an important indicator for adherence to fluid restriction. It is worth to say that large fluctuations in IDWG result in extracellular volume expansion and elevated blood pressure, placing increased strain on the cardiovascular system (Lewicki et al., 2013). IDWG results from water accumulation in the body from metabolism and dietary and fluid intake. Thirst, prompted by the osmotic stimulus that results from excess dietary sodium intake and dialysate sodium, also plays a significant role in IDWG. To minimize IDWG, HD patients are advised to make lifestyle modifications including restriction of free fluid intake and minimize dietary sodium intake, but even though these lifestyle modifications are essential to the well-being and survival of HD patients, adherence is poor (Walsh and Lehane, 2011).

Dietary preferences and behaviors are highly individual and highly variable. It is obvious to say that diet-related decisions are influenced by multiple factors, including taste, financial constraints, individual preferences, social status, educational level, societal norms, health, relationships, trust in food sources, and convenience (Wyndels et al., 2011; Holmberg et al., 2010).

For patients with CKD and on HD program, adherence to dietary regime is challenging due to the burden of constant choices about food and drink, the adaptation to complex eating patterns, existing cultural practices, and the competing demands of this chronic disease and related illnesses (Walker et al., 2012).

A descriptive, analytical study aimed to identify characteristics of HD patients most likely to experience difficulty adhering to sodium restrictions associated with their dietary regimen. The results showed that younger participants were more likely to report problems managing their HD diet and low self-efficacy for restricting sodium intake. Younger participants had a higher median sodium intake and higher average adjusted IDWG. Females reported more problems managing their diet. Race, time on dialysis and perceived income adequacy did not appear to influence outcome measures (Clark-Cutaia et al., 2014).

A longitudinal study with one month of follow-up carried out in Brazil aimed to describe the prevalence of adherence to fluid restriction using daily IDWG. The study included 146 patients, and the results showed that adherence to fluid restriction was 61% (Molto et al., 2012).

A correlational study carried out in Iran aimed to identify degree of adherence to dietary and fluid restrictions among HD patients. The sample of the study consisted of 273 patients. The results showed that mean IDWG was 1.49 kg, mean serum K^+ was 4.76 MEq/l, mean serum PO_4 was 6.37 mg/dl, and the results indicated that most of the patients have a moderate rate of nonadherence to dietary and fluid restrictions (Ahrari et al., 2014).

It is important to mention that the IDWG reflects also nutritional intake, which is necessary for growth, but dietary intake should not be reduced in an attempt to achieve a safe ultrafiltration rate (Huang et al., 2014). Thus, the researcher believes that it is essential to follow a dietary regime that maintains body weight, maintains BP within target level to

avoid undesired complications that may results because of fluid intake and dietary disturbances.

2.2.6 Adherence to treatment program in pediatric CKD

Chronic kidney disease is a prolonged illness, which need different aspects of management including HD, strict dietary regime, and fluid restriction, in addition to taking some medication that are prescribed by the physician. Consequently, this leads to a greater personal and financial burden on the patient and his family. Adherence to treatment is the degree to which individuals stick to the medical advice given to them for the purpose of treatment (Beerendrakumar et al., 2018).

Management of CKD requires a complex therapeutic regimen, including hemodialysis and a strict regimen of medication, diet and fluid control (Lins et al., 2018). In my opinion,due to the irreversible nature of the disease, CKD pediatric patients have to make adaptations and modifications in their life including diet, fluid restriction, and following medical instructions and HD program to avoid complications or deterioration in their condition that may occur because of non-adherence to treatment program.

Previous studies reported variations in degree of adherence / non-adherence to different aspects of treatment regime. Magacho et al., (2011) reported that 26% to 28% of CKD pediatric patients were non-adherent to medication prescribed by their physician.

In some studies, adherence to treatment was measured by using serum electrolytes including serum K^+ and serum PO_4 or serum BUN. PO_4 was the most common indicator of dietary nonadherence (Huang et al., 2014). An observational, cross-sectional study carried out in Kentucky, USA aimed to examine fluid and dietary adherence in 100 patients with ESRD receiving HD, found that 50% of the HD patients were nonadherent to PO_4 restrictions and they relate a high prevalence of non-adherence to lack of knowledge about dietary PO_4. Lack of knowledge about foods that contain PO_4 and culture-related norms likely made adherence to this restriction difficult. In addition, patients may have been more likely to adhere to K^+ restriction because hyperkalemia is associated with life threatening cardiovascular complications such as fatal dysrhythmias. The prevalence of elevated K^+ and BUN was low 10% and 1% respectively (Khalil et al., 2011).

A case control study conducted at the Nephrology Department of Abd El-Aziz El-Rantesy Specialized Pediatric Hospital in GS. The sample of the study consisted of 112 subjects (60

CKD pediatric patients and 52 healthy control individuals), their age ranged between 1 – 12 years. The results showed that there was a significant relationship between HTN and CKD among pediatric patients. There was significant increase in the SBP and DBP in the pediatric patients as compared with the controls. In addition, patients showed significantly higher levels of BUN and creatinine. The results also indicated that pediatric patients had significantly lower calcium and higher PO_4 as compared with controls (Muhaisen et al., 2012).

A cross-sectional study carried out at An-Najah National University Hospital in WB aimed to assess adherence to diet, fluid restriction, medications, and HD sessions. Self-reported adherence behavior obtained using ESRD Adherence Questionnaire. Predialytic serum levels of K^+ and PO_4 were obtained as clinical indicator of diet and medication adherence respectively. In addition, interdialytic body weight (IDW) was also obtained from medical records and analyzed in relation to reported adherence of fluid restriction.The results of the study showed that dietary adherence was observed in 24% of patients, while adherence to fluid restriction was observed in 31% of patients. Reported adherence to HD sessions was 52% while adherence to medications was 81%. Overall, 55.5% patients had good adherence, 40.5% had moderate adherence, and 4.1% had poor adherence behavior. Male patients had significantly higher overall adherence scores than females ($P = 0.034$). A significant correlation between reported diet adherence and pre-HD serum K^+ level ($p < 0.01$) was observed. A significant correlation between reported fluid restriction adherence and IDW ($p < 0.01$) was also found (Naalweh et al., 2017).

A comprehensive systematic review study aimed to identify factors associated with nonadherence to medication therapy in patients undergoing HD. The study results showed that the prevalence of medication nonadherence varied from 12.5% to 98.6%. Most common factors significantly associated with nonadherence were younger age, non-Caucasian ethnicity, and illness interfering family life, being a smoker, and being single, divorced or widowed. Similarly, disease-related factors included duration of HD, recurrent hospitalization, having diabetes and hypertension. Medication-related factors such as daily tablet count, total pill burden, and complexity of medication regimen were also associated with poor adherence (Ghimire et al., 2015).

Another descriptive study carried out in Turkey aimed to determine adherence to diet and fluid restriction among patients on HD. The study included 154 patients, and the results

showed that 98.3% of patients were not adherent to their prescribed diet, 95% were not adherent to fluid restriction, and they were found to have IDWG of 3 – 4.4 kg (Efe and Kocaoz, 2015).

A prospective, cross-sectional study carried out in India aimed to evaluate adherence to medication, and study factors associated with non-adherence in CKD patients. The study included 150 CKD patients, and the results showed that 34% of patients were non-adherent to prescribed medication schedule whereas 37.33% patients showed low adherence in Morisky medication adherence scale (MMAS). Investigation of causes of non-adherence reflected that 21.3% of patients attributed non-adherence due to high cost of medication, 20% due to complex dosing schedule, 16% due to fear of adverse effects. Moreover, the results revealed that 68% of patients were not aware about the importance of taking each medicine (Sontakke et al., 2015).

A cross sectional study carried out in India aimed to determine level of adherence to the dietary and fluid restriction among CKD patients. The sample of the study consisted of 100 CKD patients, and the results showed that 20% of patients had mild deviation and 69% of them had moderate deviation from dietary restrictions guidelines. In addition, the results showed that 69% of patients had moderate deviation, and 22% had mild deviation from fluid restriction guidelines. Moreover, there was no association between age and sex and adherence level, while patients education was associated with level of adherence as illiterate patients were more deviated from guidelines (Beerendrakumar et al., 2018).

A descriptive and cross-sectional study carried out in Brazil aimed to assess the adherence of CKD patients to the four dimensions of the therapeutic regimen: hemodialysis, medication use, diet and fluid restriction. The sample of the study consisted of 78 CKD patients on HD for more than three months. The results showed that 68% of pediatric patients expressed adherence to HD, 93.6% expressed adherence to medication, 82.1% were adherent to fluid restriction, and 85.9% were adherent to diet (Lins et al., 2018).

In Ethiopia, a cross sectional study carried out to assess the management practice, medication adherence, and factors affecting medication adherence in CKD patients. The sample of the study consisted of 256 CKD patients recruited through systematic random sampling. Data were collected from medical records and interviewing patients. The rate of adherence was determined using 8-item Morisky medication adherence scale. The results showed that 61.3% (stages 1 and 2=70%, stage 3=73.9%, stage 4=54.5%, and stage

5=43%) of the study population were adherent to their treatment regimens. Forgetfulness (79.8%) was the major reason for medication nonadherence (Kefale et al., 2018).

2.2.7 Burden of nonadherence to treatment in CKD pediatric patients

Chronic Kidney Disease is a public health problem worldwide. CKD involves the patients and their families because it requires behavioral changes including changes in lifestyle, and changes in dietary and fluid intake (Barnett et al. 2008). Therefore, to treat these patients successfully, adherence to complex treatment program including diet, fluid, and HD is essential. On the other hand, nonadherence to diet and fluid restrictions may lead to accumulation of metabolic by-products and excess fluid in the circulatory system, leading to increased morbidity and mortality for CKD patients. CKD, especially if it develops early in life, leads to significant height stunting and disproportionate growth failure. The height deficit begins as early as the first postnatal months, with a cumulative height deficit of -3 standard deviations by 3 years of age (Kaspar et al., 2016).

Low or nonadherence to dietary regime is a significant health problem that reduces the benefits of treatments, exacerbates symptoms, reduces quality of life for the patient, as well as increasing costs to both the patient and the health system (Ahrari et al. 2014).

In GS, with scarce resources and high poverty rate caused by the long-term siege, the situation is very difficult for MOH and the families of the pediatric patients. From my experience in dialysis units, there is shortage of the intravenous solutions for dialysis, which put the life of pediatric patients with CKD at risk. In addition, the number of dialysis machines designed for children is about 15 machines which is inadequate compared to the number of patients (50 pediatric patients), and the number is increasing steadily. In addition, pediatric patients with CKD should come to the hospital 3 to 4 times per week for HD, and that is consuming for the patient and his parents, as many families cannot afford to pay for that. In addition, school-age children will be away from school and that will affect their school achievement.

Chapter Three

Methodology

3.1 Study design

This study utilized a cross-sectional design. This design is appropriate for describing the status of phenomena (adherence to diet, fluids, and medication), and for describing relationships between phenomena (relationship between BP and diet, fluid, and medication). Furthermore, cross-sectional involves the collection of data about the phenomena under study during a single period of time (Polit and Beck, 2012).

3.2 Setting of the study

The study was carried out in hemodialysis units at governmental hospitals in the Gaza Strip, namely Al Shifa Medical Complex, Nasser Medical Complex, Al Aqsa hospital, Al Najar hospital, and Al Rantesy Specialized Pediatric Hospital.

3.3 Population and sample of the Study

The population for the study consisted of all the children with CKD undergoing hemodialysis in the governmental hospitals in the Gaze Strip (Al Rantesy, Nasser, Shohada Al Aqsa, and Al Najar hospital). The total number of children with CKD was 49 patients. The sample of the study consisted of 43 children with CKD and undergoing to hemodialysis (census). The response rate was 87.7% as presented in table (3.1).

Table (3.1):Distribution of study participants by hospital

Hospital	Frequency	Percent
Al Najar	2	4.7
Nasser	5	11.6
Shohada Al Aqsa	1	2.3
Al Rantesy	35	81.4
Total	**43**	**100.0**

3.4 Period of the study

The study commenced from January 2018 to March 2019. Data collection took place from April to July 2018.

3.5 Eligibility criteria

3.5.1 Inclusion criteria

- Children with CKD aged ≤18 years.
- On hemodialysis.

3.5.2 Exclusion criteria

- Patients with history of mental illness.

