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Assessment of Nurses' Knowledge and Practice Related to Nursing Care of Children Undergoing Hemodialysis in Gaza Strip

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Assessment of Nurses' Knowledge and Practice Related to Nursing Care of Children Undergoing Hemodialysis in Gaza Strip

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Dedication

I dedicate this project to God Almighty my creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding.

To my amazing mother and father whom without, I would not be the person that I am today. Thank you for being amazing role models, for always encouraging my dreams, and for all of the sacrifices you made in order for me to live the life I have.

To my beloved wife Israa. I appreciate the sacrifices you have made in helping me realize my dream.

To my beautiful daughter Lana who is the joy of my life for their patience and support.

To my sisters and brothers Shireen, Hanan, Said, Ahmed, Nedal, Emad and Yasmine, thank you for being my cheerleaders and for showing patience and tolerance with my busy schedule.

To my homeland Palestine

To the Holy Land of Jerusalem

To. of them, I dedicate this work.

Mohammad K. Qassem

Declaration

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

Signed: ………………………

Mohammad K. S. Qassem

Date: 7 /1 / 2020

Acknowledgment

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Abstract

Background: Hemodialysis (HD) is the most common method used to treat advanced and chronic kidney failure in pediatrics. The nurse in the HD department plays a vital role in providing information, care, support, understanding and therapeutic counseling to the pediatric patient and his family throughout the entire illness. The children undergoing HD procedure requires specially trained staff and special nursing care during phases of dialysis. **The study aimed to assess nurse's knowledge and practice regarding nursing care of children undergoing HD in Gaza Strip (GS).**

Methods: This quantitative, descriptive cross-sectional study was conducted at HD units affiliated to the governmental hospitals "Al Shifa' Complex - Al-Rantisy hospital - Al-Aqsa hospital - Nasser hospital". A self-administered questionnaire constructed by the researcher was used. The sample consisted of all available nurses working at HD units "a census sample". The total number of nurses was 90 with a response rate of 92%. A questionnaire was constructed, and the researcher collected data from the study participants.

Results: The result showed that the mean percentage of knowledge was (60.40%) which categorized according McDonald's standard as low level, and the mean percentage of practice was (75.15%) which considered a moderate level. There was a strong positive statistically significant correlation between nurse's knowledge and practice (p<0.001). Moreover, there were statistically significant differences in the nurses' knowledge and practice with regard to marital status, present of manual procedure, different graduation college and there were significant differences in the nurses' knowledge between their different places of work (P<0.05). On the other hand, there were no statistically significant differences in knowledge and practices with other factors: age, gender, education qualification, training courses and experience in HD (P >0.05).

Conclusion and recommendations: This study revealed there were low nurses' knowledge and moderate practices toward nursing care of children on HD. The researcher is recommended: The orientation period to work in HD units should be crucial, nurses should be enrolled in a special training program before starting work in HD units, and a continues education specialized program is needed to frequent update the knowledge and practice.

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List of Abbreviations

ACR	Albumin/creatinine ratio
ADH	Antidiuretic hormone
AER	Albumin excretion rate
AKD	Acute kidney disease
AKF	American Kidney Fund
AKI	Acute kidney Injury
ANNA	American Nephrology Nurses' Association
AUH	Assiut University Children Hospital
ADPKD	Autosomal Dominant Polycystic Kidney Disease
AV	Arteriovenous Fistula
BUN	Blood Urea Nitrogen
CAKUT	Congenital Anomaly of Kidney and Urinary Tract
CDC	Centers for Disease Control and Prevention
CKD	Chronic kidney disease
CKD-MBD	CKD-mineral and bone disorder'
CRCC	Castle Rock Care Center
CRF	Chronic renal failure
CVD	Cardiovascular Disease
DKD	Diabetic Kidney Disease
ESRD	End-stage Renal Disease
GFR	Glomerular Filtration Rate
GS	Gaza Strip
HD	Hemodialysis
HTN	Hypertension
ID	Identification
KDIGO	Kidney Disease Improving Global Outcomes
KT	Kidney Transplantation
MoH	Ministry of Health
NANDA	North American Nursing Diagnosis Association
NGOs	Non-Governmental Organization
NKF	National Kidney Foundation
NKUDC	National Kidney & Urologic Diseases Information Clearinghouse

NSAIDs	Non-steroidal anti-inflammatory drugs
OPT	Occupied Palestinian Territory
PCBs	Palestinian Central Bureau of Statistics
PD	Peritoneal Dialysis
PHC	Providing Primary Health Care
PHIC	Palestinian Health Information Center
PKD	Polycystic Kidney Disease
PMARP	Per million Age-Related Population
PTH	Parathyroid Hormone
QoL	Quality of Life
RRT	Replacement Therapy
UNICEF	United Nations Children's Emergency Fund
UNRWA	United Nations Relief and Works Agency
USRDS	United State Renal Data System
WB	West Bank
WHO	World health Organization

Chapter One

Introduction

1.1 Research Background

Kidney is one of the most important organs in the body, which is responsible mainly for execration of waste products and regulation of body fluids and electrolytes and produce hormones. In a healthy body, the kidney functions go properly, while due to some defects the kidney may be affected negatively (Rizzo, 2015).

Chronic kidney disease (CKD) is a major health problem worldwide with increasing incidence and prevalence that is threatening to bring on the onset of a real 'epidemic' (Brück et al, 2015). CKD defined as: indication of functional or structural kidney abnormalities that continue for at least 3 months, with or without a reduced of glomerular filtration rate (GFR), less than 60 ml/minute/1.73 m² (Webster et al. 2017). Also, Chronic renal failure (CRF) is a slowly progressive loss of kidney function over a period of several years. Eventually, the patient has permanent kidney failure. CRF is much more common than people realize and often becomes undetected and undiagnosed until the disease is well advanced and renal failure is failure occurs (Nordqvist, 2016). Moreover, Independent of the initial cause, CKD is a clinical syndrome characterized by a gradual loss of kidney function over time (Kidney Disease Improving Global Outcomes - KDIGO and CKD workgroup, 2012).

End-stage renal disease (ESRD) is defined as the total loss of kidney function, it is a common problem worldwide, and it is diagnosed by several laboratory and imaging diagnostic procedures. It occurs when a disease or condition impairs kidney function, causing kidney damage to worsen over several months or years. This includes; diabetes mellitus, hypertension, obstructed urine flow, kidney diseases, kidney artery stenosis,

certain toxins, fetal developmental problem, systemic lupus erythematosus, overuse of some medications such as non-steroidal anti-inflammatory drugs (NSAIDs), and kidneys injury (Kolvek, 2014). Thus, ESRD is a health problem that requires long-term and costly care (Pippias et al, 2017). The burden of CRF is increasing sound the alarm proportion all over the world. This occurs in many countries with an increasing prevalence (Battistella et al, 2011; Hayes et al, 2015). Greater than 50 million people throughout the world well-known to have CKD, and above one million require renal replacement therapies (RRT) such as dialysis and renal transplantation. (Power et al, 2010; Pippias et al 2017). The incidence of CRF in population for developed countries was six-eighth per 100.000 /per year (Zahran and Frances, 2010).

The management of CKD includes dialysis to remove waste products and extra fluids from the blood. The types of dialysis are; HD and peritoneal dialysis. Kidney transplantation involves surgically placing a healthy kidney from a donor inside the children's body that is used when there is no life-threatening medical condition other than kidney failure (Kraut, 2009; Wolfson, 2009).

Hemodialysis is the most common method used to treat advanced and permanent kidney failure in pediatrics. It is defined as a medical procedure that uses a special machine to filter waste products from the blood and to restore normal constituents to it again (Kallenbach, 2015). The overall aim of HD is to cleanse and filter the blood. It helps the body to get rid of harmful wastes, extra salt, and fluids. It also controls blood pressure and helps the body to keep the proper balance of electrolytes such as potassium, sodium, and chloride (Kumwenda, 2015).

Children undergoing HD procedure requires specially trained staff and special nursing care during phases of dialysis (the predialysis phase, the intradialytic phase, and the termination phase). Moreover, the management process of children with CKD or HD is considered a

highly complicated process (Gomez, 2017). These complications include cardiovascular, nutritional, gastrointestinal, hepatic, endocrinal, complications of arteriovenous fistula (AV), infections, nervous system and sleep disorders (Hinkle and Cheever, 2013). However, These complications remain a major cause of morbidity and mortality in HD patients (Pippias et al, 2017). Additionally, the complication can be divided into complications associated with HD equipment such as; HD device, water system, membrane and vascular access-related complications (Santos and Peixoto, 2010; Gomez, 2017).

The nurse in the HD department plays a vital role in providing information, care, support, understanding and therapeutic counseling to the pediatric patient and his family throughout the entire illness. The nursing management must be provided for reducing the complications of renal function and the stresses of dealing with a life-threatening illness (James et al., 2014). Knowledge is the amount of information acquired, retained and utilized in daily life (Lakhan & Sharma, 2010). It relates to how information is acquired by the public about their awareness of a certain issue (Chow et al., 2014). It is emphasized that insufficient information regarding a particular disorder within the public displays a greater hurdle in disease prevention. Moreover, practices mean the implementation of rules and knowledge which demonstrate the action in response to CKD prevention (Lakhan & Sharma, 2010). Consequently, the nurse who is work in HD department, as a fundamental caregiver, has an essential responsibility in providing constant evaluation, distinguishing the child's complaints about symptoms, providing constant support for medical strategies and providing the care in order to support the families of the children and assist them in exploring their emotions. The safety of the patient is an important concern for all healthcare professionals, especially nurses. They are permanently involved in the patient's care (McGaw et al, 2012). However, it is essential for nurses to develop their knowledge.

Eventually, the knowledge of the nurse is regarded as the heart and soul of every patient. Nurses knowledge and skills of practice play a fundamental role in containing and controlling the patient's well-being as this ultimately develops and enhances the quality of care for the patients. Therefore, Nurses who lack knowledge can cause several issues, such as complications relating to the quality of care for children with HD (Farias et al, 2016). This study aims to assess the nurses' knowledge and practice regarding nursing care of children undergoing HD at the governmental hospital in GS.

1.2 Research Problem

CKD is a serious disease might lead to death, if not managed. The last option of renal failure management before transplant is dialysis. The success of HD largely depends on monitoring the general condition and complications (e.g. hypotension HTN, cramps & hypoglycemia). Nurses represent the first line of care and observation. Accordingly, good knowledge expected to gain a positive treatment outcome. There is scarcity in studies conducted on this issue in GS, and this study is an attempt to provide primary findings.

Furthermore, by reviewing the available academic nursing programs in GS, the researcher found that the various nursing colleges and academic institutions provide a general nursing program, and there are no available nursing subspecialty programs concerned with pediatric HD nursing care. Therefore, nurses who have a bachelor's degree in nursing or even just a diploma in general nursing provide nursing care to children. Nursing care provided without any pre-training courses in hospital leads to weakness in nursing care outcome, as well as health worker shortages and poorly equipped facilities, and a lack of knowledge and competencies in dealing with children undergoing HD. This study aims to assess the nurses' knowledge and practice regarding nursing care of children undergoing HD at the governmental hospital in GS.

1.3 Justification and Significant

Children with ESRD often have disease-specific management needs, and are at especially high risk for complications. Care coordination, planning, communication, and education are at the core of basic nursing standards of care. Nurses are the most health care providers who are indispensable for caring of HD patients, they have to be sufficiently informed and practically skilled in dealing with their patients of HD. Those patients are usually needed for careful and continuous observation of their nurses, so as to avoid and or prevent any common complications and problems associated with HD processes. Therefore, the result of this study will add an important value to the nursing profession in clinical, administration, research and academic issues. This result will detect actual demand for specializing nursing training programs which will improve the competence of nurses' practices. As well as, this result will provide a clear view about the reality of nursing care system provided to a pediatric patient in HD processes , Also the result of this study will explore the nurses' knowledge outcome during academic study and the demand for modifying an training program that offers in colleges and university, guide governmental and non-governmental health organizations to focus on training newly graduate nurse to provide competent nursing care, however this study was consider intervention project seek to improve clinical practice in the HD units in GS. It was important to assess the ability of nurses to create positive change in the knowledge and practice. In addition to all researches published regarding renal diseases in GS for adults only, there isn't researches applied for children. Finally, the result of the study will detect the relation between nurses' knowledge and practices and will provide an important recommendation for a new research study. Therefore, the researcher assesses the nurse's knowledge and practice regarding the care of children undergoing HD to strengthen the vulnerability of nursing care.

1.4 Aim of Study

The overall aim of this study is to assess nurses' knowledge and practice regarding nursing care of children undergoing HD at the governmental hospital in GS.

1.5 Objectives of the Study

1. To assess the nurse's knowledge related to nursing care of children undergoing HD in GS.

2. To identify the nurse's practice related to nursing care of children undergoing HD in GS.

3. To determine there is a correlation between knowledge and practice related to nursing care of children undergoing HD in GS.

4. To determine the relationship between nurses sociodemographic, and socioeconomic variables and knowledge and practice related to nursing care of child underdoing HD in GS.