3.6 Instruments of the study

After reviewing literature and previous studies, the researcher developed a questionnaire for data collection. The questionnaire consisted of the following parts: (Annex 2)

- **Sociodemographic characteristics of study participants:** (child gender, age, educational level, place of residency, hospital, family income, fathers' education, and mothers' education). Number of HD sessions per week, years of being on dialysis, weight. Medical history of the participants (presence of hypertension, cardiac disease, Diabetes mellitus, number of years on HD, number of HD sessions per week, number of hours per session, type of dialysis machine).
- **Adherence to diet:** measured by serum K^+, serum PO_4, Blood Urea Nitrogen – BUN. (Non-adherence to the diet defined as the presence of at least one of the following: serum K^+> 5.5 mg/dl, serum PO_4> 5.5 mg/dl or serum BUN > 100 mg/dl).
- **Adherence to fluid restriction:** measured by IDWG, and calculated by subtracting the child's weight upon the arrival to the dialysis unit from the weight at the end of previous HD session. (Non-adherence to fluids defined as IDWG > 2.5 kg) (Olivera et al., 2015).
- **Measurement of Blood Pressure:** BP measured by electronic device attached to the dialysis machine. BP is recorded three times each session; at the beginning of the session, at mid of the session, and at the end of session (the Child is considered hypertensive if his or her BP is more than 140/90 mmHg before dialysis or more than 130/ 80 mmHg after dialysis).
- **Role of the nurse in monitoring adherence to diet, fluid restriction, and medication:** The questionnaire consisted of 19 statements, scores for responding to each statement was yes (2) and no (1) for positive statement, and yes (1) and no (2) for negative statements.

- **Adherence to medication:** To determine adherence to medication, the researcher adopted Morisky Medication Adherence Scale (MMAS)(Morisky et al., 2008). Morisky Medication Adherence Scale consists of 8 items. Seven questions have response on yes/no, and one question has a response on a 4-point Likert scale which is (0 = Never, 1= rarely, 2= Sometimes, 3= always). According to the scoring system for the MMAS, the score zero indicate high adherence, 1 – 2 indicate medium adherence, and 3 – 8 indicate low adherence.

3.7 Pilot study

a. Face and content validity

To examine validity, suitability and clarity of the questionnaire items, the researcher distributed the questionnaire to a panel of experts (Annex 3) for reviewing the questionnaire, and their comments were considered in modifying the questionnaire.

b. Reliability

A pilot study carried out on 20 CKD children to check its reliability by using Cronbache alpha method. The results indicated that the questionnaire was reliable as presented below.

Table (3.2): Overall scores of the questionnaire (Cronbache alpha)

Scale	No. of items	Alpha value
The role of the nurse working in hemodialysis unit in monitoring the adherence to diet, fluid, and medication.	19	0.799

3.8 Data Collection

Data collection included the following steps:

- Recruitment of the pediatric patients based on the eligibility criteria.
- The researcher explained the purpose of the study for the child / his or her parents, and then obtained their consent and agreement to participate in the study.
- Filling the questionnaire through interview with the children and or their parents.

3.9 Study procedures

Blood pressure measurement: The researcher measured BP for each participant on three consecutive HD sessions. Each session, the researcher recorded BP on two phases (pre-dialysis and 15 minutes post-dialysis).

Body weight measurement: The researcher measured body weight for each participant on three consecutive sessions. Each session, the researcher recorded body weight on two

phases (pre-dialysis and immediately post-dialysis). IDWG measured by subtracting pre-dialysis body weight from body weight at the end of the previous session.

Serum K^+, PO_4 and BUN: The researcher draw blood sample for each participant on three consecutive sessions. Each session, the researcher recorded levels of serum K^+, PO_4 and BUN on two phases (pre-dialysis and at the end of previous session).

3.10 Data entry and analysis

For data entry, the researcher used SPSS program (version 22). Data entry and analysis included the following steps: Coding design for data entry, then data cleaning, followed by performing descriptive analysis including frequencies, means, standard deviation, and percentage. In addition, performing inferential analysis using T test, One way ANOVA, and Pearson correlation test.

3.11 Ethical and administrative considerations

Before carrying out the study, the researcher got approval from Al-Quds University. Then the researcher obtained approval letter from Helsinki Committee (Annex 4), and MOH (Annex 5). The subjects were informed that participation in the study is voluntary and the patients have the right to refuse the participation or withdraw from the study at any time. The researcher assured the participants that he would use data for research purposes only. The researcher obtained consent from each participant before data collection (annex 1).

3.12 Limitation of the study

The researcher faced difficulties in controlling for potentially confounding biochemical factors that might have influenced serum potassium, phosphorus and urea levels. In addition, the researcher faced difficulties in controlling for potentially confounding and isolation the effects of the socio-behavioral variables associated with adherence.

Chapter Four

Results and Discussion

4.1 Descriptive results

The sample of the study consisted of 43 children with CKD, on HD from GS. The characteristics of study participants presented below.

4.1.1 Sociodemographic characteristics of study participants

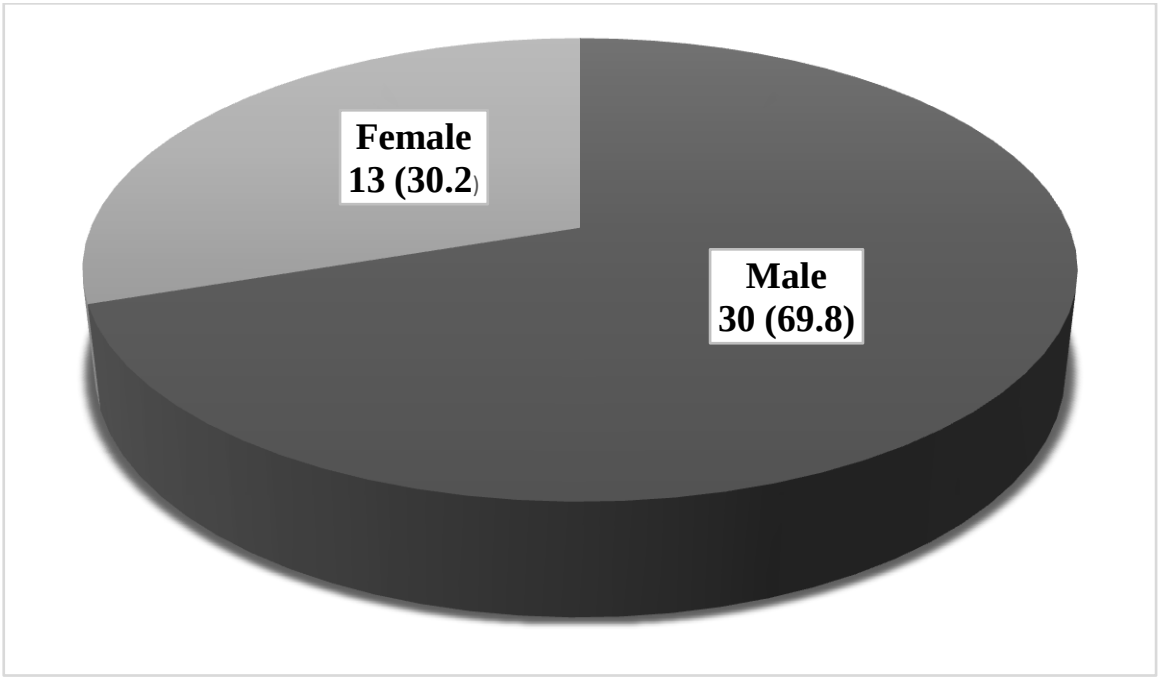

Figure (4.1): Distribution of study participants by gender

Figure (2.1) showed that 30 (69.8%) of study participants were male children and 13 (30.2%) were female children. This result was consistent with Harambat et al., (2012) who reported that the incidence and prevalence of pediatric CKD is greater in males than females because of the higher frequency of congenital abnormalities of the kidney and urinary tract in males.

Table (4.1): Sociodemographic characteristics of the study participants (n=43)

Variable	Frequency	Percent
Age of child		
≤12 years	20	46.5
> 12 years	23	53.5
Total	**43**	**100.0**
Mean age= 11.78±4.52 years		
Level of education		
Preschooler	13	30.2
Primary school	19	44.2
Preparatory school	6	14.0
Secondary school	5	11.6
Total	**43**	**100.0**
Place of residency		
South area	16	37.2
Middle area	4	9.3
Gaza and north	23	53.5
Total	**43**	**100.0**
Hospital		
Al Najar	2	4.7
Nasser	5	11.6
Shohada Al Aqsa	1	2.3
Al Rantesy	35	81.4
Total	**43**	**100.0**

Table (4.1) showed that 20 (46.5%) of pediatric patients aged 12 years and less and 23 (53.5%) aged more than 12 years, their mean age was 11.78±4.52 years. Moreover, 19 (44.2%) of study participants had primary school education and 13 (30.2%) were preschoolers. In addition, 23 (53.5%) were from Gaza governorate and north of Gaza, 16 (37.2%) were from the southern governorates, and 4 (9.3%) from the middle governorate. Moreover, 35 (81.4%) received HD at Al Rantesy hospital, 5 (11.6%) received HD at Nasser hospital, and 2 (4.7%) received HD at Al Najar hospital.

Table (4.2): Family characteristics (n=43)

Variable	Frequency	Percent
Fathers' education		
Preparatory school and less	17	39.5
Secondary school	11	25.6
University	15	34.9
Total	43	100.0
Mothers' education		
Preparatory school and less	15	34.9
Secondary school	18	41.9
University	10	23.2
Total	43	100.0
Family income		
Less than 1832 NIS	40	93.0
1832 NIS and more	3	7.0
Total	43	100.0
Mean income= 816.27 SD= 631.67 NIS		

NIS= New Israeli Shekel

Table (4.2) showed that 17 (39.5%) of fathers had low education preparatory school and less, 15 (34.9%) of fathers had university education, while 11 (25.6%) of fathers had secondary school education. Furthermore, 18 (41.9%) of mothers had secondary school education, 15 (34.9%) had preparatory school education and less, and 10 (23.2%) of mothers had university education. These results reflected that the majority of parents had low education of secondary school and less.In addition, 40 (93.0%) of families have monthly income of less than 1832 NIS (poverty line according to PCBS), and only 3 (7.0%) had an income of 1832 NIS and more. So, we can conclude that there is as association between parents' level of education, family income and the prevalence of ESRF.

4.1.2 Medical characteristics of study participants

Table (4.3): Medical characteristics of the study participants (n=43)

Variable	Frequency	Percent
Hypertension		
Yes	38	88.4
No	5	11.6
Heart Diseases		
Yes	10	23.3
No	33	76.7
Diabetes Miletus type I		
Yes	0	0
No	43	100.0
Other disease(s)		
Yes	10	23.3
No	33	76.7

Table (4.3) showed that 38 (88.4%) of study participants had hypertension, 10 (23.3%) had heart disease, none of them had Diabetes type I, and 10 (23.3%) had other diseases such as asthma, and chronic chest infections.

This result indicated that the majority of pediatric CKD patients have HTN. This result was consistent with Kramer et al., (2011) who reported that HTN is highly prevalent in pediatric CKD patients. In addition, Agarwal et al., (2014) reported that 76% of pediatric CKD patients on chronic dialysis had HTN, while other studies reported that about 50% of pediatric CKD patients had HTN (Samuels et al., 2012; Mitsnefes, 2012). These result reflected that HTN is highly prevalent among pediatric CKD patients.

Table (4.4): Information about dialysis (n=43)

Variable	Mean	SD	Min-Max value
Years of dialysis	3.73 year	2.26 year	6 months – 8 years
Sessions per week	2.69 session	0.96 session	1 – 4 sessions
Hours per session	3.74 hours	0.44 hour	3 – 4 hours
Emergency dialysis per month	1.11 time	1.21 time	0 – 4 times

Table (4.4) showed that the study participants have been on hemodialysis for 6 months to 8 years with mean 3.73±2.26 years. Number of sessions ranged between 1 – 4 sessions per week with mean 2.69±0.96 session per week. Duration of each session ranged between 3 –

4 hours with mean 3.74±0.44 hours per session. Emergency dialysis ranged from 0 – 4 times per month with mean 1.11±1.21 times per month.

4.2 Adherence to diet, fluid, and medication

The researcher examined adherence to diet by testing serum levels of K^+, PO4, and BUN. The researcher tested each parameter three times before dialysis sessions then the researcher calculated the mean level for each parameter. The researcher examined adherence to fluids intake by body weight in two phases (pre-dialysis and post-dialysis) and target weight was calculated. Body weight has been measured three times (each session), and then the mean weight has been calculated as presented in table (4.5).

Table (4.5): Adherence to diet and fluids (n=43)

Indicator	Mean	SD	Min	Max	Adherence indicator
Diet parameters					
Pre-dialysis serum potassium (K^+ mg/dl)	5.49	0.77	4.27	7.27	< 5.50
Pre-dialysis serum phosphorous (PO_4 mg/dl)	6.52	1.98	2.67	11.83	< 5.50
Pre-dialysis serum (BUN mg/dl)	161.04	52.42	55.33	292.0	< 100.0
Fluids intake parameters (Wt. Kg)					
Weight upon arrival for sessions (pre-dialysis)	25.10	9.51	3.53	49	-
Weight at the end of sessions (post-dialysis)	23.37	8.96	3.27	46	-
IDWG (kg)	1.73	0.55	0.10	3.83	< 2.50

Table (4.5) showed indicators that reflect adherence to diet and fluids. The results showed that the pre-dialysis serum K^+ ranged from 4.27 to 7.27 mg/dl with mean 5.49±0.77 mg/dl. Pre-dialysis serum PO_4 ranged from 2.67 to 11.83 mg/dl with mean 6.52±1.98 mg/dl. Pre-dialysis serum BUN ranged from 55.33 to 292.0 mg/dl with mean 161.04±52.42 mg/dl. These results indicated poor adherence to diet as mean serum K^+ was at borderline and the mean of serum PO_4 and BUN were high. Indicators for adherence to fluids showed that IDWG ranged from 0.10 kg to 3.83 kg with mean IDWG 1.73±0.55 kg.

As presented in our results, it is clear that there was no control of diet as indicated by the levels of K+, PO4, and BUN. This result is explained in the context that high K^+ content

presents in fruits, and people in Gaza do not eat much fruits on daily basis and if they eat fruits, they usually eat small amount of fruits. On the other hand, PO_4 present in many foods such as meat products, dairy products, eggs and processed foods, and these foods are eaten almost every day, which in turn lead to elevation of serum PO_4 in the blood. Controlling phosphate intake was also challenging for most patients. Nearly matched results obtained by Beerappa and Chandrababu (2019)who found that 65% of study participants have good adherence to dietary K^+(mean pre-dialysis serum K^+ 5.0±0.76 mEq/L), 68.3% of participants had serum phosphate level in the range of 2.5 - 4.5 mg/dL with mean 3.27 ± 0.98 mg/dL, and the total mean IDWG of the participants was 1.40 ± 0.37 kg. Furthermore, Ibrahim et al., (2015) found that IDWG and serum PO_4 were significantly high. In addition, the results of Ahrari et al., (2014) matched with our results, which showed that mean serum K^+ was 4.76 mg/l, mean serum PO_4 was 6.37 mg/dl, and mean IDWG was 1.49 kg.

Table (4.6): Participants' response on Morisky Medication Adherence Scale (n=38)

Item	Response	
	Yes n (%)	**No n (%)**
1. Do you forget sometimes to take anti-hypertensive medication?	17 (44.7)	21 (55.3)
2. In the last two weeks, did you forget to take anti-hypertensive medication?	14 (36.8)	24 (63.2)
3. Did you stop taking your anti-hypertensive medication without informing your physician, because you feel unpleasant when taking the medication?	10 (26.3)	28 (73.7)
4. When you go out or travel, do you sometimes forget (without intension) to take your anti-hypertensive medication with you?	35 (92.1)	3 (7.9)
5. Did you take your anti-hypertensive medication yesterday? (*)	29 (76.3)	9 (23.7)
6. When you feel that your BP is controlled, do you sometimes stop taking your anti-hypertensive medication?	16 (42.1)	22 (57.9)
7. Did you feel one-day that you were disturbed from taking anti-hypertensive medication?	29 (76.3)	9 (23.7)
8. Do you have difficulty remembering to take all your medication?	21 (55.3)	17 (44.7)
Overall mean score = 4.50±1.84		

(*) reversed statement

Table (4.6a) showed that 35 (92.1%) sometimes forgot to take their antihypertensive medication when they go out or travel, 29 (76.3%) felt one-day that they were disturbed from taking antihypertensive medication, 29 (76.3%) said that they took their antihypertensive medication yesterday. In addition, 17 (44.7%) forget sometimes to take their anti-hypertensive medication, and 16 (42.1%) sometimes stop taking their anti-hypertensive medicationwhen they feel that their BP is controlled. Generally, the results indicated low adherence to antihypertensive medication among CKD patients with mean score 4.500±1.841.

Table (4.6b): Adherence to medication among study participants (n=38)

Level of adherence	Score	n	percent
High	Zero	0	0
Medium	1 – 2	6	15.8
Low	3 - 8	32	84.2

Table (4.6b) showed that the majority of children 32 (84.2%) have low adherence to medication and 6 (15.8%) of them have medium adherence to medication. Similar results obtained by Minutolo et al., (2011) who found that the prevalence of medication nonadherence varied from 12.5% to 98.6%.

Inconsistent results obtained bya study carried out in India showed that 34% of patients were non-adherent to prescribed medication schedule whereas 37.33% patients showed low adherence in Morisky medication adherence questionnaire (Sontakke et al., 2015).

Table (4.7): Role of the nurses working in hemodialysis units in monitoring adherence of pediatric patients to fluid, diet, and medication

No.	Item	Yes n (%)	No n (%)
1.	Are your blood pressure taken by the nurse during dialysis session three times?	34 (79.1)	9 (20.9)
2.	Does the nurse measure your weight before dialysis session?	37 (86.0)	6 (14.0)
3.	Does the nurse measure your weight after dialysis session?	37 (86.0)	6 (14.0)
4.	Have you received instructions regarding food during dialysis?	40 (93.0)	3 (7.0)
5.	Are the nurses advising the patients or their parents about the correct time of medications before dialysis session?	35 (81.4)	8 (18.6)
6.	Are the nurses advising the patients or their parents about the correct time of medications after dialysis session?	35 (81.4)	8 (18.6)
7.	Do the nurses make check for the patient weight at the end of dialysis?	40 (93.0)	3 (7.0)
8.	Do you receive instructions by the nurses to avoid excessive drinking water during dialysis?	41 (95.3)	2 (4.7)
9.	Did the nurse tell you about the amount of fluid which is allowed during the day?	38 (88.4)	5 (11.6)
10.	Did the nurse tell you about the type of food which is allowed during the day?	40 (93.0)	3 (7.0)
11.	Did the nurse tell you about the amount of food which is allowed during the day?	39 (90.7)	4 (9.3)
12.	Did the nurse inform the patient and /or the parents that the weight between the sessions; should not be more than the 5% of overall weight?	36 (83.7)	7 (16.3)
13.	Did the nurse tell the patients and /or the parents that the increase in the dry weight based on the child's growth and age?	41 (95.3)	2 (4.7)
14.	Have you been advised by the nurse about the importance of adherence to diet to prevent complications?	43 (100.0)	0 (0.0)
15.	Have you been advised by the nurse about the importance of adherence to fluids to prevent complications?	43 (100.0)	0 (0.0)
16.	Have you been advised by the nurse about the importance of adherence to medications to prevent complications?	43 (100.0)	0 (0.0)
17.	Did the nurse tell you about the correct time of taking your drugs after dialysis session?	42 (97.7)	1 (2.3)
18.	Did the nurse teach you about the complications of the disease, diet, fluids intake and medications for the patient and parents?	43 (100.0)	0 (0.0)
19.	Did the nurse teach you about the time of taking medications?	39 (90.7)	4 (9.3)
Overall mean score = 1.913 Weighted percentage = 95.65			

Table (4.7) showed that all the study participants (100%) said that the nurses advised them about the importance of adherence to diet, fluids, and medication. Furthermore, all the study participants (100%) said that the nurses taught them about the complications of the disease, diet, fluid intake, and medication. In addition, 42 (97.7%) of study participants mentioned that the nurses tell them about the correct time of taking medication after dialysis session. While 34 (79.1%) of study participants stated that the nurses check BP 3 times during dialysis session. In general, the results indicated that the nurses showed high level (95.65%) of monitoring the adherence of their patients concerning diet, fluid intake, and medication.

In my opinion, nurses in the dialysis unit play an important role in monitoring adherence of their patients to the treatment program. They are measuring their body weight, BP, and checking their serum levels of electrolytes and BUN every time they are coming for HD. Therefore, they are in a position to closely monitor and observe any deviation occurred in their patients. In addition, they have adequate time to set with their patients during dialysis to assess their diet and fluid intake, they can inform them about type of foods allowed and which foods are not permitted. In addition, they can inform them about amount and type of fluids that they can drink. By doing that, the nurses can fulfill their role in assessing, monitoring and educating their patients about proper ways to maintain good adherence to treatment, and avoid complications and progression of the disease.

Table (4.8) Summary of adherence to diet, fluids, medication, and role of the nurse in hemodialysis

Item	**Adhered n (%)**	**Not adhered n (%)**	**Mean ±SD**
Diet	3 (7.0)	40 (93.0)	-
Fluids	38 (88.4)	5 (11.6)	-
Medications	14 (36.8)	24 (63.2)	4.500±1.841
Role of the nurses in monitoring the adherence of pediatric patients to diet, fluid intake, and medication.	40 (93.0)	3 (7.0)	1.913±0.128

Table (4.8) showed that 3 (7%) of study participants were fully adhered to diet, 38 (88.4%) were fully adhered to fluids intake, and 14 (36.8%) were fully adhered to anti-hypertensive medication. In addition, 40 (93%) of study participants reported that the nurses were fully performing their role in monitoring the adherence of patients to diet, fluids intake, and medication.

Nearly matched results obtained by Nerbass et al., (2010) who found that 61% of patients reported lack of adherence to dietary recommendations. In addition, Nerbass et al., (2017) more recent study by the same researchers found that the prevalence of patients with high % IDWG (> 4.5% of DW) and hyperkalemia is around 30%, while of hypophosphatemia is even higher (around 45%), and almost 58% of the patients had a salt intake over recommendation ().

On the other hand, better results obtained by Niraj et al., (2018)who found that 20% of patients had mild deviation and 69% had moderate deviation from dietary restrictions,also 69% had moderate deviation, and 22% of them had mild deviation from fluid restriction.Moreover, Magacho et al., (2011) have reported that 26% to 28% of CKD patients were non-adherent to medication prescribed by their physicians. Naalweh et al., (2017) found that dietary adherence observed in 24% of patients, adherence to fluid restriction observed in 31% of patients, adherence to HD sessions was 52%, adherence to medications was 81%, and overall, 55.5% patients had good adherence, 40.5% had moderate adherence, and 4.1% had poor adherence behavior. Another study carried out in Brazil showed that 68% of patients expressed adherence to HD, 93.6% expressed adherence to medication, 82.1% were adherent to fluid restriction, and 85.9% were adherent to diet (Lins et al., 2018).

Poor adherence found by Efe and Kocaoz (2015) who reported that 98.3% of patients were not adherent to prescribed diet, 95% were not adherent to fluid restriction, and they have IDWG of 3 – 4.4 kg.

Our results indicated good adherence to fluid intake and low adherence to diet and medication. This result raised the need for more attention from healthcare providers and parents on methods to improve adherence to diet and medication to avoid deterioration of the health condition of those patients resulted from poor adherence.

Table (4.9) Status of blood pressure before and after dialysis (n=43)

Blood Pressure (mmHg)	Pre-dialysis		Post-dialysis		Overall	
	Mean ± SD	Min - Max	Mean ± SD	Min - Max	Mean ± SD	Min - Max
Systolic BP (SBP)	129.66±19.50	93.67-176.67	111.55±19.64	83.33-175.67	120.61± 18.82	91.00 – 171.00
Diastolic BP (DBP)	78.58±13.52	55.33-110.00	68.08±14.95	47.33-121.67	73.33±13.61	51.33 – 112.00

Table (4.9) presented description of BP findings. The results showed that the mean SBP at pre-dialysis phase was 129.66±19.50 mmHg and at post-dialysis phase was 111.55±19.64 mmHg, the mean DBP at pre-dialysis phase was 78.58±13.52 mmHg and at post-dialysis phase was 68.08±14.95 mmHg.These results showed considerable differences between systolic and diastolic BP which caused by fluid accumulation between sessions. HTN is a common manifest among CKD patients. Therefore, measurement and control of BP is necessary step in the management of these patients. A study carried out in Gaza found significant increase in the SBP and DBP in HD patients (Muhaisen et al., 2012).

Table (4.10): Correlation between blood pressure and adherence to diet, fluids, medication, and role of nurses in monitoring adherence (n=43)

Variable	SBP (mmHg)		DBP (mmHg)	
	r	p-value	r	p-value
Diet				
K^+ mg/dl	-0.168	0.281	-0.048	0.760
PO_4 mg/dl	-0.237	0.125	-0.248	0.109
BUN mg/dl	-0.280	0.069	-0.364	**0.016 ***
Fluids (IDWG)	0.291	0.058	0.431	**0.004 ***
Medication - Morisky score	-0.142	0.396	-0.205	0.217
Role of the nurses in monitoring the adherence	-0.141	0.367	-0.130	0.406

r= correlation

* Significant at the 0.05 level.