5. To set specific recommendations for the policymaker to enhancing nursing care of children undergoing HD in GS.

1.6 Research Questions

1. What is the level of nurses' knowledge related to nursing care of children undergoing HD in GS?

2. What is the level of nurses' practice related to nursing care of children undergoing HD in GS?

3. Do nurses' knowledge and practice related to nursing care of children undergoing HD differ between nurses whom are working in HD department of the government hospital at G.S in relation to their sociodemographic characteristics?

4. Is there a relationship between nurses' experience and knowledge and practices provided to children undergoing HD at the governmental hospitals at G.S?

5. Did the nurses working in the HD department of the government hospital at GS receive any formal or informal training before/during their working period in this area?

6. Dose formal or informal training play a role in improving the level of knowledge and practices of nurses working in the HD department at the governmental hospitals at G.S?

7. What are the suggestions, and recommendations could be provided to the stakeholders to improve the quality of care provided to children undergoing HD of governmental hospitals at G.S?

1.7 The context of the Study

The researcher provided an overview about the context where the study was performed that could have influence on the topic under the study. The context involves socio-demographic variables, economic, political and the health care system in which the study concerning with nurse's knowledge and practice regarding nursing care of children undergoing HD in GS.

1.7.1 Demographic Context

Palestine is one of an Arabic Country (Annex 1), a relatively small one. The total surface area of Palestine is about 27.000 Km². Lebanon, Syria, Gordon, Egypt, and the Mediterranean Sea surround Palestine. Palestine has been occupied in 1948 by Israel, the

two remaining parts are separated geographically (West Bank "WB" and GS) after the war in 1967 (Ministry of health - MOH, 2010). The total area of the GS and WB is about 6020 Sq. K m² with the total population living in is about 4,780,978 individuals (1,961,406 in GS and 2,953,943 in West Bank) (Palestinian Health Information Center- PHIC – MOH, 2019).

GS is a narrow piece of land lying on the coast of the Mediterranean Sea. The total area of GS is about 365 square kilometer (Palestinian Central Bureau of Statistics-PCBS, 2017). GS is the overcrowded area, the estimated population at the end of 2016 about 1,912,276 with a population density of 5,239 inhabitants/ Km². The proportion of Pop. Aged under 5 years "16.8% in GS" (PHIC, 2017), the Mean number of children ever born to ever-married Palestinian Women (15 Years and Over) in GS 4.5. In 2017, the number of births reported in Palestine was 136,349 of which 58,303 were born in GS, which 42.8% of all reported births in 2017 (PCBS, 2018).

GS is divided into five governorates: Gaza Governorates, North Governorates, Mid-zone Governorate, Khan-Younis Governorate, and Rafah Governorate. This high population density in GS increases the overload on the hospital's care, which stress on the great need for providing a high quality of care with minimal cost through competence nurses.

1.7.2 Socio-demographic Context

The occupied Palestinian territories (OPT) consist of two geographically separated areas; WB and the GS. GS is a narrow zone of land bounded by Egypt at the south, at west by the Mediterranean Sea, and at the east and north by the occupied territories in 1948. GS has a total area of 365 sq. km with 46 kilometers long and 5–12 kilometers wide and representing 6.1% of the total area of the OPT. GS is considered as one of the most overcrowded areas in the world with a population density of 5,154 inhabitants/sq.km. GS is

geographically divided into five governorates: Gaza, Mid-Zone, Khan-Younis, Rafah, and North Gaza (PCBS, 2017).

1.7.3 Socio-Economic and Political Context

In 2017 marked the 50th year of Israeli military occupation of the WB, including East Jerusalem, and the GS. Humanitarian needs throughout the OPT remain extensive, particularly in the GS. Increase the number of unemployment, low incomes, the elevated cost of living (particularly for food) resulted in continued high levels of food insecurity in the OPT 1.6 million people need health and nutrition support, and 1.9 million people require some form of protection assistance (OPT, 2015). In 2017, more deterioration in the GS, in particular, its chronic energy crisis, exacerbating an already-fragile humanitarian situation as a consequence of the further deepening of the internal Palestinian political divide on top of the 10 years of the Israeli blockade and periodic escalations of hostilities. The GS has suffered from three wars in eight years resulted in hundreds of fatalities and thousands of injuries; and further badly affected the already weakened status of the water, sanitation, health, and power sectors in the GS (PHIC, 2017).

1.7.4 Health Care System Context

The healthcare system in Palestine is complex, unique and strongly influenced by the Israeli occupation. The consequences of the closures and separation imposed a great challenge for the MOH by creating obstacles regarding the accessibility to health care services and affected the unity of the health care system in all Palestinian governorates (United Nations Relief and Works Agency - UNRWA, 2016).

There are four main health care providers; MOH, UNRWA, Non-Governmental Organization (NGOs), and the private sector. With such a multitude of service providers, there are numerous challenges in providing a well-coordinated, standardized health service

provision during normal times and frictions are deemed to exacerbate during emergencies (World health organization - WHO, 2014). UNRWA provides health-care services to the vast majority of the over 1.3 million Palestine refugees in GS through 22 medical centers, providing Primary health care (PHC), secondary and tertiary health care services (UNRWA, 2016).

1.7.5 Governmental Hospital Services

MOH is the main health care provider in the governorates; it provides PHC, secondary and tertiary services for the whole population. The number of hospitals owned by MOH in GS is 13 hospitals with capacity 1664 beds (MOH, 2017). It provide advanced medical services by referring patients to the neighboring countries and other private and NGO healthcare facilities. MOH has been seriously affected by the financial crisis being experienced by the Palestinian Authority. In fact, there have been reductions in the number of patients being referred outside the OPT for specialized treatment and there have been growing and substantial shortages of medicines and disposables (WHO, 2013).

1.7.6 Dialysis Centers in the Gaza strip

There are five major centers to manage the care of adult patients with ESRD, being Al-Shifa hospital (Gaza city), Al-Aqsa hospital (Middle Zone), Nasser hospital (Khan Younis), and AlNajjar hospital (Rafah). and one center to manage children age of twelve years, Patients with ESRD are managed in the geographically closest hospital. Patients in Northern Zone are managed in Al-Shifa hospital, and children under the age of twelve years old receive care in the al-Rantisi pediatric hospital in Gaza City.

1.7.6.1 Al-Shifa hospital

It is the largest and oldest health institution in the GS, where it was established in 1946 on an area of 42,000 m2. It is located in the central west of Gaza City, at the crossroads intersection of Izz El-Din Al-Qassam Street. The hospital contained 597 hospitalization beds, distributed into three hospitals. These hospitals are surgical hospitals, Medical hospital and Obstetrics hospital. Each hospital has its own administrative teams. Al-Shifa hospital provides services like orthopedics, pediatrics, coronary care unit, intensive care unit, burn department and dialysis center (PHIC – MOH, 2019). The numbers of dialysis machines in dialysis centers were 45 machines serving 448 ESRD patients, 2.2 sessions per week (MOH, 2019). Al-Shifa hospital provides HD services for Gaza city and North-Zone ESRD patients.

1.7.6.2 Nasser hospital

It's the second-largest governmental medical institution in the GS. It was established in 1957 on the area of 50000 m2 containing 338 beds. It provides secondary services that included medical, surgical services and obstetrics and maternity care. The Nasser hospital provides services like orthopedics, pediatrics, coronary care unit, intensive care unit and dialysis department (PHIC – MOH, 2019). The numbers of dialysis machines in the dialysis center were 23 machines serving 144 ESRD patients, with an average of 2.4 sessions per week (MOH, 2019).

1.7.63 Al-Aqsa hospital

It is one of the governmental hospitals, which was established in 2001 in the Middle Zone. It provides secondary services to the province of Deir Al-Balah including Pediatric, medical, surgical, Obstetrics services, and dialysis unit, The hospital contained 217 hospitalization beds (PHIC – MOH, 2019). The number of dialysis machines in the dialysis

center is 12 machines serving 88 ESRD patients, with an average of 2.1 sessions per week (MOH, 2019).

1.7.6.4 Al-Rantisy hospital

It is one of the governmental hospitals, which was established in 2009 in Gaza governorate provides tertiary service to the pediatric service and dialysis unit, The hospital contained 125 hospitalization beds (PHIC – MOH, 2019).

The number of dialysis machines in the dialysis center was 10 machines serving 40 ESRD Patients, with an average of 2.3 sessions per week (MOH, 2019).

1.7.6.5 Al-Najjar hospital

Is the only government hospital that serves the province of Rafah, It was established in 2000 on an area of 4000 m 2. It is located in Eljenaina-El-Aboor Street. The hospital provides secondary services that include pediatric, medical, surgical services and has a dialysis unit, The hospital contained 102 hospitalization beds (PHIC – MOH, 2019). The number of dialysis machines at the dialysis center is 12 machines serving 89 ESRD patients, with an average of 2.2 sessions per week (MOH, 2019).

1.8 Theoretical and Operational definition

1.8.1 Child

A child means every human being below the age of 18 years unless, under the law applicable to the child, majority is attained earlier (United Nations Children's Emergency Fund - UNICEF, 2014).

1.8.2 Knowledge

The nurses' theoretical understanding of HD children nursing care issues acquired through education or experience and measure through the questionnaires constructed by the researcher of this study.

Knowledge is the amount of information acquired, retained and utilized in daily life (Lakhan & Sharma, 2010)

1.8.3 Practice

The nurses' practical understanding of HD children nursing care issues acquired through education or experience and measure through the questionnaires constructed by the researcher of this study.

Practices mean the implementation of rules and knowledge which demonstrate the action in response to CKD prevention (Lakhan & Sharma, 2010).

1.8.4 Hemodialysis

HD is a medical procedure that uses a special machine (a dialysis machine) to filter waste products from the blood and to restore normal constituents to it. HD is frequently done to treat patients with ESRD. Under such circumstances, kidney dialysis is typically administered using a fixed schedule of three times per week (Medicine Net, 2013).

1.8.4 Nursing Care

Tasks identified by a nursing needs assessment as those that need to carried out or supervised by a qualified nurse (housing care, 2019)

1.9 Layout of the Study

1.9.1 Chapter One (Introduction)

This chapter presents a general introduction including the problem statement, justification, and significance of the study. Also the aim of the study and the overall objectives and

research questions of the study. The context of the study includes demographics, socioeconomic political, health care system, Dialysis department in Gaza governmental hospitals context. Finally, the operational definition discussed.

1.9.2 Chapter Two (Literature review)

This chapter discusses the conceptual framework of the study, define preterm neonate, epidemiology of children HD globally, in the developed and developing country, in Arab countries and especially in Palestine. Also the characteristics and risk factors of children with CKD. Common health problems result from HD. Finally, this chapter explores the teamwork in the HD department.

1.9.3 Chapter Three (Methodology)

This chapter presents the method of the study to answer the research questions. In this chapter different items were explained: study design, place of the study, study population, sample size, sampling process, a period of the study, inclusion and exclusion criteria, ethical and administrative consideration, study tools, reliability, validity, pilot study, data collection, data management of the study.

1.9.4 Chapter Four (Results and Discussion)

This chapter illustrates the results of a statistical analysis of the data from 83 nurse participants, including descriptive analysis that presents the socio-demographic characteristics of the study sample and answers to the study questions. The researcher used simple statistics including frequencies, means, and percentages. Also, independent sample t-test, One-way ANOVA and Pearson correlation were used.

1.9.5 Chapter Five (Conclusion and recommendations)

This chapter concludes the overall study result, an overview of the research process clearly formulate the findings and conclusions regarding the research problem. Finally, the recommendation result from this study.

Chapter Two

Conceptual Framework and Literature review

2.1 Conceptual Framework
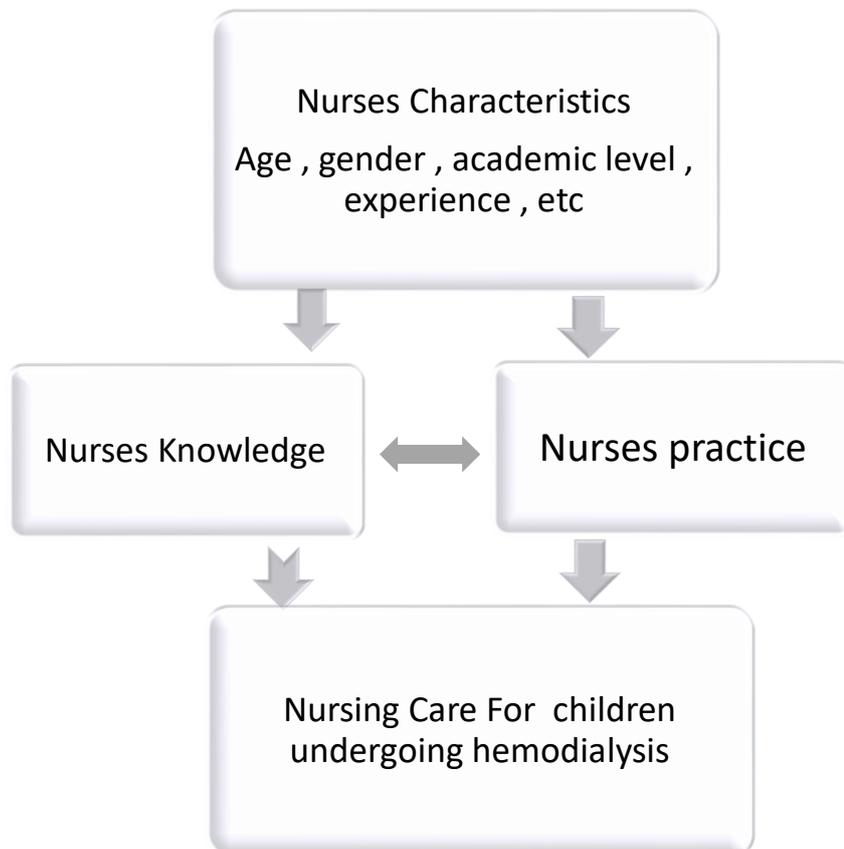
Figure 2.1: Conceptual framework of the study

This conceptual framework was developed by the researcher to illustrate the effect of three-dimension; (a) Nurse's Characteristics (b) Nurse's Knowledge (c) Nurse's practice, on providing competent nursing care for children undergoing HD. The details of the framework displayed in the (figure2.1). As depicted in the diagram that there are three major elements could influence nursing care among HD children. The first element is the nurse's characteristics, each of these characteristics affected nurse's knowledge and practice

in caring for children undergoing HD. The second element is the nurse knowledge, which influenced by nursing graduation, academic qualification, experience and special nurse courses before and during working in the dialysis department. The third element is the nurse practice. The researcher supposes that the interaction between these the three elements can establish competent nursing care among children undergoing HD.