Table (4.10) showed that there is a statistically significant inverse correlation between DBP and BUN (r= -0.364, P= 0.016), and there was a statistically significant positive correlation between DBP and fluid intake (r= 0.431P= 0.004). While there is no statistical significant correlation between SBP and adherence to diet (K^+, PO_4, BUN), fluids, medication, and role of nurses in monitoring adherence.

The researcher believes that patients with CKD needs to modify their lifestyle, focusing on diet and fluid intake as the prognosis of these patients largely depends on adherence to the recommended nutritional regime. Nonadherence to the suggested diet and fluids regime leads to rapid worsening of the condition. Elevation of BP is one of the main complications associated with CKD, thus, adherence to diet, fluid intake, and medication is essential to control BP.

Table (4.11): Correlation between diet, fluid, medication adherence and role of nurses'monitoring in adherence

Variable	Diet		Fluids		Medication	
	r	p value	r	p value	r	p value
Fluids	0.42	0.510	-	-	-	-
Medications	-2.06	0.042*	1.220	0.222	-	-
Role of nurses' in monitoring adherence.	-0.490	0.620	-0.040	0.961	-0.160	0.320

r= correlation – Pearson test * Significant at the 0.05 level.

Table (4.11) showed that there was statistically significant correlation between diet and medication (P= 0.04), but there is no statistical significant correlation between diet and fluids and role of the nurse in monitoring adherence (P= 0.51 and 0.62 respectively). Koc et al., (2011) found positive relationship between IDWG and elevated BP. In addition, the results of Paglialonga et al., (2015) indicatedpositive relationshipbetween IDWG and elevated BP. Another study carried out in WB reported significant correlation between diet adherence and serum pre-HD K^+ level, and significant correlation between fluid restriction adherence and IDW (Naalweh et al., 2017).

It is important to say that diet, fluids, and medication are independent factors that are important components of treatment program for CKD patients. Even though the results did not show significant correlation between the three factors but they are collectively vital for

the progression of the disease and avoiding complications that may encounter because of nonadherence to these factors.

Table (4.12): Correlation between blood pressure and selected variables

Variable	SBP (mmHg)		DBP (mmHg)	
	r	p-value	r	p-value
Age (years)	0.26	0.091	0.27	0.081
Family income (NIS)	-0.15	0.302	-0.05	0.710
Number of years on dialysis	0.20	0.188	0.19	0.203
Session/week	0.17	0.270	0.26	0.091
Hours/session	-0.50	0.001*	-0.47	0.001*
Emergency dialysis (time/month)	0.05	0.742	-0.02	0.880

r= correlation * Significant at the 0.05 level

Table (4.12) showed that there was statistically significant inversed correlation between SBP, DBP and number of hours per HD session (P= 0.001), which means that longer hours of dialysis will lead to lower SBP and DBP. Inconsistent results obtained by Clark-Cutaia et al., (2014) who foundno relationship betweenhours of dialysis sessionandBP for patients with CKD.

In my opinion, if the patient stayed longer hours on the HD, the patient will lose more fluids and other substances, and as a result his BP will be lower and he will lose more weight. Because the dialysis unit in Al Rantesy hospital is the only one that serve pediatric patients with CKD in GS, usually the patients do not stay on HD for more than three hours per session. There are 14 machines in the unit serving all the 50 pediatric patients, and that caused pressure on the machines and nurses who are working in the unit.

Table (4.13): Differences in adherence related to gender of child (N= 43)

Variable	Gender	n	Mean	SD	t	P value
SBP	Male	30	129.177	20.417	-0.247	0.806
	Female	13	130.794	17.933		
DBP	Male	30	78.088	13.917	-0.359	0.721
	Female	13	79.717	13.045		
Serum K^+	Male	30	4.238	0.599	-0.593	0.557
	Female	13	4.362	0.697		
Serum PO_4	Male	30	6.493	1.837	-0.160	0.874
	Female	13	6.600	2.373		
BUN	Male	30	168.922	55.288	1.520	0.136
	Female	13	142.871	41.468		
Fluid IDWG	Male	30	1.402	0.897	-1.611	0.115
	Female	13	1.853	0.699		
Medication (n= 38)	Male	30	4.360	1.868	-0.645	0.523
	Female	13	4.769	1.832		
Role of the nurse in monitoring adherence	Male	30	36.866	2.239	2.201	0.033*
	Female	13	35.153	2.577		

* Difference is significant at the 0.05 level.

Table (4.13) showed that there were statistically significant differences in the mean role of the nurse in monitoring adherence (P= 0.033) with regard to gender in favor of females. The results also showed that there is no statistical significant difference in the mean of SBP (P= 0.806), DBP (P= 0.721), serum K^+ (P= 0.557), serum PO_4 (P= 0.874), BUN (P= 0.136), fluids (P= 0.115) and medication (P= 0.523) with regard to gender.

Similar results obtained in a study conducted in India and found no association between gender and adherence level (Beerendrakumar et al., 2018). In contrary, different results obtained by Naalweh et al., (2017) which showed that male patients had significantly higher overall adherence scores than females, while Clark-Cutaia et al., (2014) found that female patients reported more problems managing their diet.

Table (4.14): Differences in adherence related to age (N= 43)

Variable	Age group	N	Mean	SD	t	P value
SBP	Less than 12	18	126.222	17.459	-0.982	0.332
	12 and more	25	132.146	20.839		
DBP	Less than 12	18	76.833	10.894	-0.715	0.479
	12 and more	25	79.840	15.235		
Serum K^+	Less than 12	18	4.253	0.568	-0.201	0.841
	12 and more	25	4.292	0.673		
Serum PO_4	Less than 12	18	6.863	2.297	0.944	0.351
	12 and more	25	6.282	1.736		
BUN	Less than 12	18	179.037	49.187	1.974	0.055
	12 and more	25	148.093	51.755		
Fluid (IDWG)	Less than 12	18	1.042	0.685	-3.651	0.001*
	12 and more	25	1.896	0.802		
Medication (n= 38)	Less than 12	15	4.466	2.166	-0.089	0.930
	12 and more	23	4.521	1.647		
Role of the nurse in monitoring adherence	Less than 12	18	36.944	2.042	1.368	0.179
	12 and more	25	35.920	2.660		

* Difference is significant at the 0.05 level.

Table (4.14) showed that there is a statistical significant difference in the mean level of adherence to fluid intake (P= 0.001), in which the mean of adherence among children who are 12 years old and more is higher than the mean of adherence among children who are below 12 years. Moreover, there are no statistical significant differences in SBP (P= 0.332), DBP (P= 0.479), serum K^+ (P= 0.841, serum PO_4 (P= 0.351), BUN (P= 0.055), medication (P= 0.930), and role of nurses in monitoring adherence (P= 0.179) with regard to the age groups of children.

Previous studies reflected variation in results. In a systematic review carried out by Ghimire et al., 2015), the results showed that the prevalence of nonadherence to medication varied between patients, and younger age was a common factor significantly associated with poor adherence to medication. Another study showed that younger patients with CKD have more problems managing their diet and restricting sodium intake (Clark-Cutaia et al., 2014). On the other hand, Beerendrakumar et al., (2018) found that there was no association between age and adherence level.

The researcher thinks that our results are convincing because all the participants of the study are from childhood age and there were not big gap between different ages, besides that they are under control of their parents at home, and that caused similar levels of adherence.

Table (4.15): Differences in adherence related to educational level of children (N= 43)

Variable	Group	n	Mean	SD	F	P value
SBP	Preschooler	13	124.102	21.396	2.258	0.097
	Primary school	19	128.684	13.639		
	Prep school	6	128.444	23.521		
	Secondary school	5	149.333	22.361		
DBP	Preschooler	13	73.589	11.336	2.896	0.047 *
	Primary school	19	78.491	11.295		
	Prep school	6	77.500	18.057		
	Secondary school	5	93.200	14.268		
Serum K^+	Preschooler	13	4.230	0.577	0.108	0.955
	Primary school	19	4.334	0.679		
	Prep school	6	4.190	0.780		
	Secondary school	5	4.273	0.473		
Serum PO_4	Preschooler	13	6.533	2.436	0.422	0.738
	Primary school	19	6.771	1.736		
	Prep school	6	6.477	1.890		
	Secondary school	5	5.626	2.064		
BUN	Preschooler	13	153.205	43.419	3.595	0.022 *
	Primary school	19	183.070	56.747		
	Prep school	6	153.388	38.604		
	Secondary school	5	106.933	24.448		
Fluid (IDWG)	Preschooler	13	0.928	0.699	4.397	0.009 *
	Primary school	19	1.689	0.845		
	Prep school	6	1.866	0.849		
	Secondary school	5	2.160	0.469		
Medication (n=38)	Preschooler	12	4.750	2.094	2.223	0.103
	Primary school	15	4.333	1.588		
	Prep school	6	5.666	1.366		
	Secondary school	5	3.000	1.732		
Role of the nurse in monitoring adherence	Preschooler	13	36.692	2.323	2.357	0.087
	Primary school	19	36.789	1.960		
	Prep school	6	34.000	3.847		
	Secondary school	5	36.600	1.140		

Statistical testing using ANOVA, *= Difference is significant at the 0.05 level

Table (4.15) showed that there was no statistical significant difference in the mean of SBP (P= 0.097), serum K^+ (P= 0.955), serum PO_4 (P= 0.738), medication (P= 0.103), and role of nurses in the monitoring of adherence (P= 0.087) with regard to child's level of education. Also, there was a statistical significant difference in the mean level of DBP (P= 0.047) with regard to the child's level of education, Scheffe test was conducted to show the difference between which groups and revealed that the children who have secondary school; have higher DBP compared to children of lower level of education. Also, there are statistical significant differences in IDWG (P= 0.009) with regard to the child's level of education. Scheffe test revealed that secondary school children have lower adherence to fluid intake.

The results of Beerendrakumar et al., (2018) were not matching with our results as it showed that illiterate patients had lower adherence to diet and fluid restriction, while our results indicated that there were no significant differences in adherence to treatment program related to educational level of the pediatric patients. In my opinion, level of education is an important factor in adherence to treatment, and that patients with higher level of education will have higher awareness and understanding about their treatment program, which in turn will improve their adherence to treatment. The researcher explains our results in the context that younger patients are observed and monitored closely by their parents, and their parents follow the instructions of treatment, and that will improve their adherence to treatment, and that would lead to similar levels of adherence among younger children and older children.

Table (4.16): Difference in adherence related to place of residency (N= 43)

Variable	Group	N	Mean	SD	F	P value
SBP	Rafah	6	137.222	28.774	1.726	0.164
	Khanyounis	10	137.666	16.814		
	Middle	4	137.083	19.969		
	Gaza	21	123.857	15.613		
	North	2	113.166	27.577		
DBP	Rafah	6	86.277	16.697	1.542	0.210
	Khanyounis	10	80.900	16.511		
	Middle	4	84.500	12.688		
	Gaza	21	75.317	10.541		
	North	2	66.333	7.542		
Serum K^+	Rafah	6	4.596	0.596	1.622	0.189
	Khanyounis	10	4.147	0.658		
	Middle	4	4.005	0.360		
	Gaza	21	4.368	0.628		
	North	2	3.522	0.094		
Serum PO_4	Rafah	6	6.772	2.273	0.462	0.763
	Khanyounis	10	5.790	1.721		
	Middle	4	7.091	3.493		
	Gaza	21	6.668	1.765		
	North	2	6.833	2.545		
BUN	Rafah	6	148.611	49.828	0.559	0.693
	Khanyounis	10	145.366	63.578		
	Middle	4	166.666	81.270		
	Gaza	21	172.174	44.664		
	North	2	148.666	22.627		
Fluid (IDWG)	Rafah	6	2.222	0.449	3.763	0.011 *
	Khanyounis	10	1.823	0.787		
	Middle	4	0.850	0.765		
	Gaza	21	1.254	0.822		
	North	2	2.433	0.612		
Medication (n= 38)	Rafah	6	4.500	2.073	0.693	0.602
	Khanyounis	9	3.666	1.412		
	Middle	4	5.250	3.201		
	Gaza	17	4.705	1.686		
	North	2	5.000	1.414		
Role of the nurse in monitoring adherence	Rafah	6	37.000	1.673	0.425	0.790
	Khanyounis	10	35.500	3.240		
	Middle	4	36.750	1.500		
	Gaza	21	36.476	2.462		
	North	2	36.500	2.121		

* Difference is significant at the 0.05 level (2-tailed).

Table (4.16) showed that there were no statistical significant differences in SBP (P= 0.10), DBP (P= 0.19), medication (P= 0.60), diet (P= 0.44), and fluids (P= 0.09) related to place of residency. This result indicated that there were no statistical significant differences in

adherence to treatment program related to place of residency. In my opinion, GS is a narrow area with same climate and environment. Life conditions and culture are similar. In addition, the vast majority of patients receive treatment in the same unit, and follow the same treatment protocol and same instructions. Therefore, their adherence to treatment program will be almost the same regardless of their place of residency.

Table (4.17): Difference in adherence related to Hospital (N= 43)

Variable	Group	N	Mean	SD	F	P value
SBP	Al Najar	2	169.500	10.135	5.952	0.002 *
	Khanyounis	5	143.200	14.530		
	Al-Aqsa	1	143.333	.		
	Al-Rantesy	35	125.066	17.157		
DBP	Al Najar	2	105.500	6.363	5.208	0.004 *
	Khanyounis	5	83.933	15.992		
	Al-Aqsa	1	96.666	.		
	Al-Rantesy	35	75.761	11.404		
Serum K^+	Al Najar	2	4.444	0.219	1.229	0.312
	Khanyounis	5	3.802	0.439		
	Al-Aqsa	1	3.988	.		
	Al-Rantesy	35	4.342	.645		
Serum PO_4	Al Najar	2	4.916	1.013	3.485	0.025 *
	Khanyounis	5	4.846	1.595		
	Al-Aqsa	1	3.433	.		
	Al-Rantesy	35	6.945	1.873		
BUN	Al Najar	2	99.500	8.720	6.707	0.001 *
	Khanyounis	5	100.533	26.270		
	Al-Aqsa	1	82.666	.		
	Al-Rantesy	35	175.447	46.436		
Fluid (IDWG)	Al Najar	2	2.633	0.282	2.292	0.093
	Khanyounis	5	2.066	0.323		
	Al-Aqsa	1	1.866	.		
	Al-Rantesy	35	1.391	0.872		
Medication (n=38)	Al Najar	2	6.500	0.707	1.972	0.137
	Khanyounis	5	3.600	1.816		
	Al-Aqsa	1	2.000	.		
	Al-Rantesy	30	4.600	1.792		
Role of the nurse in monitoring adherence	Al Najar	2	35.000	1.414	3.407	0.027 *
	Khanyounis	5	33.600	3.577		
	Al-Aqsa	1	35.000	.		
	Al-Rantesy	35	36.857	2.074		

*significant at 0.05 level

Table (4.17) showed that pediatric patients from Al-Rantesy hospital showed statistically significant lowed SBP and DBP (P= 0.002 and 0.004 respectively), while serum $PO_4$and BUN were significantly higher in children from Al-Rantesy hospital.

Al Rantesy hospital is the only hospital specialized in treatment of pediatric patients with CKD and the only one that have special HD unit for pediatrics. In addition, the physicians and nurses are well trained to treat and care for children with CKD. Furthermore, the machines at Al Rantesy hospitals are designed for children so the children will have better outcome at the end of dialysis sessions. The nurses give adequate instructions and education to the children and their parents about treatment and the importance of adhering to treatment program. All these conditions led to better adherence to treatment among pediatric patients with CKD at Al Rantesy hospital.

Table (4.18): Difference in the adherence level with regard to family income

Variable	Income group	N	Mean	SD	t	P value
SBP	Less than 1800	40	129.883	19.820	0.263	0.794
	1800 and more	3	126.777	17.670		
DBP	Less than 1800	40	78.433	13.559	-0.259	0.797
	1800 and more	3	80.555	15.809		
Serum K^+	Less than 1800	40	4.285	0.645	0.374	0.710
	1800 and more	3	4.144	0.193		
Serum PO_4	Less than 1800	40	6.555	2.030	0.361	0.720
	1800 and more	3	6.122	1.468		
BUN	Less than 1800	40	159.766	52.569	-0.580	0.565
	1800 and more	3	178.111	57.967		
Fluid (IDWG)	Less than 1800	40	1.543	0.851	0.126	0.900
	1800 and more	3	1.477	1.178		
Medication (n= 38)	Less than 1800	35	4.400	1.881	-1.148	0.258
	1800 and more	3	5.666	0.577		

Table (4.18) showed that there were no statistical significant differences in SBP (P= 0.794), DBP (P= 0.797), serum K^+ (0.710), serum PO_4 (P= 0.720), BUN (P=0.565), fluid (P= 0.900), and medication related to family income.

Lower socioeconomic status is a risk factor for CKD progression to end-stage renal disease, and poor health outcomes. Matching results obtained by Hidalgo et al., (2013) who found positive association between income and kidney disease, whileClark-Cutaia et al., (2014) found thatincome did not influence adherence to diet, fluids, and medication.

In my opinion, the economic situation in GS is very low with high inflation rate and poverty. The majority of those who are working or employed have low income. This situation make the whole population almost in the same level; most of the employees

receive between 40% – 50% of their salary with narrow gap between salaries. Therefore, they are almost in the same level, and in consequence, there were no differences in their adherence to treatment related to income.

Table (4.19): Difference in adherence related to fathers' level of education (N= 43)

Variable	Group	N	Mean	SD	F	P value
SBP	Prep and less	17	132.588	13.882	0.349	0.708
	Secondary	11	126.424	16.460		
	University	15	128.733	26.599		
BP	Prep and less	17	80.156	12.783	0.502	0.609
	Secondary	11	75.060	13.329		
	University	15	79.377	14.889		
Serum K^+	Prep and less	17	4.245	.655	0.914	0.409
	Secondary	11	4.106	.519		
	University	15	4.435	.659		
Serum PO_4	Prep and less	17	6.086	1.606	0.903	0.414
	Secondary	11	6.512	2.067		
	University	15	7.033	2.305		
BUN	Prep and less	17	155.745	53.031	0.142	0.868
	Secondary	11	165.636	61.772		
	University	15	163.688	47.410		
Fluid (IDWG)	Prep and less	17	1.666	1.018	0.515	0.580
	Secondary	11	1.315	.748		
	University	15	1.557	.757		
Medication (n= 38)	Prep and less	15	3.733	1.791	3.056	0.060
	Secondary	18	5.222	1.699		
	University	5	4.200	1.788		

Table (4.19) showed that there were no statistical significant differences in SBP (P= 0.708), DBP (P= 0.609), serum K^+ (P= 0.409), serum PO_4 (P= 0.414), BUN (P= 0.868), fluid (P= 0.580), medication (P= 0.060), related to fathers' level of education. This result indicated that there were no statistical significant differences in adherence to treatment related to fathers' level of education. It is worth to say that fathers' level of education is an important factor in adherence of their children to treatment, and that fathers with higher education, their children will have better adherence to treatment. In my opinion, regardless of their level of education, the fathers care about their children and want them to be healthy and in good condition. Therefore, they monitor their children, and give them medication as prescribed and accompany them to the hospital for HD. Therefore, there were no significant differences in adherence to treatment.

Table (4.20): Difference in adherence related to mothers' level of education (N= 43)

Variable	Group	N	Mean	SD	F	P value
SBP	Prep and less	15	131.622	17.052	0.125	0.883
	Secondary	19	128.193	20.448		
	University	9	129.518	23.119		
DBP	Prep and less	15	79.466	13.818	0.232	0.794
	Secondary	19	77.017	14.038		
	University	9	80.407	13.108		
Serum K^+	Prep and less	15	4.255	0.667	1.080	0.349
	Secondary	19	4.168	0.636		
	University	9	4.537	.50298		
Serum PO_4	Prep and less	15	5.753	1.616	1.832	0.173
	Secondary	19	6.887	2.303		
	University	9	7.048	1.564		
BUN	Prep and less	15	151.577	54.607	0.456	0.637
	Secondary	19	163.193	56.673		
	University	9	172.296	40.782		
Fluid (IDWG)	Prep and less	15	1.624	0.975	0.132	0.876
	Secondary	19	1.468	0.841		
	University	9	1.544	0.775		

Table (4.20) showed that there were no statistical significant differences in SBP (P= 0.883), DBP (P= 0.974), serum K^+ (P= 0.349), serum PO_4 (P= 0.173), BUN (P= 0.637), fluid (P= 0.876), medication (P= 0.060) related to mothers' level of education.

This result indicated that there were no statistical significant differences in adherence to treatment related to mothers' level of education. It is worth to say that mothers' level of education is an important factor in adherence of their children to treatment, and that mothers with higher education, will have better understanding of the disease process and special precautions needed to avoid complications and worsening the condition of their children. Therefore, their children will have better adherence to treatment. In my opinion, regardless of their level of education, the mothers care about their children and want them to be healthy and in good condition. So, they monitor their children, and give them medication as prescribed and accompany them to the hospital for HD. Therefore, there were no significant differences in adherence to treatment.

Table (4.21): Difference in adherence related to number of years on dialysis (N= 43)

Variable	Group	N	Mean	SD	t	P value
SBP	< 5 years	26	126.34	19.95	-1.396	0.170
	≥ 5 years	17	134.74	18.19		
DBP	< 5 years	26	76.43	13.63	-1.297	0.202
	≥ 5 years	17	81.86	13.06		
Serum K^+	< 5 years	26	4.28	0.59	0.144	0.886
	≥ 5 years	17	4.25	0.69		
Serum PO_4	< 5 years	26	6.83	2.04	1.260	0.215
	≥ 5 years	17	6.05	1.85		
BUN	< 5 years	26	176.32	52.38	2.507	0.016 *
	≥ 5 years	17	137.68	44.37		
Fluid (IDWG)	< 5 years	26	1.31	0.96	-2.257	0.029 *
	≥ 5 years	17	1.88	0.52		
Medication (n= 38)	< 5 years	22	4.72	1.85	0.889	0.380
	≥ 5 years	16	4.18	1.83		

*significant at 0.05 level

Table (4.21) showed that CKD patients who are on HD for less than five years had statistically significant higher level of BUN (P= 0.016), while those who are on HD for five years and more had statistically significant higher IDWG (P= 0.029). The results also showed that there were no statistical significant differences in SBP (P= 0.170), DBP (P= 0.202), serum K^+ (P= 0.886), serum PO_4 (P= 0.215), and medication (P= 0.380). Matched results obtained by Obialo et al., (2012) which showed that years on dialysis did not affect adherence to treatment program, and only 2.4% of patients had missed treatments.

In my opinion, length of years on HD may affects adherence to treatment. By increase of the years on dialysis, the patient and his family get fed up from going to the hospital three days per week, so sometimes they miss some HD sessions especially if they feel better. On the other hand, fear of developing complication may enforce the patient to follow the prescribed treatment and that would improve their adherence to treatment program,

Chapter Five

Conclusion, recommendations, and suggestions for further research

5.1 Conclusion

Adherence is a major problem in pediatric patients with CKD. Patients can be nonadherent with different aspects of their treatment, which includes medications, treatment regimens, and dietary and fluid restrictions.

This study concluded that two-thirds of the study participants were male pediatric patients and one-third of them were male pediatric patients, with mean age 11.78±4.52 years, and mean number of years on dialysis was 3.73 years. In addition, 7% of pediatric patients were fully adhered to diet, 88.4% were fully adhered to fluids intake, 36.8% were fully adhered to anti-hypertensive medication, 93% reported that the nurses were fully performing their role in monitoring the adherence of patients to diet, fluids intake, and medication. There was statistically significant correlation between SBP, DBP and number of hours per HD session.

There were no statistical significant differences in BP, diet, fluid intake, and medication related to gender, age of the child, educational level of the child (except for DBP), place of residency, and family income, parents' level of education, and number of years being on HD. While significant differences existed in relation to the hospital (in favor of Al Rantesy hospital).

5.2 Recommendations

In the light of the study results, the researcher recommends the following:

- The Health promotion department at MOH should develop and implement an educational program about appropriate diet, fluid intake, and medication to improve adherence and avoid complications that may result from nonadherence to treatment.
- The need to use media and TV programs to increase public awareness and understanding of the disease process and preventive measures that eliminate relevant contributing factors to non-adherence in CKD patients.
- Activate school health counseling with MOH to increase their visits and educational programs in the schools to increase the awareness of children about preventive measures of renal disease.

- Ensure having written, clear protocols and guidelines that specify the process of hemodialysis procedures and adherence issues to make sure that every patient receives the treatment in the same way.
- Utilizing Nutritionists especially the nurses who have master degree in clinical nutrition to participate in health education programs regarding diet for children with renal failure.