2.2 Literature review

Renal failure is a condition in which the kidney cannot concentrate urine, conserve electrolytes and excrete waste products. In children, the renal failure may occur as an acute or chronic disorder. Some cases of acute renal failure resolve without further complication while dialysis is necessary for other children. When acute renal failure continues to progress, it becomes a CRF. Dialysis and kidney transplantation are treatment modalities used for CRF (Kyle, 2008). Medical management of CRF includes dialysis to remove waste products and extra water from the blood. There are two types of dialysis; HD and peritoneal dialysis. Kidney transplantation involves surgically placing a healthy kidney from a donor inside a patients' body that is used when there is no life threading medical condition other than kidney failure (Kraut, 2009; Wolfson, 2009). Moreover, HD is the most common process used to treat progressive and permanent kidney failure. HD is a widely used mode of RRT in infants and children with ESRD. It can be defined as a treatment that cleans the blood of excess waste products and removes excess fluid. Excess water and waste are removed through a semipermeable membrane by means of diffusion and osmosis (American Nephrology Nurses' Association - ANNA, 2013).

2.3 Overview of the kidney

Kidney is a paired organ, the basic units of the kidneys are microscopically thin structures called nephrons, which filter the blood and cause wastes to be removed in the form of

urine. Together with the two ureters, bladder, and the single urethra, the kidneys make up the body's urinary system. Human beings, as well as members of all other vertebrate species, typically have two kidneys (Figure 2.2). The kidneys of adult humans are about 10 to 13 cm (4 to 5 in) long and about 5 to 7.5 cm (2 to 3 in) wide (National Kidney Foundation - NKF, 2013). Moreover, the normal size of kidneys in children's deference from adults and naturally depend on the age and size of the child. Based on the children's ages normal average renal length on ultrasound are as follows:

- 0 to 2 months: 5 cm (approximately 2 inches)

- 2 months to 6 months: 5.7 cm

- 6 months to 1 year: 6.2 cm (2.5 inches)

- 1 year to 5 years: 7.3 cm (3 inches)

- 5 years to 10 years: 8.5 cm (3.5 inches)

- 10 years to 15 years: 10 cm (approximately 4 inches)

- Above 15 years: similar to an adult's normal kidney size (Kecler-Pietrzyk, 2017).
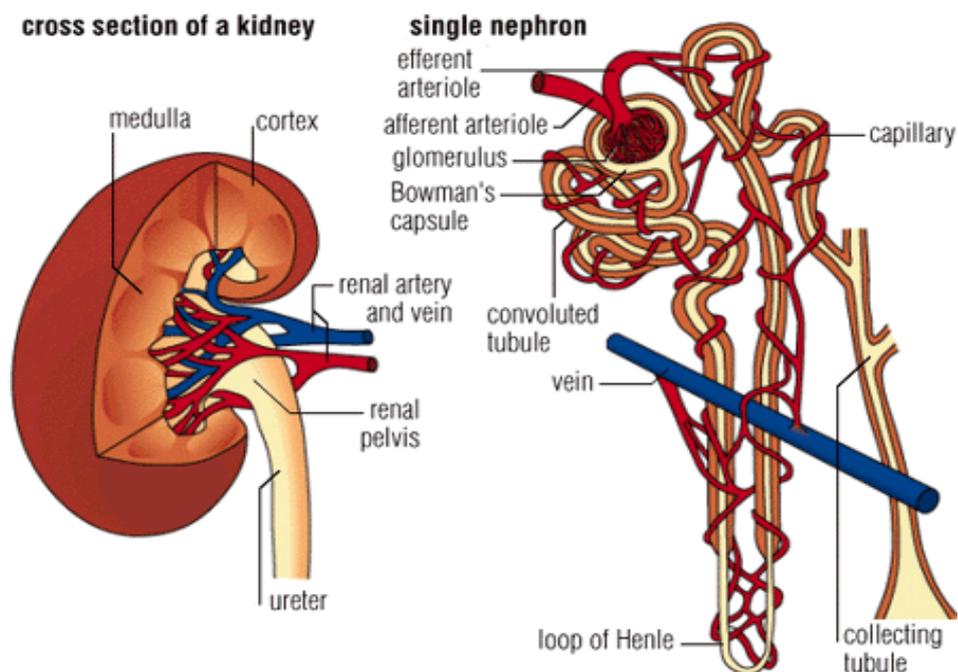
Figure 2.2: Cross-section of the kidney

2.4 Function of kidneys

A primary function of kidneys is the removal of poisonous wastes from the blood and regulating the amount of fluid in the body. Main among these wastes are the BUN and uric acid, which result from the breakdown of proteins and nucleic acids. Life-threatening diseases happen when many of these waste products accumulate in the blood. Fortunately, a healthy kidney can easily rid the body of these substances (NKF, 2013).

2.5 Epidemiology

There has been a significant rise in the prevalence of pediatric CKD worldwide over the past few years (Baum, 2010). This may be due to early detection of cases during childhood and longer survival of patients due to the widespread availability of dialysis and transplantation. The prevalence of children diagnosed with ESRD ranges from 65 to 85 per million age-related population (PMARP) based on registries of western countries (Harambat et al, 2012). Until 2008, the incidence of children less than 20 years of age receiving RRT was about 9 PMARP worldwide (Schwartz et al, 2009). while it was 15.5 PMARP in the USA (United States Renal Data System USRDS, 2010). The incidence and prevalence in Palestine, similar to other developing countries, is unknown so far due to a lack of pediatric CKD registry.

2.6 Kidney disease

2.6.1 Acute Kidney Injury (AKI)

AKI is a syndrome of diminished renal function, measured by urine output or serum creatinine occurring over hours-days. It includes different etiologies and may be multifactorial. Moreover, AKI is common, occurring in up to 18% of hospital patients and ~50% of ICU patients. Risk factors for AKI include pre-existing CKD, age, male sex, and

comorbidity "diabetes mellitus, cardiovascular disease (CVD), malignancy, chronic liver disease, complex surgery" (Wilkinson et al. 2017).

In 2012 the KDIGO released their clinical practice guidelines for acute kidney injury (AKI), which build off of the AKI criteria. KDIGO defines AKI as any of the following: Increase in serum creatinine by 0.3mg/dL or more within 48 hours, or increase in serum creatinine to 1.5 times baseline or more within the last 7 days, or urine output less than 0.5 mL/kg/h for 6 hours (KDIGO, 2012).

2.7.2 Causes of Acute Kidney Injury

1- Pre-renal: Occur due to renal hypoperfusion e.g., sepsis, congestive cardiac failure, liver cirrhosis and renal artery stenosis.

2- Intrinsic: Occur due to response to cytotoxic, ischemic, or inflammatory insults to the kidney, with structural and functional damage.

3- Post-renal: Occur due to urinary tract obstruction (Wilkinson et al, 2017).

The association between AKI and CKD was studied by (Thakar, et al., 2011), who found a strong association between episodes of AKI and cumulative risk for the development of advanced CKD. Furthermore, any AKI versus no AKI was a risk factor for stage 4 CKD, and each additional AKI episode doubled that risk.

2.7.3 Chronic Kidney Disease in children

2.7.3.1 Definition

Prior to 2002, the term chronic renal insufficiency was used to characterize patients who had a progressive decline in renal function, defined as a GFR of less than 75 mL/min per 1.73 m2 body surface area. CKD is the new term defined by the KDOQI Group to classify

any patient who has kidney damage lasting for at least 3 months with or without a reduced GFR or any children patient who have a GFR of fewer than 60 mL/min per 1.73 m2 lasting for 3 months with or without kidney damage. Consequently, CKD is an increasingly common clinical problem that raises children's risk for developing several life-threatening medical conditions, including ESRD and CVD. Moreover, there are markers of kidney damage include one or more of these signs, Albuminuria (An albumin excretion rate (AER) ≥ 30mg/24hrs, and Albumin/creatinine ratio (ACR) ≥ 30mg/g), Urine sediment abnormalities, Electrolyte and other abnormalities due to tubular disorders, Abnormalities detected by histology, Structural abnormalities detected by imaging and History of prior kidney transplantation (Whyte and Fine, 2018).

2.7.4. Glomerular filtration rate

GFR is the most accurate measurement of the level of renal function when the serum urea or creatinine is within the normal range. It varies according to age, sex, and body size and also affected by the normal physiological status that affects single nephron such as pregnancy or protein intake. Also, the GFR level is an excellent measure of CKD as well as the risk of complications of CKD, but it involves considerable effort, cost, and time. Low or decreasing GFR is a good indicator of CKD. The sum of the filtration rate of individual's nephron is equal to the total kidney GFR, which used as an index of functioning renal mass. The stage that precedes kidney failure in all forms of progressive kidney disease is a decrease in GFR. Therefore, GFR monitoring is important for delineating progression GFR (KDOQI, 2012).

2.7.5 Chronic kidney disease stages

GFR considered as the best guide of broad kidney function in health and disease. Also, the stages of CKD, defined as structural abnormalities of the kidney that can lead to

diminished GFR, are recognized. Moreover, CKD mentions to all five stages of kidney damage, from very mild damage in Stage 1 to complete kidney failure in Stage 5, the stages of kidney disease depend on how healthy kidneys can do their job – to filter waste and extra fluid out of the blood. In the early stages of kidney disease, the kidneys are still able to filter out waste from the blood. In the later stages, kidneys have to work harder to get rid of waste and may stop working altogether (American Kidney Fund AKF, 2018). Consequently, kidney disease determined by five stages based on the presence of kidney damage and GFR. It is a measure of kidney function level and considered the best way to determine how the kidneys work. In addition, treatment depends on the stages of kidney disease (NKF-KDOQI, 2012).

2.7.5.1 Stage 1 is defined as kidney damage with normal GFR (>90 mL/min/1.73 m²), which over time can lead to decreased GFR.

2.7.5.2 Stage 2 is defined as kidney damage with mild reduction in GFR (60-89 mL/min/1.73 m²). In this stage, patients usually have HTN and may have laboratory abnormalities indicative of dysfunction. This is determined by measurements of serum creatinine levels.

2.7.5.3 Stage 3 is defined as kidney damage with a moderate reduction in GFR (30-59 mL/min/1.73 m²). This stage is distinguished by the presence of azotemia (nitrogen metabolism) and expressed by an elevation in serum creatinine and blood urea nitrogen (BUN). Erythropoietin production reductions and laboratory abnormalities reflecting dysfunction in other organ systems are regularly present. Although patients may have symptoms, they often remain remarkably asymptomatic even though their kidney function reduced by as much as 70%.

2.7.5.4 Stage 4 is characterized by a severe reduction in GFR (15-29 mL/min/1.73 m²). In this stage, an extremely tenuous stage of CKD, the worsening of anemia, azotemia, and

other laboratory deformities reflect that several organ systems may be dysfunction. However, patients usually have mild symptoms.

2.7.5.5 Stage 5 is characterized by Kidney failure (GFR <15 mL/min/1.73 m² or dialysis). In most cases, this level of kidney functions accompanied by a constellation of symptoms and laboratory abnormalities in several organ systems, which collectively referred to as uremia. Initiation of kidney replacement therapy (dialysis or transplantation) is typically required for treatment of co-morbid conditions or complications of decreased GFR, which would otherwise increase the risk of morbidity and mortality (NKF/KDOQI, 2012).

2.8 Etiology of CKD in children

The etiology of CKD varies not only among pediatric and adult patients but also within the pediatric group. In fact, the main etiologic factors of CKD in children are represented by Congenital Anomaly of Kidney and Urinary Tract (CAKUT), steroid-resistant nephrotic syndrome, chronic glomerulonephritis (e.g. lupus nephritis, Alport syndrome) and renal ciliopathies. Moreover, less common causes of CKD in children include thrombotic microangiopathies (especially atypical hemolytic uremic syndrome), nephrolithiasis/nephrocalcinosis, Wilms tumor, infectious and interstitial diseases, and others. While structural causes (e.g. renal hypoplasia or posterior urethral valves) clearly predominate in younger patients, the incidence of glomerulonephritis increases in those >12 years old (Vivante and Hildebrandt, 2016). However, minor reductions in nephron numbers that are seen in low-birth-weight and small for gestational age newborns are now emerging as important predisposing factors to CKD and will come to represent an important issue for nephrologists as the number of premature children continues to grow (Cain et al, 2010; Schreuder, 2012). Also, evaluation of the urinary tract is extremely essential among all pediatric cases to assess reversibility, to reduce the incidence of infections and prior to transplantation. Moreover, recent data showed that obese children

(Ding, 2015), premature, low birth weight, and small for gestational age babies are prone to CKD in their adolescence (Carmody & Charlton 2013). Registry data also reflects a racial and gender-based diversity in the etiology and prognosis. African Americans in North America and native aborigines in Australia have increased the incidence of CKD and faster progression to ESRD as compared to their Caucasian counterparts. Males are more common than females, probably because CAKUT is more common in males (Harambat et al, 2012).

2.9 Who is at increased risk for chronic kidney disease

Data from the USRDS 2011, indicates the incidence of ESRD is disproportionately high among older individuals, certain ethnic minorities, and individuals with HTN, diabetes, and autoimmune diseases, overuse of anti-inflammation, infection (glomerulonephritis). This suggests that demographic and clinical factors may be risk factors for the development or progression of CKD. Moreover, people with a family history of kidney disease seem to be at higher risk of emerging kidney disease. This seems to be true for utmost categories of kidney diseases, suggesting the attendance of genes coding for susceptibility factors for the progression of kidney disease overall, as well as genes coding for specific kidney diseases, such as autosomal dominant polycystic kidney disease (ADPKD) or Alport's syndrome. Finally, child patients who have acute kidney failure, whether due to acute tubular necrosis or other parenchymal diseases, may also be at hazard of developing CKD (USRDS, 2011).

2.10 Clinical Manifestations of ESRD

The clinical manifestations of ESRD include alteration in water, electrolyte, and acid-base balance; mineral and skeletal disorders; anemia and coagulation disorders; hypertension and alterations in cardiovascular function; gastrointestinal disorders; neurologic complications; disorders of skin integrity; and immunologic disorders. Moreover,

impairment of the excretory function of the kidney results in an elevation in levels of BUN, creatinine, and various protein metabolic products. Impairment in the synthetic function results in a decrease in the production of erythropoietin (causing anemia) and active vitamin D-3 (causing hypocalcemia, secondary hyperparathyroidism, hypophosphatemia, and renal osteodystrophy). Also, impairment in synthetic function also results in a reduction in acid, potassium, salt, and water excretion (causing acidosis, hyperkalemia, hypertension, and edema) and in platelet dysfunction (promoting bleeding), (Kazmi et al., 2012). Additionally, the following are a most common manifestations of ESRD in children.

2.10.1 Uremic syndrome

The uremic syndrome is characterized not only by solute accumulation but also by hormonal alterations such as decreased production of erythropoietin and calcitriol and decreased clearance of insulin. The signs and symptoms vary from one patient to another, depending partly on the rate and severity of the loss of kidney function. Uremic toxins can be divided into three chief groups depend on their physical and chemical characteristics, (1) Small, lipid-soluble and/or protein-bound compounds, such as the phenols (2) Small, water-soluble, non-protein-bound compounds, such as urea (3) Larger so-called middle-molecules, such as beta 2 macroglobulin (Kazmi et al., 2012).

2.10.2 Hematologic Problems

Anemia is a frequent complication of CKD with increasing prevalence as this condition progresses, thereby affecting nearly all patients on dialysis. The etiology of anemia in the children and adolescent population with CKD is often multifactorial, erythropoietin deficiency remains the principal cause. Other important contributors include blood loss, iron deficiency, vitamin deficiency/poor nutrition, inflammation, poorly controlled

hyperparathyroidism, medications (e.g., angiotensin-converting enzyme inhibitors and angiotensin receptor blockers), inadequate dialysis, and systemic disease (Massengill and Ferris, 2014; Warady et al 2014). The systemic effects of anemia in the adolescent age group are considerable, including fatigue, depression, sleep disturbance, impaired cognitive function, loss of appetite and decreased exercise tolerance, ultimately resulting in poor QoL (Massengill and Ferris, 2014). In addition, anemia has a significant impact on overall health outcomes given its association with cardiovascular complications, such as left ventricular hypertrophy, blood transfusions resulting in human leukocyte antigen sensitization and potential decreased probability of renal transplantation, and increased mortality (Warady et al 2014). Given these substantial effects on the long-term health of the adolescents with CKD, as well as on their QoL, providers should monitor for the development of anemia and iron deficiency in this population. The threshold to diagnose anemia in children with CKD is age-dependent but approaches the KDOQI standard for adult females of <12 g/dl for children age 12-15 years (KDIGO, 2009). Iron studies should be obtained in all adolescents with CKD, regardless of use of an erythropoietin stimulating agent, with a goal transferrin saturation >20% and serum ferritin level >100 ng/ml, though the utility of the serum ferritin level as a measure of iron status has been questioned based on recent studies, as it is thought to be more reflective of the inflammatory state (Bacchetta et al, 2012). The preferred initial route of administration for iron is by mouth, except in those who are on maintenance HD (NKF, K/DOQI, 2012). Furthermore, bleeding may be a significant problem in patients with ESRD, and it has been attributed to increased prostacyclin activity, increased capillary fragility, and a deficiency in platelet factor. In addition, the acquired qualitative platelets defect secondary to uremic toxins leading to decreased platelet adhesiveness. Also, the low hematocrit levels commonly found in uremic patients negatively influence the rheological component of platelet–vessel wall

interactions. Platelet defects secondary to uremia are best remedied by dialysis (Markova et al, 2012).

2.10.3 Mineral and Bone Disorder

Adolescence is a crucial time for accrual of skeletal mass with approximately 25% of this mass being laid down during the 2-year period of peak height velocity (Schmitt and Mehls, 2010). Both bone mass and bone strength are known to be affected by the uremic state, and as such, adolescents with CKD experience changes in bone modeling/remodeling that may ultimately impact their quality of life (QoL) and long-term health. In addition, there has been increasing appreciation in the last decade of the cardiovascular calcifications that are associated with CKD, along with the resultant increase in mortality related to CVD for these patients (Wesseling and Salusky, 2013). As such, the triad of bone disease, disordered mineral metabolism, and CVD in the setting of renal dysfunction, is now referred to as 'CKD-mineral and bone disorder', or CKD-MBD (KDIGO, 2009). CKD-MBD is the result of complex signaling mechanisms between the skeleton, kidneys, and parathyroid glands in the setting of renal dysfunction, which leads to alterations in serum values of calcium, phosphorus, FGF23 (a bone-derived regulator of phosphate metabolism), parathyroid hormone (PTH) and vitamin D metabolites. These changes have been shown to occur early in the course of CKD with evidence of increased levels of FGF23 in patients with stage 2 CKD (Wesseling and Salusky, 2013). The clinical manifestations of CKD-MBD in the children and adolescent population are a source of significant morbidity and mortality, and include such entities as bone pain, myopathy, fractures and cardiovascular calcifications, in addition to poor growth in those with an earlier onset of CKD (Schmitt and Mehls, 2010). As such, it is imperative for providers caring for children's with CKD to be alert in monitoring biochemical parameters (calcium, phosphorus, PTH, and alkaline phosphatase) in order to minimize these complications.

Bone biopsy remains the gold standard for assessing renal bone disease; however, it is not widely used in the care of children with CKD. The Kidney Disease Outcomes Quality Initiatives (KDOQI) endorses a bone biopsy for the following clinical indications: (1) pathological fractures, (2) unexplained hypercalcemia and (3) concern for aluminum toxicity. Dual X-ray absorptiometry is not recommended for use in children with CKD due to its substantial limitations in this population, a position endorsed by both the National Kidney Foundation (KDOQI guidelines) and the International Society for Clinical Densitometry (Weber and Mehls, 2013).

2.10.4 Psychological manifestations

Psychiatric illness is common among children with chronic disorders, particularly in those with ESRD. The psychological problems associated with CKD included affective disorders, particularly depression, organic brain diseases, dementia, schizophrenia, and other psychoses and personality disorders (McQuillan et al, 2010).

2.11 Kidney investigation

Healthy kidneys eliminate wastes and extra fluid from the blood. Blood and urine tests demonstration how well the kidneys are doing their job and how rapidly body wastes are being eliminated. Furthermore, Also, urine tests can detect whether the kidneys are leaking irregular amounts of protein, a sign of kidney injury. There is a quick guide to the tests measure kidney function. However, we must remember that physician review of medical history as physical examination because children's who have CKD may develop ESRD. Physical examination included all procedures done by physicians, in additional tests to determine kidney function well-being. The following are the most procedure done to investigate kidney function (NKF, 2017).

2.11.1 Serum Creatinine

Creatinine is a waste product that comes from the normal wear and tears on the muscles of the body. The creatinine levels in the blood can vary based on age, race and body size. So a creatinine level of greater than 1.4 for male and greater than 1.2 for females may be an early sign that the kidneys are not working correctly. As kidney disease progresses, the level of creatinine in the blood rises (NKF, 2017).

2.11.2 Glomerular Filtration Rate

GFR test is a measure of how well the kidneys are eliminating wastes and extra fluid from the blood. This is calculated from the serum creatinine level using gender and age with adjustment for those of African American parentage. Moreover, normal GFR differ according to age (as a person gets older it can decline). The standard value for GFR is 90 or above. A GFR under 60 is a sign that the kidneys are not working well. Once the GFR decreases below 15, one is at high risk for needing treatment for kidney failures, such as dialysis or a kidney transplant (NKF, 2017).

2.11.3 Blood urea nitrogen test

Urea nitrogen is a waste product from the breakdown of protein from the foods eat and from body metabolism that disposed of by the kidneys. Nitrogen is a product of urea and will remove by the kidneys. Thus, when kidney function reduced, maybe high BUN (NKF, 2012).

2.11.3 Ultrasound

Ultrasound is a noninvasive step that its wage sound waves passed into the body through a transducer to detect abnormalities of internal tissues and organs, This test uses sound waves to get a picture of the kidney. It may be used to appearance for abnormalities in the

position or size of the kidneys or for obstructions such as tumors or stones. Renal ultrasound may be considered in all patients with GFR < 60 both for evaluation and establishing a baseline. Moreover, ultrasound is strongly recommended in a patient with symptoms or signs consistent with obstruction, Family history of cystic kidney disease, Rapid progression of CKD (Di Lullo, 2014).

2.11.4 CT Scan

CT is an imaging method uses X-rays to image the kidneys. It may also be used to appearance for structural irregularities and the occurrence of obstructions. This test may require the use of intravenous contrast dye which can be of concern for those with kidney disease (NKF, 2017).

2.11.5 Urinalysis

Includes a microscopic examination of a urine sample as well as a dipstick test. The strip in dipstick is a chemically treated, which is dipped into a urine sample. In the presence of abnormalities such as excess amounts of protein, blood, pus, bacteria and sugar The color of strip will changes. A urinalysis can help to detect a variety of kidney and urinary tract disorders, including CKD, diabetes, bladder infections and kidney stones (NKF, 2017).

2.11.6 Renal biopsy

Kidney biopsy was the most effective role in the development of our understanding of various types of histopathological abnormalities in the kidney, which contribute to the defects of the urinary sediment. A renal biopsy may be done for one of the following reasons, (1) to assess the amount of damage that has occurred in the kidney (2) to identify an exact disease process and determine whether it will respond to management (3) to discover why a kidney transplant may not be doing well. A kidney biopsy is performed by

using a thin needle with a sharp cutting edge to slice small pieces of kidney tissue for examination under a microscope (NKF, 2017).

2.13 Management of ESRD in children's

2.13.1 Dialysis

Dialysis is a process that uses a man-made membrane to filter out toxins, waste products, and excess fluid from the blood when kidney function is impaired. Dialysis treatment also balances the bodýs calcium, phosphorus and potassium levels. Moreover, dialysis treatment extends life expectancy significantly, but it alone is not enough to manage advanced CKD, so it is used in conjunction with dietary restrictions and medication to slow down the progression of CKD. Removal of excess fluid through dialysis is also known as ultrafiltration. The level of ultrafiltration is dependent on the patient́s fluid load. Fluid load is determined by weighing the patient before dialysis treatment to determine a post-dialysis target weight. The weight gain between dialysis treatments should be in a maximum of 2 kilograms (Munuais-ja maksaliitto 2013). Additionally, dialysis is the most widely utilized treatment for end-stage CKD. However, it requires extensive modifications and restrictions to a patient́s lifestyle and often interferes with daily activities (Pessoa and Linhares, 2015). There are two major types of dialysis-including HD and various forms of PD.