5.3 Suggestions for further research

- Further studies should be conducted to examine the risk factors that contribute to the development of CKD in children in Gaza Strip.
- Further studies should be conductedaiming to identify barriers that hinder the adherence of children to treatment program.

References

Abu-Odah, H., Abed, Y., El-Nems, K. (2017). Factors associated with end-stage renal disease in the Gaza Strip: a case-control study. 390 (2), Page S34.

Agarwal, R., Flynn, J., Pogue, V., Rahman, M., Reisin, E., Weir, MR. (2014). Assessment and management of hypertension in patients on dialysis. *J Am Soc Nephrol*, 25(8),1630-1646.

Ahrari, S., Moshki, M., Bahrami, M. (2014). The relationship between social support and adherence of dietary and fluids restrictions among hemodialysis patients in Iran. *J Caring Sci*, 3,11-19.

Al Rantesy Pediatric Hospital, (2018). Dialysis unit. Annual report.

Alsmadi, I., Al-Hijazat, M., Akash, N. (2008) Prevalence of hypertension and adequacy of blood pressure control in hemodialysis patients. *Journal of the Royal Medical Services*, 15(1), 71-74.

Barnett, T., Li Yoong, T., Pinikahana, J., Si-Yen, T. (2008). Fluids compliance among patients having hemodialysis: can an educational program make a difference? *J Adv Nurs*, 61(3), 300-306.

Beerappa, H. & Chandrababu, R. (2019). Adherence to dietary and fluid restrictions among patients undergoing hemodialysis: An observational study. *Clinical Epidemiology and Global Health*, 7(1), 127-130.

Beerendrakumar, N., Ramamoorthy, L., Haridasan, S. (2018). Dietary and fluid regime adherence in chronic kidney disease patients. *J Caring Sci*, 7(1),17-20.

Cain, J.E., Di Giovanni, V., Smeeton, J., Rosenblum, ND. (2010). Genetics of renal hypoplasia: insights into the mechanisms controlling nephron endowment. *Pediatr Res*, 68: 91-98.

Centers for Disease Control and prevention – CDC, (2017). Long-term trends in the prevalence of chronic kidney disease in the United States. (https://nccd.cdc.gov).

Clark-Cutaia, M., Ren, D., Hoffman, L., Burke, L., Sevick, M. (2014).Adherence to hemodialysis dietary sodium recommendations: influence of patient characteristics, self-efficacy and perceived barriers. *J Ren Nutr*, 24(2), 92-99.

Cui, H., Wang, F., Fan, L., Hu, Y., Hu, G., Liu, L., et al. (2011). Association factors of target organ damage: analysis of 17, 682 elderly hypertensive patients in China. *Chinese medical journal*, 124(22), 3676-3681.

Daugirdas, A. (2015). Measuring interdialytic hypotension to improve quality of care. *Journal of the American Society of Nephrology*, 26(3), 512-514.

Denhaerynck, K., Manhaeve, D., Dobbels, F., Garzoni, D., Nolte, C., & De Geest, S. (2007). Prevalence and consequences of nonadherence to hemodialysis regimens. *American Journal of Critical Care*, 16(3), 222-235.

Efe, D. & Kocaoz, S. (2015). Adherence to diet and fluid restriction of individuals on hemodialysis treatment and affecting factors in Turkey. *Japan Journal of Nursing Science*, 12, 113-123.

ESPN/ERA-EDTA registry. (2016). European registry for children on renal replacement therapy. (www.espn-reg.org/index.jsp).

Fischbach, A., & Zaloszyc, R. (2015). The interdialytic weight gain: a simple marker of left ventricular hypertrophy in children on chronic hemodialysis. *Pediatric Nephrology*, 30 (6), 859-863.

Gallibois, C.M., Jawa, N.A., Noone, D.G. (2017). Hypertension in pediatric patients with chronic kidney disease: management challenges. *Int J Nephrol Renovasc Dis*, 10, 205-213.

Ghimire, S., Castelino, R.L., Lioufas, NM., Peterson, GM., Zaidi, STR. (2015). Nonadherence to Medication Therapy in Hemodialysis Patients: A Systematic Review. *PLoS ONE*, 10(12), e0144119.

Halbach, S., & Flynn, J. (2015). Treatment of hypertension in children with chronic kidney disease. *Curr Hypertension Rep*, 17(1),503.

Halle, M.P., Lapsap, C.T., Barla, E., Fouda, H., Djantio, H., et al., (2017). Epidemiology and outcomes of children with renal failure in the pediatric ward of a tertiary hospital in Cameroon. *BMC Pediatrics*, 17, 202.

Harambat, J., van Stralen, K.J., Kim, J.J., Tizard, J. (2012). Epidemiology of chronic kidney disease in children. *Pediatr Nephrol*, 27,363-373.

Hezel, M., Peleli, M., Liu, M., Zollbrecht, C., Jensen, B.L. (2016). Dietary nitrate improves age-related hypertension and metabolic abnormalities in rats via modulation of angiotensin II receptor signaling and inhibition of superoxide generation. *Free Radic. Biol. Med*, 99, 87-98.

Hinkle, JL., & Cheever, KH. (2013). *Brunner & Suddarth's Textbook of Medical Surgical Nursing*. 11th ed. Philadelphia: Lippincott Williams & Wilkins.

Holmberg, L., Coveney, J., Henderson, J., Meyer, S. (2010). What should primary health care practitioners know about factors influencing young people's food choices? *Australas Med J*, 1(4), 259-266.

Huang, SH., Filler, G., Lindsay, R., McIntyre, CW. (2014). Euvolemia in hemodialysis patients: a potentially dangerous goal. *Semin Dial*, 28(1), 1-5.

Ibrahim, S., Hossam, M., Belal, D. (2015). Study of non-compliance among chronic hemodialysis patients and its impact on patients' outcomes. *Saudi J Kidney Dis Transpl*, 26(2), 243-249.

Ikonomou, M., Skapinakis, P., Balafa, O., Eleftheroudi, M., Damigos, D., Siamopoulos, KC. (2015). The impact of socioeconomic factors on quality of life of patients with chronic kidney disease in Greece. *J Ren Care*, 41(4), 239-46.

Kramer, A.M., van Stralen, K., Jager, K., Schaefer, F., Verrina, E., Seeman, T., Lewis, M., et al., (2011). Demographics of blood pressure and hypertension in children on renal replacement therapy in Europe. *Kidney International*, 80(10), 1092-1098.

Kalantar-Zadeh, K., Regidor, D.L., Kovesdy, CP., Wyck, D.V., Bunnapradist, S. (2016). Fluid retention is associated with cardiovascular mortality in patients undergoing long-term hemodialysis. *Circulation*, 119(5), 671-679.

Kaspar, C.D.W., Bholah, R., Bunchman, T.E. (2016). A Review of pediatric chronic kidney disease. *Blood Purif*, 41, 211-217.

Katsoufis, C., Seeherunvong, W., Sasaki, N., Abitbol, CL., Chandar, J., Freundlich, M., Zilleruelo, GE. (2014). Forty-four-hour interdialytic ambulatory blood pressure monitoring and cardiovascular risk in pediatric hemodialysis patients. *Clin Kidney J*, 7, 33-39.

Kefale, B., Tadesse, Y., Alebachew, M., Engidawork, E. (2018). Management practice, and adherence and its contributing factors among patients with chronic kidney disease at Tikur Anbessa Specialized Hospital: A hospital based cross-sectional study. *Int J Nephrol*, 2018. (https://www.ncbi.nlm.nih.gov/pmc/articles).

Khader, MI., Snouber, S., Alkhatib, A., Nazzal, Z., Dudin, A. (2013). Prevalence of patients with end-stage renal disease on dialysis in the West Bank. Palestine. *Saudi J Kidney Dis Transpl*, 24(4), 832-837.

Khalil, A., & Darawad, M. (2014). Objectively measured and self-reported nonadherence among Jordanian patients receiving hemodialysis. Hemodialysis International, 18(1), 95-103.

Khalil, A.A., Frazier, S.K., Lennie, T.A., Sawaya, B.P. (2011). Depressive symptoms and dietary adherence in patients with end-stage renal disease. *Journal of Renal Care*, 37(1), 30-39.

Kidney Disease: Improving Global Outcomes (KDIGO) CKD work group. (2013). KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. *Kidney Int Suppl*, 3,1-150.

Koc, Y., Unsal, A., Kayabasi, H., Oztekin, E., Sakaci, T., Ahbap, E., Yilmaz, M., Akgun AO. (2011). Impact of volume status on blood pressure and left ventricle structure in patients undergoing chronic hemodialysis. *J Ren Fail*, 33,377-381.

Konstantyner, T., Sesso, R., de Camargo, M.F., Feltran, L.S., Koch-Nougueira, P.C. (2015). Pediatric chronic dialysis in Brazil: Epidemiology and regional inequalities. *PLOS ONE*, 10(8), e0135649. (https://journals.plos.org).

Lewicki, M.C., Kerr, PG., Polkinghorne, KR. (2013). Blood pressure and blood volume: acute and chronic considerations in hemodialysis. *Semin Dial*, 26(1),62-72.

Lewis, M.A., Shaw, J., Sinha, MD., Adalat, S., Hussain, F., Castledine, C., Schalkwyk, D., Inward, C. (2010). Demography of the UK pediatric renal replacement therapy population in 2008. *Nephron Clin Pract*, 115, 279-288.

Lins, S., Leite, J., Godoy, S., Tavares, J., Rocha, R., Silva, F. (2018). Treatment adherence of chronic kidney disease patients on hemodialysis. *Acta Paulista de Enfermagem*, 31(1), 54-60.

Magacho, E.J., Ribeiro, L.C., Chaoubah, A., Bastos, MG. (2011). Adherence to drug therapy in kidney disease. *Braz J Med Biol Res*, 44, 258-262.

Marsenic, O., Anderson, M., Couloures, K. (2016). Relationship between interdialytic weight gain and blood pressure in pediatric patients on chronic hemodialysis. *Biomed Res Int*. (https://www.ncbi.nlm.nih.gov).

Ministry of Health, (2017). Health annual report. Palestinian Health Information System, MOH, Ramallah Registry. South Australia: Adelaide.

MOH, (2018). Nursing Unit, Gaza Strip.

Minutolo, R., Agarwal, R., Borrelli, S., Chiodini, P., Bellizzi, V., Nappi, F., Cianciaruso, B., & et al., (2011). Prognostic role of ambulatory blood pressure measurement in patients with nondialysis chronic kidney disease.*Arch Intern Med*, 171(12), 1090-1098.

Mitsnefes, MM. (2012). Cardiovascular disease in children with chronic kidney disease. *J Am Soc Nephrol*, 23, 578-585.

Mitsnefes, M., Flynn, J., Cohn, S., Samuels, J., Blydt-Hansen, T., Saland, J., et al., (2010). Masked hypertension associates with left ventricular hypertrophy in children with CKD. *J Am Soc Nephrol*, 21(1):137-144.

Molto, C.I., Lopez-Roig, S., Mira, M. (2012). Prevalence of adherence to fluid restriction in kidney patients in hemodialysis: objective indicator and perceived compliance. *Nefrologia (English Version)*, 32, 477-485.

Morisky, D.E., Ang, A., Krousel-Wood, M., Ward, H.J. (2008). Predictive validity of a medication adherence measure in an outpatient setting. *J Clin Hypertension (Greenwich)*, 10(5), 348-354.

Muhaisen, R.M., Sharif, F.A., Yassin, M.M. (2012). Risk factors of cardiovascular disease among children with chronic kidney disease in Gaza Strip. *J Cardiovascular Dis Res*, 3(2), 91-98.

Naalweh, K., Barakat, M., Sweileh1, M., Al-Jabi, S. (2017). Treatment adherence and perception in patients on maintenance hemodialysis: a cross-sectional study from Palestine. *BMC Nephrology*, 18, 178.

National Kidney Foundation. (2010): Kidney Disease Outcomes Quality Initiative (NKF/DOQI) guidelines. *American Journal of Kidney Diseases*, 55(5), 773-799.

Nerbass, FB., Morais, JG., dos Santos, RG., Kruger, TS., Sczip, AC., Vieira, MA., Morais, JG. (2017). Perceptions of hemodialysis patients about dietary and fluid restrictions. *J Bras Nefrol*, 39(2), 154-161.

Nerbass, FB., Morais, JG., dos Santos, RG., Krüger, TS., Koene, TT., da Luz Filho, HA. (2010). Adherence and knowledge about hypophosphatemia treatment in hemodialysis patients with hypophosphatemia. *J Bras Nefrol*, 32, 149-155.