2.13.2 Peritoneal dialysis

PD is the second major type of dialysis, which is used for the treatment of ESRD that removes wastes, chemicals, and extra water from the body by using lining in the abdominal cavity to filter blood. Its procedure done by dissolving sugar and a mixture of minerals called dialysis solution and traveled through the lining of the abdomen. Dextrose draws wastes and extra water from the peritoneal membrane to the dialysis solution. Several

hours later, the solution, which used in the process taking waste from the blood, drained from the abdomen through the tube. Then the abdomen is refilled with a new solution, and the process repeated until the blood becomes free from waste (USRDS, 2011).

2.13.3 Hemodialysis

HD was first successfully used in 1940; the procedure was not used widely until 1952. In the 1960s permanent dialysis access was developed, which allowed routine use. Since the 1960s, HD became a practical treatment for kidney failure and is the most common method used to treat advanced and permanent kidney failure (Foote and Manley, 2008). Furthermore, in HD blood is passed over a semi-permeable membrane against dialysis fluid flowing in the opposite direction. The diffusion of solutes occurs down the concentration gradient. Then a hydrostatic gradient is used to clear excess fluid as required (ultra-filtration). Access is preferentially via an AV fistula which provides increased blood flow and longevity. This should be created prior to need for RRT to avoid the infection risk associated with central venous dialysis catheters. HD is needed 3 times/week or more. Daily HD increases the 'dose' and improves outcomes (Wilkinson et al. 2017). Moreover, HD can be performed at home or in a dialysis center. The center may be located in the hospital or in a separated center (NKF, 2009). In Gs, the five-dialysis centers or units of MOH are not separated but they are located at the hospitals as departments of the hospital.

2.13.3.1 Advantages of HD

(1) Higher solute clearance allows intermittent treatment (2) Parameters of adequacy of dialysis are better defined and therefore under dialysis can be detected early (3) Technique failure rate is low (4) Even though intermittent heparinization is required; hemostasis parameters are better corrected with HD than peritoneal dialysis (5) In-center HD enables closer monitoring of the patient (Foote and Manley, 2008).

2.13.3.2 Disadvantages of HD

(1) Requires multiple visits each week to the HD center (2) Disequilibrium, dialysis hypotension, and muscle cramps are common (3) Vascular access is frequently associated with infection and thrombosis (4) Decline of residual renal function is more rapid compared to peritoneal dialysis (Foote et al., 2008).

2.14 Dialysis machine

It is a machine used in dialysis which filters blood to remove waste products and extra fluids when the kidneys are injured, dysfunctional, or missing. A dialysis machine can be supposed to as an artificial kidney. From inside, it involves more plastic tubing that transports the removed blood to the dialyzer, a bundle of deep fibers that forms a semi-permeable membrane for filtering out layers. In the dialyzer, blood is diffused with a saline solution called dialysate, and the dialysate is in turn diffused with blood. When the filtration process is complete, the cleansed blood is returned to the patient (Figure 2.3). Most patients who undergo dialysis because of kidney impairment or failure use a dialysis machine at a dialysis center (Medicine Net, 2017) At MOH hospital, there are present five centers of dialysis and 102 machines of HD distributed to five centers, Al-Shifa hospital (45), Nasser hospital (23), Al Aqsa hospital (12), Al-Najjar hospital (12) and Al-Rantisi pediatric hospitals (10) machines (MOH, 2019).

Figure 2.3: Dialysis machine

2.15 Vascular Access

Vascular access is an HD patient's lifeline. Vascular access makes life-saving HD treatments possible. HD is a treatment for kidney failure that uses a machine to send the patient's blood through a filter, called a dialyzer, outside the body. The access is a surgically created vein used to remove and return blood during HD. The blood goes over a needle, a little ounces at a time. Then, the blood travels through a tube that takes it to the dialyzer. In the dialyzer, the blood flows through tinny fibers that filter out extra fluid and wastes. The machine takings the filtered blood to the body through a different tube. Vascular access lets large amounts of blood flow continuously during HD treatments to filter as much blood as possible per treatment. About a half-liter of blood flows through the machine every minute. Vascular access should be in place weeks or months before the first HD treatment. There are two types of vascular access designed for long-term use include

the AV fistula and the AV graft. The third type of vascular access the venous catheter is for short-term use (Hyperarts, 2014).

2.15.1 Types of Vascular Access:

2.15.1.1 The native AV fistula

The AV fistula is a connection, made by a surgeon, of an artery to a vein. Arteries transmit blood from the heart to the body, while veins transport blood from the body back to the heart. Vascular surgeons specialize in blood vessel surgery. The surgeon usually places an AV fistula in the forearm or upper arm (Figure 2.4). The AV fistula causes further pressure and further blood to flow into the vein, making it grow large and strong. The larger vein offers easy, reliable access to blood vessels. Without this kind of access, regular HD sessions would not be possible. Untreated veins cannot withstand repeated needle insertions. They would collapse the way a straw collapses under strong suction (National and Institute of Diabetes and Digestive and Kidney Disease – NIH 2014).
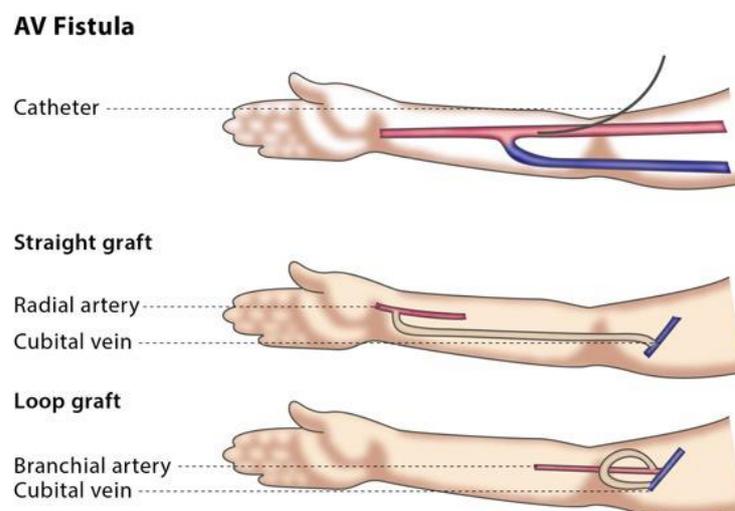
Figure 2.4: Arteriovenous (AV) fistula

2.15.1.2 Synthetic AV grafts

Are another option for permanent AV access, An AV graft is a looped, plastic tube that connects an artery to a vein. An avascular surgeon performs AV graft surgery, much like AV fistula surgery, in an outpatient center or a hospital. As AV fistula surgery, the patient may should be to stay overnight in the hospital, while many patients can go home after the procedure. A health care provider uses local anesthesia to numb the area where the surgeon creates the AV graft (Figure 2.5). A patient can commonly use an AV graft 2 to 3 weeks later the surgery. Moreover, the AV graft is more common than an AV fistula to have problems with clotting and infection. Repeated blood clots can block the flow of blood through the graft. However, a well-cared-for graft can last several years (NIH, 2014).
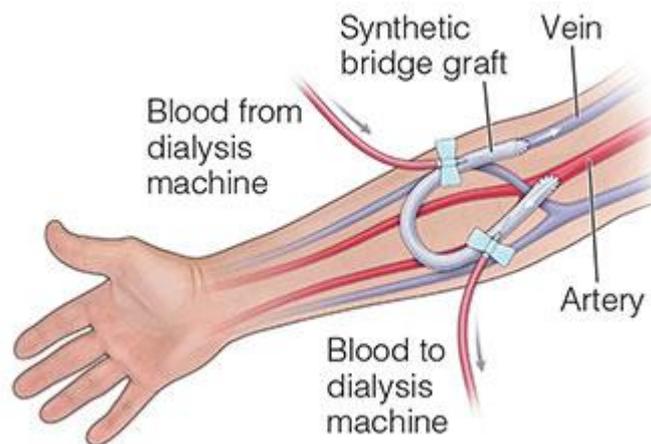
Figure 2.5: Synthetic AV graft

2.15.1.3 Central venous catheters

Are the least-desirable HD access which unfortunately are commonly used in chronic HD patients. A central venous catheter is a tube inserted into a vein in the neck, chest, or leg near the groin, usually only for short-term HD. The tube separations in 2 after the tube

exits the body. The 2 tubes have caps designed to connect to the line that transports blood to the dialyzer and the line that transports blood from the dialyzer back to the body (Figure 2.6). A person must close the clamps on each line when connecting and disconnecting the catheter from the tubes (NIH, 2014).
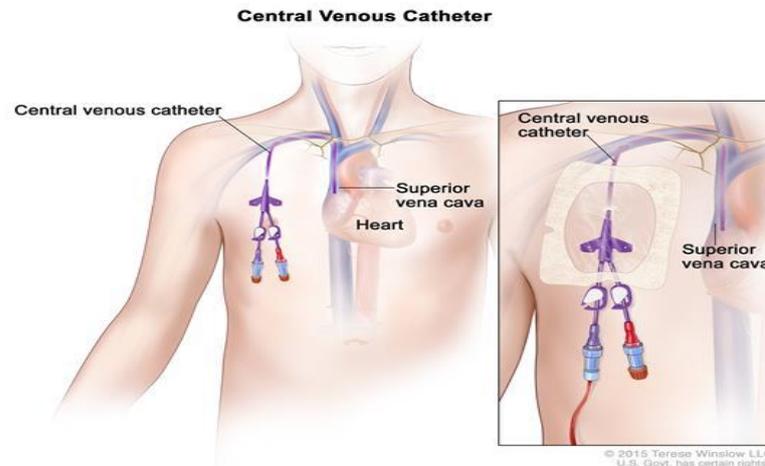
Figure 2.6: Central venous catheter

2.16 Criteria for placing patients on dialysis

Commonly accepted criteria for placing patients on dialysis include the presence of the uremic syndrome; the presence of hyperkalemia unresponsive to conservative measures; extracellular volume expansion; acidosis refractory to medical therapy; a bleeding diathesis; and a creatinine clearance of 10 mL/min per 1.73 m² (Christopher & James, 2014).

2.17 Complication **of Hemodialysis**

Acute complications commonly occur during routine HD treatments .They include the following (Holley et al, 2013)

o Hypotension — 25 to 55 percent of treatments.

o Cramps 5 to 20 percent.

o Nausea and vomiting 5 to 15 percent.

o Headache 5 percent .

o Chest pain 2 to 5 percent .

o Back pain 2 to 5 percent.

o Itching 5 percent.

o Fever and chills — Less than 1 percent.

These complications are generally caused by multiple underlying mechanisms and are poorly understood. Knowledge of their pathogenesis is further complicated by their often simultaneous occurrence.

2.17.1 Hypotension

Hypotension with HD, which has a myriad of possible causes, may be accompanied by nausea, vomiting, headache, and/or chest pain.

2.17.2 Cramps

Cramps may be associated with hypotension and are often very difficult to treat .

2.17.3 Headache, nausea, and vomiting

The longer treatment periods and/or ultrafiltration in association with a great degree of solute removal significantly enhance the incidence of headache, nausea, and vomiting during dialysis. Metabolic disturbances (eg, hypoglycemia ‹hypernatremia, and hyponatremia), uremia, subdural hematoma, and medication-induced headaches should be considered in patients with recurrent dialysis-associated headaches. Rarely, dialysis-associated headache may be associated with increased intraocular pressure (Milinkovic et al, 2009).

2.17.4 Chest pain

May be associated with hypotension or dialysis disequilibrium syndrome, in addition to angina, hemolysis, and rarely due to air embolism .

2.17.6 Hemolysis

Hemolysis may present as chest pain, chest tightness, or back pain. It deserves consideration as an etiologic factor in the patient with these complaints ،particularly if multiple individuals have such symptoms simultaneous.

2.17.7 Air embolism

Air embolism during dialysis is another cause of chest pain as well as other symptoms, particularly dyspnea. It may be lead to death if not quickly detected and treated .

2.17.8 Arrhythmias

The occurrence of ventricular arrhythmias in dialysis patients has been evaluated by Holter monitoring. These arrhythmias are common during dialysis and between treatments, Supraventricular arrhythmias are also common.

2.17.9 Dyspnea

Patients may complain of shortness of breath while on HD. Most often, the dyspnea will occur as a result of volume overload and the patient will describe the dyspnea as occurring before the start of the HD treatment. However, dyspnea that begins after the initiation of HD should prompt consideration of other possible causes such as angina or acute coronary syndrome, bacteremia (associated with dialysis catheter), a reaction to the dialyzer, pericardial effusion with or without tamponade, or pneumonia (Grebenyuk et al, 2009).

2.12 Renal replacement therapy

Dialysis among pediatric CKD patients' needs special consideration as compared to adults, though the modalities are the same. Though peritoneal dialysis was widely prescribed earlier, HD has surpassed it lately. Though pre-emptive transplantation is recommended, dialysis needs to be performed as a bridging therapy in certain situations. HD is associated with frequent visits to the dialysis centers leading to frequent disruption of educational activities. Dependence on dialysis machines, frequent venipuncture of fistulae, scars over arms, and restriction of travel lead to poor quality of life as compared to peritoneal dialysis and renal transplantation. Peritoneal dialysis is associated with more independence, lesser disruption of educational activities and better quality of life. Renal transplantation is associated with better control of HTN, alleviation of anemia and better quality of life. However, correction of lower urinary tract abnormalities in children with CAKUT is essential prior to transplantation to avoid renal allograft injury. Also, lack of adherence to medication has been found to be an important cause of graft loss in adolescents (Becherucci et al, 2016). There are three primary treatment options for patients with ESRD are HD, peritoneal dialysis and kidney transplantation. As recommended by the NKF, planning for replacement therapy should begin once the patient's GFR or creatinine clearance drops below 30 ml/min per 1.73 m2 (NKF/KDOQI, 2013). Kidney transplantation is the treatment of choice; a successful kidney transplant improves the QoL and reduces the mortality risk for most children's when compared with maintenance dialysis (Garcia et al., 2012). However, not all patients are appropriate candidates for a kidney allograft because of absolute and/or relative contraindications to this procedure or the subsequently required medications (Danovitch, 2009).

2.18 Kidney transplantation (KT)

Is the surgical procedure that places a healthy kidney from another person into the body (National Kidney & Urologic Diseases Information Clearinghouse - NKUDC, 2015). Kidney transplantation is the treatment of choice for ESRD; a successful kidney transplant improves the quality of life and reduces the mortality risk for most patients when compared with maintenance dialysis (Garcia et al., 2012). However, not all patients are appropriate candidates for a kidney allograft because of absolute and/or relative contraindications to this procedure or the subsequently required medications (Danovitch, 2009).

2.18.1 Kidney transplantation in the Gaza strip

In GS, MOH celebrated the first two KT completed successfully at Al-Shifa hospital in late January 2013. A surgical team from Liverpool University from the United Kingdom performed both transplants, with assistance from local surgeons. Moreover, the same team has continued that project by performing three successfully KT operations else in June 2013.

The Liverpool team performed the tissue cross-matching and typing, as well as the majority of the donor and recipient assessments. The Liverpool team has provided a two to the three-year program to train local surgeons in KT, with a long-term plan for GG physicians to perform the KT surgery independently. There are currently no trained urologists in GG to perform KT. There are no nephrologists with additional training in KT. The laboratory services in GS are unable to perform tissue typing and crossmatch (MOH, 2012).

2.19 Nursing Care in the HD department

2.19.1 Pre dialysis assessment and nursing care

Once the patient's dialysis machine and station are sufficiently ready for the patient to be able to settle down and be seated comfortably, a nurse will call the patient from the waiting area. Any special isolation or machine preparation needs to be checked and as ready as possible, beforehand to ensure patients are dialyzed safely and in the correct cohort. For those patients that have an AFV/G, the patient will be asked to wash the relevant limb, along with their hands, with soap and water, before entering their dialysis station area. Assistance will be provided if required. Patients dialyzing via a renal dialysis catheter will be asked to wash their hands. All patients should also be weighed before entering their dialysis area. Again they will be encouraged to perform this aspect of their care themselves with the help given as required. For those that can weight themselves and carry out and record their observations and those self-caring, encourage those that can do so. Ensure patients are aware of where and how to document the observations (Simpson and Day, 2017).

Pre-dialysis observations will be performed and recorded which include ("blood pressure Ensure seated for at least 5 minutes and correct cuff size", Pulse rate, Temperature, and Respiratory rate). Also, patients wishing to perform their own observations should be appropriately trained and deemed competent as per self-competency documentation. To ensure patients are treated safely and appropriately it is vital that a thorough assessment of the patient and their observations is performed before dialysis is commenced. This allows early identification of arising medical problems and appropriate delivery of dialysis.

1. Before commencement of dialysis assess and question the patient taking particular note of any changes since last session: (mobility, pain skin state, any edema, signs of

bruising /bleeding, overall well-being including change in general health since last session, whether the patient has complaints or signs and symptoms of infection and document whether healthcare has been sought elsewhere since previous dialysis session and chase any correspondence relating to this.

2. Review information from previous dialysis session: Note pre and post dialysis observations and note any recorded dialysis variances.

3. Review baseline information which includes the following:

2.19.1.1 Weight gain - ideally <5% of prescribed dry weight.

• If weight gains are higher than this (Simpson and Day, 2017):

✓ Educate patients in safe fluid intake, diet and how to reduce high salt intake foods. Use dietitian as needed and consider a discussion with care provider/family.

✓ Review whether there has been a reduction in native urine output; perform 24-hour collection (collected on day's in-between dialysis). Consider frusemide prescription in those with native urine output

✓ If diabetic, review blood glucose levels, as if high this may increase thirst and the need for fluids.

✓ If persistently finishing dialysis above dry weight consider if needs reassessment.

✓ Consider the use of blood volume monitoring if available, to help assess fluid status.

• If weight gains become less than previously, consider the need to reduce dry weight Consider the use of blood volume monitoring if available, to help assess fluid status.

- If the patient reports shortness of breath in the period before the dialysis session considers dry weight reduction.

- If the patient reports increasing subcutaneous edema consider dry weight reduction.

2.19.1.2 Blood pressure - ideally < 140/80mmHg. Acceptable up to 160 systolic and 90 diastolic. Higher systolic may be acceptable in patients with wide pulse pressure and where rapid falls occur with dialysis (Simpson and Day, 2017):

- If BP has been gradually increasing then consider whether dry weight reduction is required.

- If BP persistently >160/90 then obtain some intradialytic recordings for review by consultant. Ensure up-to-date information on antihypertensive medications and doses.

- If BP is markedly lower than previous pre-dialysis recordings consider whether the patient is unwell; eg sepsis, dehydration. Seek advice.

2.19.1.3 Pulse - The ideal pulse rate is 60-100 bpm and should be comparable with previous pre-dialysis recordings.

- Feel rhythm manually to check the pulse is regular in addition to machine recording.

✓ Outside of this range consider dehydration, sepsis, cardiac arrhythmia.

2.19.1.4 Temperature - ideally 35.8 - 37.0°C and should be comparable with previous pre-dialysis recordings.

✓ Outside this range consider sepsis, hypothermia.

- The question as to whether the patient has been systemically unwell at home eg fevers, rigors, poor appetite.

- Question patient with regards to localizing symptoms of infection eg (ear, throat, cough), diarrhea and vomiting, urinary, skin breaks). Take skin swabs, urine cultures if indicated.

- Follow blood culture procedure.

- Discuss with the unit consultant if concerns.

1.19.1.5 Respiratory rate - ideally 18-24 rpm.

- Outer this range consider overload of fluid or other respiratory condition, sepsis.

❖ **Moreover, the nurses who are working in the HD department for pre-dialysis nursing care should make the following steps:**

1. Calculate fluid removal and dialysis plan based on observations and patient assessment, seek advice from senior nursing staff if unsure, and ensure the patient understands the need for any re-setting of dry weight or other changes to treatment.

2. Review and prepare for any pre-dialysis testing, complete any pre-dialysis test checks, to ensure the dialysis is delivered in the correct environment (eg isolation or no isolation).

3. Prepare any other equipment such as mattresses, infusion pumps etc to support the patient during dialysis.

4. Take any necessary pre-dialysis types of blood prior to commencement of treatment (Simpson and Day, 2017).

2.19.2 Nursing care during HD

Once dialysis has commenced, all patients can expect to have their dialysis monitored and recorded, and any issues shared with the staff action. Observations should be recorded in electronic patient records and in Dialysis Care Round document. Adequate observations will prevent unexpected dialysis emergencies, needle dislodgment, and clotted circuits.

 1. Perform observations (BP, P, R and record machine parameters, dialysis progress and medications administered, etc). The frequency of observations should be risk assessed. In very stable patients who normally have no adverse dialysis events requiring intervention; observations can be taken pre, midway and post dialysis. Patients that are less stable will require a minimum hourly observation.

2. Patients that are diabetic will require additional blood sugar monitoring, as a minimum pre and post dialysis (using at the point of care monitors).

3. Routine drug rounds should be completed for eg iron and erythropoietin

4. Prepare and administer any extra prescribed medication as per protocols eg antibiotics.

5. Chase any recent test results and ensure actioned appropriately.

6. Ensure the transport for patient's return journey is arranged.

7. Train patients in self-care/ shared care competencies if interested.

8. Spend time discussing any medical issues with the patient and updating their kidney care plans; help them understand their blood results and dialysis prescription suggesting self-management strategies to make aid improvements. Refer to a dietitian if needed.

9. Discuss any psychosocial issues referring to welfare support or psychological support service if needed.

10. Ensure patients and care provider is aware of any approaching outpatient clinics and their time and location arranging transport if needed (Simpson and Day, 2017).

2.19.3 Post dialysis nursing care

- Assess and document vital signs, weight, and vascular access site conditions. Rapid fluid during dialysis may lead to cardiopulmonary changes, orthostatic hypotension, and weight loss .

- Monitor BUN, serum electrolyte, serum creatinine, and hematocrit levels between dialysis treatments. These values help determine the effectiveness of the treatment, the need for fluid and diet restrictions, and the timing of future dialysis sessions. The anemia associated with renal failure does not improve with dialysis, and iron and folate supplements or periodic blood transfusions may be needed .

- Assess for dialysis disequilibrium syndrome, with headache, nausea and vomiting, altered level of consciousness; and hypertension. Rapid changes in BUN, pH, and electrolyte levels during dialysis may lead to cerebral edema and increased intracranial pressure .

- Assess for other adverse responses to dialysis, such as dehydration, nausea, and vomiting, muscle cramps, or seizure activity. Treat as ordered. Excess fluid removal and rapid changes in electrolyte balance can cause the fluid deficit, nausea, vomiting, and seizure activity .

- Assess the access site or elsewhere for bleeding. Use standard precautions at all times. heparinization during dialysis increase the risk of bleeding. Frequent exposure to blood and blood products increase the risk for hepatitis B or C or other blood-borne diseases .

- When a transfusion is given during dialysis, monitor for possible transfusion reaction (e.g., dyspnea; chills and fever; chest, back, or arm pain; and urticaria or itching). Clients in renal failure may receive multiple transfusions, increasing the risk of

transfusion reaction. Monitoring during and after the transfusion is important to identify early signs of a reaction .

- Provide psychological support and listen actively. Address worries and accept responses such as depression, anger, and noncompliance. Reinforce client and family strengths in coping with renal failure and HD .Grieving is a normal response to loss of organ function. The client may feel hopeless or helpless and resent dependence on a machine. The nurse can help the client and family work through these responses and focus on positive aspects of living .

- Refer to social services and counseling as indicated. Patients with renal failure may need other support services to help them familiarize to and live with their disease (Castle Rock Care Center CRCC, 2015).

2.20 Previous related Studies

A study was conducted in the Pediatric Nephrology and Dialysis Unit in Assuit Children University Hospital (AUH), El–Mabarah Hospital and El–Eyman General Hospital to assess the nurses' knowledge and practice related to nursing care of children undergoing HD at Assiut city, The study included convenience sample of 48 nurses from different Nephrology Units at Assiut City, the .study showed that The most of AUH nurses had higher score of knowledge related to renal failure and HD than the ministry of health hospitals. Nurse's practice regarding HD children in the nephrology unit at AUH is higher than that of nurses working at the Ministry of Health Hospitals (Abd-Alfatah et al, 2013).

A study was conducted to assess the Knowledge Regarding Care Of Patients Undergoing HD among Staff Nurses and Nursing Students in Narayana Medical College Hospital, Nellore, This was a descriptive cross-sectional design and convenient sampling technique was followed which included 30 samples were used. Data were collected using a structured

questionnaire, The results showed that with regard to the level of knowledge regarding care of patients undergoing HD among staff nurses 4(26.7%) had inadequate knowledge, 9(60%) had moderately adequate knowledge and 2(13.3%) had adequate knowledge. (Lydia et al, 2016).

A study was conducted to provide an overview of the effect of an educational program based on clinical practice guidelines to improve the knowledge and performance of nurses in HD settings, This was a quasi-experimental design with an educational program as the intervention, The study included a convenience sample consisting of 38 nurses working in the HD unit at Zagazig University Hospital, Three tools were used to collect data for this study: a demographic tool, a knowledge questionnaire, and an observational checklist, The result showed that All participants were female, and their ages ranged from 18 to 38 years, with a mean age of 26.9 years. All participants had nursing school diplomas, The mean number of years of experience was about 9 years(range 3 to 18 years), a limited level of educational preparation for HD practice prior to this study. Few participants (less than 25%) were aware of HD nursing care standards. While eight participants had attended educational lectures, The demographic tool assessed knowledge about the availability of resources for staff nurses, and responses suggested limited resources for staff nurses in this setting, Also findings of the present study showed that the majority of participants (85.7%) had unsatisfactory knowledge about HD care at baseline overall and in nearly all subcategories (Hassona et al, 2011).

A study was conducted to Evaluation of Nurses' Practices throughout HD Treatment for Patients in HD unit, This study was conducted at Baghdad teaching hospitals, A descriptive study was carried out at HD units of Baghdad teaching hospitals started from December 25th, 2011 through May, 9th, 2012. Non-probability (purposive sample) of (30)

nurses, who were working in HD units, were selected from Baghdad teaching hospitals, The data were collected through the use of constructed questionnaire, which consist of two parts (1) Demographic data form that consist 10-items and (2) Nurses' practices form that consist of 25 items, by means of direct interview technique and visualization of the nurses, The findings of the study indicated that there was a deficit in the nurses' practice that should be applied to the patient throughout HD treatment. No significant relationship was found between nurses' practice and their gender, level of education, years of experience in HD units, while a significant relationship was found between nurses' practice and their marital status (Bakey, 2012).