Niraj, B., Lakshmi, R., Satish, H. (2018). Dietary and Fluid Regime Adherence in Chronic Kidney Disease Patients. *Journal of Caring Sciences*, 7, 17-20.

Obialo, C., Hunt, W., Bashir, K., Zager, P. (2012). Relationship of missed and shortened hemodialysis treatments to hospitalization and mortality: observations from a US dialysis network. *Clin Kidney J*, 5(4), 315-319.

Oliveira, T.S., Garagarza, C.A., Valente, A.T. (2015). Effect of personalized nutritional counseling in maintenance hemodialysis patients. *Hemodialysis International*, 3,412-418.

Orr, NI., McDonald, SP., McTaggart, S., Henning, P., Craig, JC. (2009). Frequency, etiology and treatment of childhood end-stage kidney disease in Australia and New Zealand.*Pediatric Nephrology*, 24(9), 1719-1726.

Paglialonga, S., Consolo, M. A., Galli, S., Edefonti, A. (2015). Interdialytic weight gain in oligoanuric children and adolescents on chronic hemodialysis. *Pediatric Nephrology*, 30 (6), 999-1005.

Palestinian Central Bureau of Statistics - PCBS, (2018). Census 2017. Ramallah, Palestine. (http://www.pcbs.gov.ps).

PCBS, (2018). Palestinian Children's Day 2018. Ramallah, Palestine. (http://www.pcbs.gov.ps).

PCBS, (2017). Census 2017. Ramallah, Palestine. (http://www.pcbs.gov.ps).

Peco-Antic, A., & Paripovic, D. (2014). Renal hypertension and cardiovascular disorder in children with chronic kidney disease. *Srp Arh Celok Lek*., 142(1-2), 113-117.

Peter, N., Buren, V., Jula, K. (2012). Inrig Division of Nephrology. University of Texas Southwestern Medical Center at Dallas.

Polit, D. & Beck, C. (2012). *Resource Manual for Nursing Research: Generating and assessing evidence for nursing practice*. 9th ed., Lippincott Williams & Wilkins, Philadelphia.

Safouh, H., Fadel, F., Essam, R., Bekhet, A. (2015). Causes of chronic kidney disease in Egyptian children. *Saudi J Kidney Dis Transpl*, 26(4), 806-809.

Samuels, J., Ng, D., Flynn, J.T., Mitsnefes, M., Poffenbarger, T., Warady, B.A., Furth, s. (2012). Ambulatory blood pressure patterns in children with chronic kidney disease. *Hypertension*, 60(1),43-50.

Sakar, SR., Kotanko, P., Levin, NW. (2006). Interdialytic weight gain: implications in hemodialysis patients. *Semin Dial*, 19(5), 429-433.

Schreuder, MF. (2012). Safety in glomerular numbers. *Pediatr Nephrol*, 27, 1881.

Smith, JM., Stablein, D.M., Munoz, R. (2010). Contributions of the transplant registry: The 2006 annual report of the North American Pediatric Renal Trials and Collaborative Studies (NAPRTCS). *Pediatr Transplant*, 366-373.

Sontakke, S., Budania, R., Bajait, C., Jaiswal, K., Pimpalkhute, S. (2015). Evaluation of adherence to therapy in patients of chronic kidney disease. *Indian J Pharmacol*, 47(6), 668-671.

Trapote, A., Ibanez, S., Navarro, M. (2010). Epidemiology of chronic kidney disease in Spanish pediatric population. REPIR II Project. *Nefrologia (English Version*, 30,508-517.

Van Buren, J., & Inrig, K. (2012). Hypertension and hemodialysis: pathophysiology and outcomes in adult and pediatric populations. *Pediatric Nephrology*, 27 (3), 339-350.

Viswanathan, M., Golin, C.E., Jones, C.D., Ashok, M., Blalock, S.J., Wines, R., et al. (2012). Interventions to improve adherence to self-administered medications for chronic diseases in the United States: A systematic review. *Annals of Internal Medicine*, 157(11), 785-795.

Vivante A, & Hildebrandt F. (2016). Exploring the genetic basis of early-onset chronic kidney disease. *Nat Rev Nephrol*, 12, 133-146.

United Nations Office for the Coordination of Humanitarian Affairs – OCHA,(2018). (https://www.ochaopt.org/location/gaza-strip).

Walker, R., James, H., Burns, A. (2012). Adhering to behavior change in older pre-dialysis populations-what do patients think? A qualitative study. *J Ren Care*, 38, 34-42.

Walsh, E., & Lehane, E. (2011). An exploration of the relationship between adherence with dietary sodium restrictions and health beliefs regarding these restrictions in Irish patients receiving hemodialysis for end-stage renal disease. *J Clin Nurs*, 20(3-4), 331-340.

World Health Organization – WHO, (2019). Adherence to long-term therapies - evidence for action. Essential Medicines and Health Products Information Portal. A World Health Organization resource. Last updated October 2018.

Wyndels, K., Dallongville, J., Simon, C., Bonnard, V., Wagner, A., Ruidavets, JB., Arveiler, D., et al., (2011). Regional factors interact with educational and income tax levels to influence food intake in France. *Eur J Clin Nutr*, 65(9), 1067-1075.

Zaloszyc, B., Schaefer, B., Schaefer, F., Krid, S., Salomon, R., Niaudet, P., et al., (2013). Hydration measurement by bio-impedance spectroscopy and blood pressure management in children on hemodialysis. *Pediatric Nephrology*, 28(11), 2169-2177.

Annexes

Annex (1): Consent Form

عزيزي/عزيزتي ... تحيةطيبةوبعد،،،

أنا الباحثة/ عفاف عبد اللطيف أبو نمر، الملتحقة ببرنامج ماجستير تمريض أطفال، جامعة القدس – أبو ديس، أقوم بإعداد بحث بعنوان: **العلاقة بين ضغط الدم ومدى الالتزام بالحمية الغذائية، وكمية السوائل، والأدوية لدى أطفال غسيل الكلى في قطاع غزة.**

نأملمنسيادتكمالتكرموالمشاركةفيتعبئةهذاالاستبيانوالذييهدفمعرفة العلاقة بين ضغط الدم ومدى الالتزام بالحمية الغذائية، كمية السوائل، والأدوية الموصوفة لدى الأطفال الذين يخضعون لجلسات غسيل الكلى في قطاع غزة.

سيتم إجراءهذهالدراسةمنخلالالاستبانة،وهيتستغرقحوالي 15–20 دقيقة وستكون لمرة واحدة، مع العلم أن الموافقة طوعية ولكمالحقفيعدم المشاركة في الدراسة، مع التأكيد على سريةالمعلوماتالتيسيتم جمعها، حيث أنها سوف تستخدم لأغراض البحث العلمي فقط.

شاكرينلكمحسنتعاونكم ،،،

الباحثة

عفاف أبو نمر

توقيعالأب / الأم: .....

Annex (2): Adherence to diet, fluids, and medication questionnaire

Part (1): Demographic characteristics

Gender	□ Male	□ Female	
Age	**……** years	**.....month**	
Educational Level	□Primary	□Elementary	□Secondary
Residence	□Rafah	□Khanyounis	□Middle area
	□Gaza	□North Gaza	
Hospital	□Alnajjar	□Nasser	□Alaqsa
	□Shifa	□Rantisi	□……
Average family income	**……** NIS		
Father education	□Illiterate	□Primary school	□Preparatory school
	□Secondary	□University	□High education
Mother education	□Illiterate	□Primary school	□Preparatory school
	□Secondary	□University	□High education

Part (2): Medical history of the patient

Hypertension	□Yes	□No	
Heart disease	□Yes	□No	
Diabetes Mellitus type I	□Yes	□No	
Other diseases	**…….**……..		
Years number of dialysis	……/ Years		
Session/ week	……/ week		
Hours /session	**……** Hours		
Emergency dialysis	**……** Times/month		
Type of dialysis machine	□Gambro	□Braun	□Fresenius

Part (3): Adherence to diet

Indicator	**Reading 1** **Before session 1**	**Reading 2** **Before session 2**	**Reading 3** **Before session 3**
Pre dialysis serum K	_____ mg/dl	_____ mg/dl	_____ mg/dl
Pre dialysis serum Phosphorus	_____ mg/dl	_____ mg/dl	_____ mg/dl
Pre dialysis serum BUN	_____ mg/dl	_____ mg/dl	_____ mg/dl

Part (4): Adherence to fluids

Indicator	**Weight upon arrival for this session (pre dialyses)**	**Weight at the end of previous session(post dialyses)**	**TargetWeight**
IDWG **session** 1	_____ Kg	_____ Kg	_____Kg
IDWG **session** 2	_____ Kg	_____ Kg	_____Kg
IDWG **session** 3	_____ Kg	_____ Kg	_____Kg

Part (5): Measurement of Blood Pressure

Indicator	**Reading 1 Before session 1**	**Reading 2 Before session 2**	**Reading 3 Before session 3**
Pre-dialysis Blood Pressure	____/____ mmHg	____/____ mmHg	____/____ mmHg
Post-dialysis Blood Pressure	____/____ mmHg	____/____ mmHg	____/____ mmHg

Part(6):Measurement role of the nurses working in hemodialysis units in monitoring the adherence of pediatric patients to fluid, diet and medication.

No.	Item	Yes	No
1-	Are your blood pressure taken by the nurse during dialysis session three times?		
2-	Your weight is measured before dialysis session by the nurse?		
3-	Your weight is measured after dialysis session by the nurse?		
4-	Have you given instructions regarding food during dialysis?		
5-	Are the nurse advice patient / parents about the correct time of medications before dialysis session?		
6-	Are the nurse advice patient / parents about the correct time of medications after dialysis session?		
7-	Do the nurse make check for the patient weight at the end of dialysis?		
8-	Are you instructed by nurse to avoid excessive drinking water during dialysis?		
9-	Did the nurse tell you about the amount of fluid which is allowed during the day?		
10-	Did the nurse tell you about the type of food which is allowed during the day?		
11-	Did the nurse tell you about the amount of food which is allowed during the day?		
12-	Did the nurse inform the patient and /or the parents that the weight between the sessions; should not be more than the 5% of overall weight?		
13-	Did the nurse tell the patients and /or the parents that the increase in the dry weight should be based on the child growth and his/her age?		
14-	Are you advised by the nurse about the importance of adherence to diet to prevent complications?		
15-	Are you advised by the nurse about the importance of adherence to fluids to prevent complications?		
16-	Are you advised by the nurse about the importance of adherence to medications to prevent complications?		
17-	Did the nurse tell you about the correct time of intake your drug must be deal with after dialysis session?		
18-	Did the nurse teach you about the complications of the disease, complications, diet, fluids intake and medications for the patient and parents?		
19-	Did the nurse teach you about the time of taking medications?		

خامساً: مقياس مورسكي للالتزام بالعلاج

الرجاء الإجابة على هذه الأسئلة بناء على تجربتك الشخصية في تناول الأدوية

الفقـــــــرة	نعم	لا
1.هل تنسى في بعض الأحيان أن تتناول دوائك الخاص بارتفاع ضغط الدم من غير قصد؟		
2. خلال الأسبوعين الماضيين، هل كان هنالك أيام نسيت فيها تناول دوائك الخاص بارتفاع ضغط الدم؟		
3. هل قمت بالتوقف عن تناول علاجك بدون أن تخبر الطبيب، لأنك تشعر باستياء عند تناول دوائك الخاص بارتفاع ضغط الدم؟		
4. عندما تغادر البيت أو تسافر، هل تنسى في بعض الأحيان أن تحضر دوائك الخاص بارتفاع ضغط الدم من غير قصد؟		
5.هل تناولت دوائك الخاص بارتفاع ضغط الدم في الأمس؟		
6. عندما تشعر بان ضغط دمك تحت السيطرة، هل تتوقف في بعض الأحيان عن تناول دوائك الخاص بارتفاع ضغط الدم؟		
7.تناول الدواء بشكل يومي هو إزعاج حقيقي بالنسبة للبعض، هل شعرت يوما بأنك منزعج بشان الالتزام بتناول العلاج الخاص بارتفاع ضغط الدم؟		
8. كم مره في الغالب تجد صعوبة أن تتذكر تناول أدوية ارتفاع ضغط الدم؟ الرجاء وضع دائرة حول ما يناسبك: □ مطلقا □نادراً □ في بعضالأحيان□كل الأوقات		

Annex (3): Names of experts

Dr. Mustafa Al Eila	Director of Al Rantesy Specialized Pediatric Hospital
Dr. Osama Elian	Palestine University
Dr. Alam Abu Hamda	Director of SCBU at Al Shifa Medical Complex
Dr. Ryad Barbakh	Director of Dialysis Unit at Nasser Medical Complex
Dr. Ahmed Al Shaer	Islamic University - Gaza

Annex (4): Approval from Helsinki Committee

المجلس الفلسطيني للبحث الصحي
Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار

Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee
For Ethical Approval

Date: 05/02/2018 **Number:** PHRC/HC/326/18

Name: AFAF ABUNEMER الاسم:

We would like to inform you that the committee had discussed the proposal of your study about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Associations between Blood Pressure and the Adherence to Fluid, Diet, and Medication among Children Undergoing Hemodialysis in the Gaza Strip

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/326/18 in its meeting on 05/02/2018

و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member **Member**

5/2/2018

Chairman

Genral Conditions:-
1. Valid for 2 years from the date of approval.
2. It is necessary to notify the committee of any change in the approved study protocol.
3. The committee appreciates receiving a copy of your final research when completed.