A study was conducted to assess HD nurses compliance to infection prevention and control practices during vascular access care, this study was conducted at HD units of El-Moassat, and Medical Research Institute Hospitals, The study subjects included all nurses responsible for HD procedures at the above-mentioned settings. Their numbers were 48 nurses (26 from El-Moassat and 22 from Medical Research Institute hospitals), Two tools were used for data collection: The HD Nurses Structured Questionnaire Sheet and An observational checklist, The result showed that the overall percentage score of nurses' knowledge about infection prevention and control practices was (61.57%). The overall nurses' compliance with infection prevention and control practices at both hospitals was poor (Moursy & Sharaf, 2017).

Ali, (2013) was conducted a study to assess nurses' knowledge and practice provided to the patients undergoing HD at Cairo University Hospital, A descriptive exploratory research design was used in this study, A convenient sample of 65 male and female nurses working in HD units at Cairo University Hospital were selected over a period of six months. Two tools were developed by the investigator to collect data. (1) Knowledge assessment sheet

consists of two-part; part cover socio-demographic data while part two covers knowledge assessment data, (2) HD nurses practice checklist, Structured interview and direct observation were utilized for data collection, The result in this study was more than half of the study sample had average knowledge regarding HD, While all of the study sample an unsatisfactory level of practice regarding care provided to a patient undergoing HD.

Al-mawshek et al, (2016) were conducted a study to assess nurses' knowledge and practice regarding care for the patients during HD at Ismailia Hospitals, A descriptive exploratory design was used in this study. Subjects were composed of all available nurses that providing direct care to patients in HD units at Ismailia University Hospital and Ismailia General Hospital, the study included 50 nurses, Two tools were used, namely a self-questionnaire and an observation checklist, the result showed that the findings of the study indicated that the majority of studied nurses 90% had satisfactory level of total knowledge about HD, while 44% of studied nurses had unsatisfactory level of practice regarding care for the patients during HD. There was no significant correlation between practice score and total knowledge scores.

A study was conducted to assess nursing knowledge and practice regarding intradialytic complications. A descriptive design was adopted to conduct this study. The study was conducted at two units, at the Urology and Nephrology Center in Mansoura City. Two tools were used to conduct this study namely a self-administered questionnaire to assess nurses' knowledge and observation checklist to assess nurse's practice regarding the HD process and intradialytic complications. Study results revealed that most of them had a satisfactory level of knowledge related to care of dialysis complications. The majority of them deal adequately with HD complications. Conclusion nurses having a satisfactory level of knowledge have also adequate practice (El-Moghazy, 2013).

A study was conducted to evaluate the effect of an educational program for vascular access care on nurses' knowledge at nine dialysis centers in Khartoum State, This was a Quasi-experimental study (pre- and post-test for the same group), Sixty-one nurses working in these HD centers were chosen by simple random sampling method. A structured face-to-face interview questionnaire based on the K/DOQI clinical practice guidelines for vascular access care was used; the study showed that the majority of the nurses (89.5%) attained a score of knowledge less than "good" before the educational intervention. Their knowledge score improved dramatically after the intervention so that 75% of them scored levels of "very good" to "Excellent" (Yousif et al, 2017).

A study was conducted to assess Nurses' Knowledge and Practice towards care of HD patients at Governmental Hospitals in Khartoum State, A descriptive cross-sectional hospital-based study conducted among 100 nurses working at dialysis centers in 5 governmental hospitals. The data was collected by using predesigned questionnaire managed by the researcher fulfilled by interview and observation, the result in this study was Among 100 nurses, the commonest age group was 30-39 yrs (54%), female to male ratio was 2.3: 1. In-service training was received by 67%, mostly for less than 1 week (55.2% out of 67), it was local for 92.5% of nurses who received training versus 7.5% who received abroad training. The mean of knowledge about the care of HD patients was found moderate (67.2%), mean of practice about the care of HD patients was found moderate (66.4%). They showed high knowledge and practice regarding routine investigations (80%) and measuring vital signs (97%), but poor knowledge and practice regarding mechanism of HD and infection control methods properly (37%) (3%) respectively, in conclusion of this study the Nurses in dialysis units showed moderate level of knowledge and practice towards care of HD patients, but there is a need for more efforts regarding training and patients counseling (Hamed, 2016)

Eid & Aziz (2013) Regarding job description, he clarifies that most of the studied nurses have agreed about the importance of the presence of job descriptions in a dialysis unit that describe and clarify the role of every nurse in the unit, it must be clear and reviewed every 6 months. Also, he clarified the importance of safe handling of medication. This finding supported by (Gutterman, 2006) who mentioned that the importance of patients identification (ID) band includes (patients name, medical record No), to prevent a conflict between medicine and tests for each patient. Also mentioned that every unit should have a policy that describes the safe handling of medications through 7 rights of medications. Concerning the importance of policy, the procedure of infection control must be founded in a dialysis unit. And he obtained the majority of studied nurses have agreed about the importance of policy and procedure of infection control which must be founded in the Dialysis Unit.

Abd-elsatir (2013) examines the nurses' awareness and practice of HD access care, focusing on the application of proper hand hygiene and HD access care. The result showed that females composed 72% of study participants, and 85% were university graduates, and 50% of the participants had more than two years' experience in HD work. Structured training on HD access care received by 56%. The participants reported that proper HD access care helped prevent access infection, but only 54% indicated that it assisted in preserving access function. Nurses with a bachelor degree tended to be more adherent to hand hygiene (72.5 versus 42.9%) and the use of gloves (100% versus 85.7%) compared to nurses with a diploma degree.

Abu El-Enein et al, (2011) used an observational checklist to assess nurses knowledge and attitude toward standard precautions in the HD department. They found that none of the nurses (0%) washed hands before and after the different activities that required hand

washing or used plastic aprons or face protection. In contrast, all of them (100%) wore non-sterile gloves before or after the different activities that required wearing of gloves. Less than half of nurses (47.1%) correctly knew that they had to wash their hands before and after caring for a patient. None of the nurses received training in infection control. Among the reported barriers for not applying standard precautions, inaccessibility of sinks, high workload or lack of appropriate staffing, and interference with the practice of care were cited as the most important barriers.

Chapter Three

Methodology

This chapter presents the method of the study to answer the research questions. In this chapter different items were explained: study design, study setting, study population, sample size, sampling process, a period of the study, eligibility criteria, ethical and administrative consideration, study tools, reliability, validity, pilot study, data collection, and data management of the study.

3.1 Study Design

This is a quantitative descriptive cross-sectional study conducted to assess nurse's knowledge and practices related to the care of children undergoing HD provided by nurses working in HD department of the government hospital at G.S. This design was suitable for the nature of the problem in this study, effective, less time and money consuming.

3.2 Study Setting

This study has been conducted at four main hospitals (Al Shifa' Complex - Al-Rantisy hospital - al-Aqsa hospital - Nasser hospital) in GS.
Al-Najjar hospital was excluded because there are no pediatric cases of less than 18 years undergoing HD.

3.3 Study population

The population of this study consists of all nurses (90) working in fourth HD departments of the governmental hospitals namely " Al-Aqsa hospital (13) - Al Shifa' Complex (49) - Al-Rantisy hospital (11) - Nasser hospital (17)" at G.S.

3.4 Period of the Study

The study was conducted in the period between Jan. 2018 to Nov. 2019. after obtaining approval for the study proposal from the College of health professions at Al-Quds University, and ethical approval from Helsinki Committee.

3.5 Sample size and sampling

The sample size of study was (83) working in the fourth HD department of the governmental hospitals (Al Shifa' Complex - Al-Rantisy hospital - al-Aqsa hospital - Nasser hospital) in G.S, were included in the study "census sample".

3.5.1 Eligibility Criteria

- All nurses working in fourth HD departments of the selected governmental hospitals at G.S during the period of the study, and who are willing to participate in the study.

- Nurses who are working in the HD departments more than one year.

3.6 Study instrument

A self-administered questionnaire constructed by the researcher himself to assess the knowledge and practices of the nurses regarding the care of children undergoing HD in governmental hospitals in G.S (Annex 2). The first part of the questionnaire covered the respondent's sociodemographic information; which included gender, age, marital status, academic level, job position, monthly income, workplace, and work experience in HD unit..

The second part of the questionnaire developed by the researcher based on the review of the literature and past experiences to measure knowledge of the participants towards children undergoing HD nursing care. It was composed of 20-item multiple-choice

questions, each item in the knowledge section of the questionnaire had two possible responses, namely True, False. One mark will is awarded for every correct response, zero otherwise. The total score ranged from 0-20 and it was then converted into percentage. The higher scores indicated the higher level of knowledge. This part of the questionnaire validated by disseminating this questionnaire to a panel of experts.

The third part of the questionnaire developed by the researchers based on the review of the literature and past experiences to measure the practice of the participants towards children undergoing HD nursing care. 40-item was used, Each item in the practice section of the questionnaire had three possible responses, namely Not Never = 0, Sometimes = 1, and Yes, Always = 2. The possible scores ranged from 0-80. These scores were then converted into a percentage. The higher scores indicated the higher level of practice. This part of the questionnaire validated by disseminating this questionnaire to a panel of experts.

McDonald's standard of learning outcome-measured criteria was used to categorize nurses' level of Knowledge/Practice related to the nursing care of children undergoing HD. The level of Knowledge/Practice were categorized into five groups (McDonald, 2002): The level of Knowledge/Practice Composite percent of scores.

Table 3.1: McDonald's standard of learning outcome-measured criteria

Group	Scores
• Very low	< 60%
• Low	60% - 69.99%
• Moderate	70% - 79.99%
• High	80% - 89.99%
• Very high	90% - 100%

3.7 Validity and Reliability of the Instrument

3.7.1 Content Validity

The constructed questionnaires were sent to seven experts to validate the questions and their relation to the domains that reflect the study. Comments of the experts were considered and modification was performed accordingly (Annex 3).

3.7.2 Reliability

Reliability refers to the consistency of a measure. A test is considered reliable if we get the same result repeatedly. To measure the reliability of the instruments, the researcher conducted a "Cronbach alpha coefficient". Cronbach's alpha reliability coefficient normally ranges between -1 and 1. However, there is actually no lower limit to the coefficient. The closer Cronbach's alpha coefficient is to 1.0, the greater the internal consistency of the items in the scale. George and Mallery (2003) provide the following rules: If the Cronbach's alpha coefficient > 0.9 = Excellent, − > 0.8 = Good, − > 0.7 = Acceptable, − > 0.6 = Questionable, − > 0.5 = Poor, and − < 0.5 = Unacceptable. Cronbach's Alpha equation was used to compute the reliability coefficient, it was 0.927. It is considered a good reliability coefficient. Table 3.2 shows the reliability estimated of the derived factors for the questionnaire.

3.8 Pilot study

The researcher made a pilot study after receiving the approval to perform it from the hospital's general directorate. The researcher conducted the pilot study in order to refine the methodology of the larger study by using the same subjects, settings, and methods of data collection and analysis as those used in large study as recommended by (Fitzpatrick and Wallace, 2006). Ten questionnaires for nursing working in the HD department were

distributed then collected. The subjects asked to determine any ambiguity or misunderstanding in words or sentences to avoid it in the study. Some minor changes and modifications were performed without any effect on the main domains. The subjects were included in the study.

3.7.2.1 Reliability Statistics

Table 3.2: Reliability estimates for the entire scale

Cronbach's Alpha	N of Items
.93	40

Cronbach's Alpha equation was used to compute the reliability coefficient for both questionnaires; it was more than 0.90; it is considered an excellent reliability coefficient.

3.9 Data Collection

Data were collected by using self-administered questionnaires to assess nurse's knowledge and practice related to care of children undergoing HD provided by nurses in HD department of the governmental hospital in G.S. The researcher distributed the questionnaires to the participants at the working hours in the day and evening work shifts and then receiving them after completion of the questionnaires. The average time for filling the questionnaire was 25 minutes. The covering letter of the questionnaire outlined the title and the purpose of the study and the identity of the researcher.

3.10 Response Rate

The total number of target population was 90 subjects. 83 of them are positively responded with a response rate of 92%.

3.11 Ethical and administrative considerations

An academic Approval was obtained from the College of health professions at Al-Quds University, and ethical approval was obtained from the Helsinki Committee (Annex 4) in Gaza to carry out the study. An administrative approval was obtained from MOH Gaza (Annex 5) to conduct the study at four hospitals. Every participant was provided with a full explanatory form (Annex 2) attached to the questionnaire included the purpose of the study, assurance about the confidentiality of the information, the instructions on how to respond to the questionnaire, and a statement indicating that the participation is voluntary. Honesty was maintained during reporting and analysis of the data with respect to confidentiality and respecting of results.