Specific Conditions:-

E-Mail:pal.phrc@gmail.com

Gaza - Palestine غزة - فلسطين
شارع النصر - مفترق العيون

Annex (5): Approval from Ministry of Health

State of Palestine
Ministry of health

دولة فلسطين
وزارة الصحة

السيد : المحترم

التاريخ:21/06/2018
رقم المراسلة 222768

مدير عام بالوزارة /الإدارة العامة لتنمية القوى البشرية ـ /وزارة الصحة

السلام عليكم ,,,

الموضوع/ تسهيل مهمة الباحثة//عفاف أبو نمر

التفاصيل //
بخصوص الموضوع أعلاه، يرجي تسهيل مهمة الباحثة/ **عفاف عبداللطيف أبو نمر**
الملتحقة ببرنامج ماجستير التمريض – تخصص تمريض أطفال ـ جامعة القدس أبوديس في إجراء بحث بعنوان: ـ
"Association between blood pressure and the adherence to fluid, diet, and Medication among children undergoing Hemodialysis in the Gaza Strip"
حيث الباحثة بحاجة لتعبئة استبانة من عدد من مرضى الفشل الكلوي من الأطفال ـ او ذويهم ـ المترددين على وحدات غسيل الكلى في مستشفيات قطاع غزة.
نأمل توجيهاتكم لذوي الاختصاص بضرورة الحصول على الموافقة المستنيرة من الأطفال وأولياء أمور الأطفال الذين لديهم استعداد للمشاركة في البحث من ثم تمكين الباحثة من التواصل معهم ، بما لا يتعارض مع مصلحة العمل وضمن أخلاقيات البحث العلمي، ودون تحمل الوزارة أي أعباء أو مسئولية.
وتفضلوا بقبول التحية والتقدير،،،
ملاحظة/ البحث حصل على موافقة لجنة اخلاقيات البحث الصحي
ملاحظة / تسهيل المهمة الخاص بالدراسة أعلاه صالح لمدة 6 شهر من تاريخه.

محمد ابراهيم محمد السرساوي
مدير دائرة/الإدارة العامة لتنمية القوى البشرية ـ

التحويلات

■ محمد ابراهيم محمد السرساوي(مدير دائرة)	← رامي عيد سليمان العبادله(مدير عام بالوزارة)	إجراءاتكم بالخصوص(21/06/2018)
■ رامي عيد سليمان العبادله(مدير عام بالوزارة)	← عبد اللطيف محمد محمد الحاج(مدير عام بالوزارة)	إجراءاتكم بالخصوص(21/06/2018)
■ عبد اللطيف محمد محمد الحاج(مدير عام بالوزارة)	← مدحت عباس خضر حسن(مدير عام بالوزارة)	إجراءاتكم بالخصوص(21/06/2018)
■ عبد اللطيف محمد محمد الحاج(مدير عام بالوزارة)	← محمد محمد عبد الحليم ابوسلمية(مدير مستشفى)	إجراءاتكم بالخصوص(21/06/2018)
■ عبد اللطيف محمد محمد الحاج(مدير عام بالوزارة)	← محمد خليل محمد زقوت(مدير)	إجراءاتكم بالخصوص(21/06/2018)

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■ عبد اللطيف محمد محمد الحاج(مدير عام بالوزارة)	← كمال عواد محمد خطاب(مدير مستشفى)	إجراءاتكم بالخصوص(21/06/2018)
■ كمال عواد محمد خطاب(مدير مستشفى)	← اياد محمد سليم الجبري(طبيب رئيس قسم)	إجراءاتكم بالخصوص(21/06/2018)
■ محمد محمد عبد الحليم ابوسلمية(مدير مستشفى)	← سعدي دياب حسن الرملاوي(رئيس قسم مالي)	إجراءاتكم بالخصوص(21/06/2018)
■ محمد خليل محمد زقوت(مدير)	← عمر عبدالله حسين الأسطل(مدير دائرة)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ محمد خليل محمد زقوت(مدير)	← بيان مصباح غانم شراب(مدير صيدلية)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ محمد خليل محمد زقوت(مدير)	← علاء الدين محمود فايز المصري(طبيب رئيس قسم)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ محمد خليل محمد زقوت(مدير)	← ()	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ محمد خليل محمد زقوت(مدير)	← أيمن خالد عثمان الفرا(طبيب مقيم)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ محمد خليل محمد زقوت(مدير)	← ()	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ محمد خليل محمد زقوت(مدير)	← صوفيا شحده محمود زعرب(مدير)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ محمد خليل محمد زقوت(مدير)	← وئام ابراهيم اسماعيل فارس(رئيس قسم اداري)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ محمد خليل محمد زقوت(مدير)	← عطا عبد الغني خميس الجزار(حكيم جامعي)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ محمد خليل محمد زقوت(مدير)	← طارق سليمان عبد ابو مصطفى(طبيب بشري أخصائي)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ مدحت عباس خضر حسن(مدير عام بالوزارة)	← حسن محمد خليل حافظ اللوح(مدير)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ مدحت عباس خضر حسن(مدير عام بالوزارة)	← رأفت حامد يوسف حمدونه(مدير دائرة)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ مدحت عباس خضر حسن(مدير عام بالوزارة)	← زهير محمود أحمد نوفل(مدير دائرة التمريض)	للإطلاع و توجيهاتكم بالخصوص(24/06/2018)
■ سعدي دياب حسن الرملاوي(رئيس قسم مالي)	← حسن عبد المطلب حسين الرفاتي(رئيس قسم اداري)	لعمل اللازم(24/06/2018)
■ عطا عبد الغني خميس الجزار(حكيم جامعي)	← خولة عبد الكريم خليل الحلاق(حكيم جامعي)	للمتابعة(24/06/2018)
■ حسن محمد خليل حافظ اللوح(مدير)	← محمد عبد الرحيم أحمد زقوت(طبيب رئيس قسم)	إجراءاتكم بالخصوص(26/06/2018)
■ حسن محمد خليل حافظ اللوح(مدير)	← اسامه محمد سلمان ابو جبل(طبيب مدير)	إجراءاتكم بالخصوص(26/06/2018)

Annex (6): Map of Palestine

عنوان الدراسة: العلاقة بين ضغط الدم ومدى الالتزام بالحمية الغذائية، وكمية السوائل، والأدوية لدى أطفال غسيل الكلى في قطاع غزة.

إعداد: عفاف أبو نمر

إشراف: د. سامر النواجحة

ملخص الدراسة

هدفت هذه الدراسة إلى معرفة العلاقة بين ضغط الدم ومدى الالتزام بالحمية الغذائية، وكمية السوائل والأدوية لدى أطفال غسيل الكلى الذين يعانون من الفشل الكلوي المزمن في قطاع غزة. استخدمت الباحثة المنهج الوصفي التحليلي. تكون مجتمع الدراسة من 50 طفلاً، وتكونت عينة الدراسة من 43 طفلاً يخضعون لعملية غسيل كلوي حيث بلغت نسبة الاستجابة للمشاركة في الدراسة 87.7%.

لجمع البيانات قامت الباحثة بإعداد استبانة تكونت من المعلومات الشخصية، الالتزام بكل من الحمية الغذائية، كمية السوائل، الأدوية الموصوفة، دور التمريض في متابعة مدى الالتزام بالبرنامج العلاجي، ومقياس موريسكي لمعرفة مدى الالتزام بالأدوية الموصوفة. وقد تم توزيع الاستبانة على مجموعة من المحكمين بهدف التأكد من صدق المحتوى، كما تم إجراء دراسة استطلاعية على عينة من 20 طفلاً وبلغت قيمة ألفا كرونباخ 0.79 لاستبانة دور التمريض في متابعة مدى التزام المرضى بالبرنامج العلاجي، كما بلغت قيمة ألفا كرونباخ 0.92 على مقياس موريسكي. ولتحليل البيانات فقد تم استخدام برنامج الرزم الإحصائية للعلوم الاجتماعية SPSS 22 وتضمنت المعالجات الإحصائية التكرارات، النسب المئوية، المتوسط الحسابي، الانحراف المعياري، اختبار (ت)، تحليل التباين الأحادي، واختبار بيرسون للعلاقة بين المتغيرات.

أظهرت نتائج الدراسة أن 69.8% من عينة الدراسة كانوا من الأطفال الذكور و30.2% من الأطفال الإناث، وبلغ متوسط أعمارهم 11.78 سنة بانحراف معياري 4.52، كما أن 44.2% منهم ملتحقين بالمدرسة الابتدائية و30.2% لم يلتحقوا بالمدارس بعد.

وبينت النتائج أن 88.4% من الأطفال لديهم ضغط دم مرتفع ويخضع أطفال عينة الدراسة لعملية غسيل الكلى منذ 6 شهور إلى 8 سنوات (م= 3.73 سنة). وبينت النتائج أن درجة الالتزام بالحمية الغذائية كانت ضعيفة ويظهر ذلك من نتائج تحليل الدم التي بينت أن مستوى البوتاسيوم قبل عملية الغسيل تراوح بين 4.27 إلى 7.27 مليغرام/ ديسيلتر (م= 5.49 مغم/ديسيلتر)، مستوى الفسفور تراوح بين 2.67 إلى 11.83 مغم/ ديسيلتر (م= 6.52 مغم/ ديسيلتر)، ومستوى اليوريا تراوح بين 55.33 إلى 292.0 مغم/ ديسيلتر، وأظهرت النتائج أن الوزن المكتسب بين الغسيل السابق والغسيل

الحالي تراوح بين 0.10 غرام إلى 3.83 كيلو غرام (م= 1.73 كغم)، كما أن الالتزام بأدوية ضغط الدم كان منخفضاً بحسب الدرجات على مقياس موريسكي(51.14%).

وبينت النتائج أن الممرضين التزموا بدرجة عالية (91.3%) بدورهم في متابعة درجة التزام الأطفال بالبرنامج العلاجي، كما أن 7% من الأطفال التزموا بالحمية الغذائية بشكل كامل، 88.4% التزموا بكمية السوائل المسموحة بشكل كامل، 36.8% التزموا بتناول أدوية ضغط الدم بشكل كامل، وبلغ متوسط ضغط الدم الانقباضي قبل جلسة الغسيل 129.66 مغم زئبق ومتوسط ضغط الدم الانبساطي 78.58 مغم زئبق.

وأظهرت النتائج وجود علاقة دالة إحصائياً بين كل من ضغط الدم الانبساطي وكمية السوائل التي يتناولها الأطفال (P= 0.03)، الغذاء والأدوية المتناولة (P= 0.04)، وضغط الدم وعدد الساعات لكل جلسة غسيل.

كما بينت النتائج عدم وجود فروق ذات دلالة إحصائية في درجة الالتزام بالبرنامج العلاجي تعزى لكل من الجنس، عمر الطفل، المستوى التعليمي للطفل (ما عدا ضغط الدم الانبساطي)، مكان السكن، الدخل الشهري، المستوى التعليمي للوالدين، عدد سنوات الغسيل الكلوي، في حين أن درجة الالتزام كانت مرتفعة وذات دلالة إحصائية لدى الأطفال الذين يخضعون لعملية غسيل الكلى في مستشفى الشهيد عبد العزيز الرنتيسي التخصصي للأطفال مقارنة بالمستشفيات الأخرى.

في الإجمال فقد أظهرت الدراسة الحاجة إلى التركيز على العوامل التي تحد من التزام الأطفال بالبرنامج العلاجي، والحاجة إلى تحديد المشكلات في النظام الصحي التي تحد من القدرة على الالتزام بالبرنامج العلاجي، بالإضافة إلى الدور الهام الملقى على عاتق التمريض في تحديد المعيقات التي تحد من درجة التزام الأطفال بالبرنامج العلاجي، ووضع استراتيجيات تهدف إلى المساعدة في رفع درجة الالتزام بالبرنامج العلاجي.