3.12 Data Entry and statically Analysis

The collected data entered into the computer software "Statistical Package for Social Sciences" SPSS program by the researcher after coding of the questions and then cleaning of the entered data. The collected data were analyzed using the SPSS software program. After data entry and data cleaning, the researcher performed frequency distribution for all variables of the questionnaires. After that, the researcher performed recoding for continuous variables. The researcher used simple statistics including frequencies, means, and percentages. Also, Cronbach alpha, independent sample t-test, One-way ANOVA and Pearson correlation were used.

Limitations of the study

1. The study was based on reported rather than observed knowledge and practice toward nursing care in HD departments.
2. Financial constraints since the study was self-funded by the researcher.
3. Frequent electricity cuts affected the ability to accomplish the work in a timely manner.
4. Subjectivity measure of practice part of questionnaire.

Chapter Four

Results and Discussion

4.1 Introduction

This chapter illustrates the results of a statistical analysis of the data from 83 nurses' participants, including descriptive analysis that presents the socio-demographic characteristics of the study sample and answers to the study questions.

In this chapter, the results of this study are presented under the following headings**:**

1. Characteristics of the study participants

2. Levels of nurses' knowledge and practice regarding nursing care of children on HD.

3. The relationship between nurses' knowledge and practices towards nursing care of children on HD

4. The relationship between socio-demographic variables and nurses knowledge and practices towards nursing care of children on HD

5. Discussion of the results.

4.2 Characteristics of the study participants

This section presents a description of the study sample socio-demographic characteristics including the age of subjects, gender, marital status, education level, as well as, variables about the workplace, year of work in HD units, qualification and special training courses regarding nursing care of children on HD.

Table 4.1: Sample distribution based on the Participants' Age, Experience, Qualification and Workplace

Table 4.1 Sample distribution based on the Participants' Age, Experience, Qualification and Workplace

Variables	Categories	Frequency	Percent
Age	< 30	29	34.9
	30 - <40	43	51.8
	≥ 40	11	13.3
	Total	**83**	**100**
Experience	1< 5	31	37.4
	5 -10	26	31.3
	> 10	26	31.3
	Total	**83**	**100**
Qualification	Diploma	20	24.1
	Bachelor	55	66.3
	Master	8	9.6
	Total	**83**	**100**
Workplace	Al Shifa Medical Complex	45	45.2
	Al-Rantisy hospital	11	13.3
	Al al-Aqsa hospital	10	12.0
	Nasser hospital	17	20.5
	Total	**83**	**100**

The table 4.1 showed the distribution of the study participants based on their age, experience qualification, and their workplace. The table 4.1 showed that more than half (51.8%) of the study participants are between 30 – 39 years old, This results disagree with AL-Mawsheki et al (2016) who found that more than half of the nurses between ages twenty to less than thirty years, which might be related to their new graduation, and the current study is congruent with Moghazy (2013) who stated that more than half of nurses aged more than thirty years. The big number of employees retired in the last years could explain this result, and there was no newly employment of nurses for several years. and the table shows 34.9% of them are less than 30 years old. The researcher also explained these results that the hospital administration focused in the selection of nurses to work in dialysis departments that the nurse has worked long enough in other departments and gained more practical experience in terms of dealing with patients and then be chosen to work in the dialysis department because of the importance of the nurse to be sufficient knowledge and experience. Also, the table shows that 31.3% of the study participants have been working for less than 5 years with the same percentage for 5 – 10 years.

Moreover, 66.3% of the study participants have a bachelor degree in nursing which consider the positive point to provide competent care towered children on HD, this is in agreement with Thomas (2014) who reported that half of the nurses studied had baccalaureate degree in nursing. On other hand, 24.1% have a diploma, and 9.6% of them have a master's degree. Additionally, 45.2% of the study participants are working in Al Shifa Medical Complex, 20.5% are working in Nasser Medical Complex, while 13.3% are working in Al-Rantisy hospital, The distribution and number of nurses working in different hospitals depend on the number of beds, the number of patients attending in HD process, and the number of dialysis machine in different HD units. In addition, these percentages of the study participants reflect only the employed nurses.

Table 4.2 Sample distribution based on the Participants' Marital Status, and Residency (n=83)

Variables	Categories	Frequency	Percent
Marital status	Single	13	15.7
	Married	70	84.3
	Total	83	100
Residency	North Gaza	9	10.8
	Gaza	38	45.8
	Mid zone	18	21.7
	KhanYounis	17	20.5
	Rafah	1	1.2
	Total	**83**	**100**

The table 4.2 showed the distribution of the study participants based on their marital status, and residence. The table shows that 84.3% of the study participants are married, and 15.7% of them are singles, these results consistent with Abd Alfatah et al (2016) who found that the majority of the nurses in his study was married. Also, the table shows that 45.8% of the study participants are living in Gaza, 21.7% are living in the middle area, while 20.5% of them are living in Khan Younis.

4.2.1 Sample distribution according to the participants' gender

30.1%

69.9%
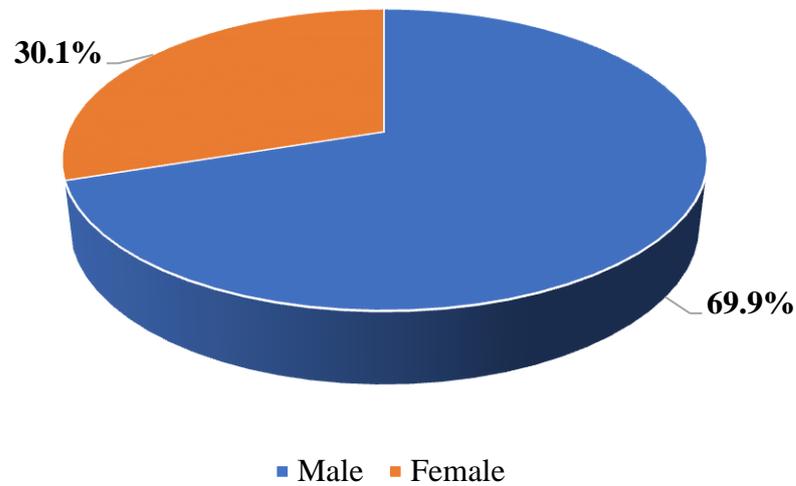
■ Male ■ Female

Figure 4.1: Sample distribution according to the participants' gender

The figure 4.1 showed that 69.9% of the study participants are males, while 30.1% are females. The result of the current study is consistent with the result of Bakey, (2012) in a study entitled "Evaluation of nurses practices throughout HD treatment for patients in HD unit at Baghdad teaching hospitals", in Iraq, who stated that the majority of studied nurses (53.3%) were males. but this finding is in disagreement with yousif et all (2017) which revealed that the majority of the nurses (82.5%) were females and 17.5% were male. This reflects the general nursing situation in the country where the study was conducted, where most of the nursing is carried out by females.

4.2.1 Sample distribution according to the participants' Graduation College
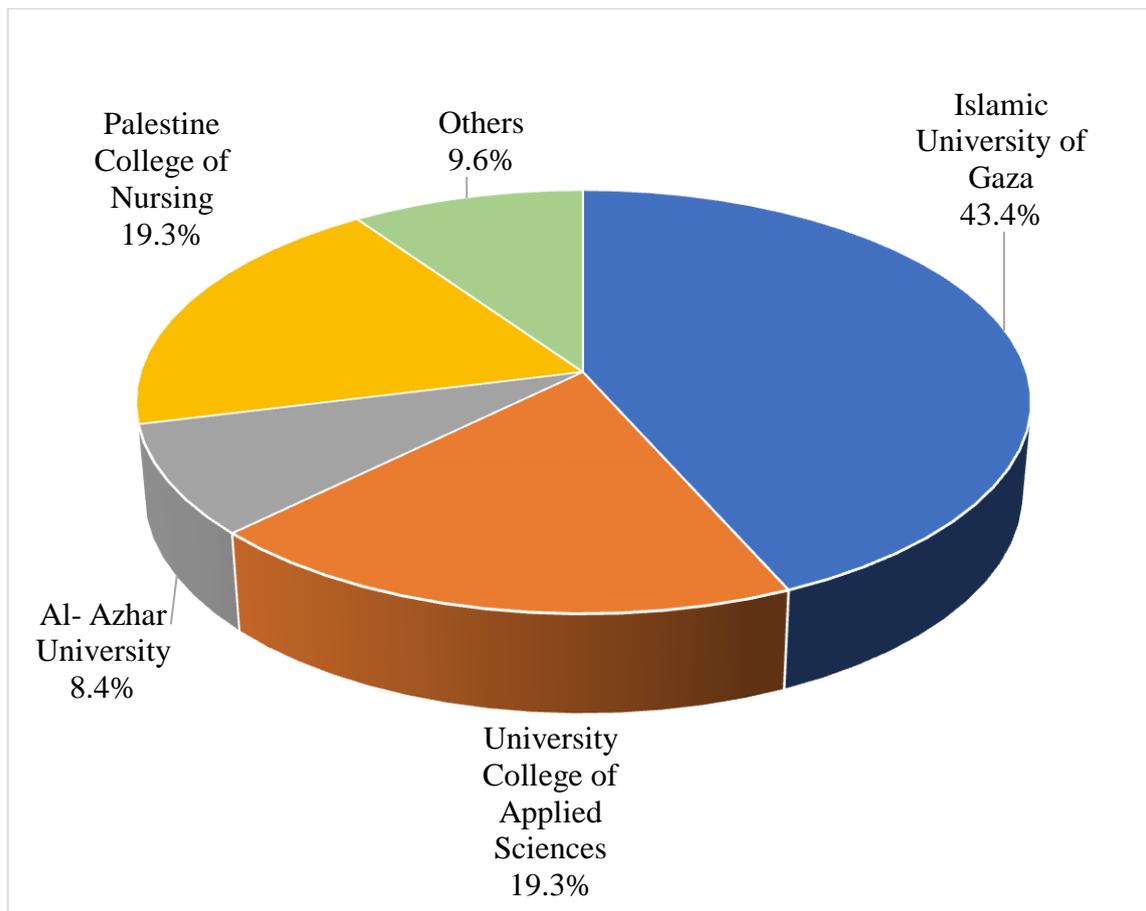
Figure 4.2: Sample distribution according to the participants' Graduation College

The figure shows the distribution of study participants according to their graduation college which shows that 43.4% of the study participants was graduate from Islamic University of Gaza, 19.3% of the study participants was graduate from University College of Applied Sciences, 19.3% was graduate from Palestine College of Nursing, 8.4% was graduate from Al- Azhar University, and 9.6% of the study participants was graduate from Other universities.

4.3 Participation in training Courses, Period and Place of Training

Table 4.3 Training Courses Participation, Period and Place of Training (n=83)

Variables	Categories	Frequency	Percent
Attending training courses concerned to HD	Yes	31	37.3
	No	52	62.7
	Total	**83**	**100**
Duration of training		N 31	%
	Less than one month	4	12.9
	One month	4	12.9
	Two month	10	32.3
	Six month	13	41.9
	Total	**31**	**100**
	Internal	25	80.1
	External	6	19.4
	Total	**31**	**100**

The table showed that 37.3% of the nurses in the current study attended training courses concerned to HD, while 62.7% of them did not. Also, 41.9% of the trainee nurses have been trained for six months, and 32.3% have been trained for two months. Moreover, 80.1% of the trainee nurses have received the training inside their work settings, while 19.4% of them have received it outside their work settings.

Regarding attending training courses, the result of the current study is nearly consistent with the result of AL-Mawsheki et al (2016) which revealed that nearly two-thirds of studied nurses did not attend training course about patient care in HD unit. Also, this is in

agreement with Abdelfatah (2013) and Bakey (2012), they are stated that the majority of studied nurses did not attend training course about patients care in HD Unit.

4.4 Presence of Manual Procedure related to Dialysis
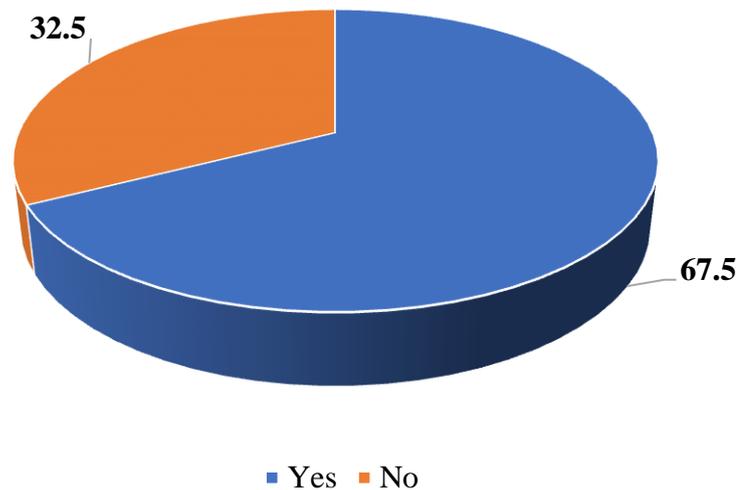
Figure 4.3: Presence of manual procedure related to dialysis

The figure 4.3 showed the presence of manual procedure related to dialysis, it showed that 67.5% of the study participants reported that there is manual procedure related to dialysis, while 32.5% did not. These results could be attributed to either lack of manual procedure within the hospitals related to the MOH, either the participants were not aware of the availability of these manual procedure.

4.5 Distribution of Study Participants according to their Monthly Income
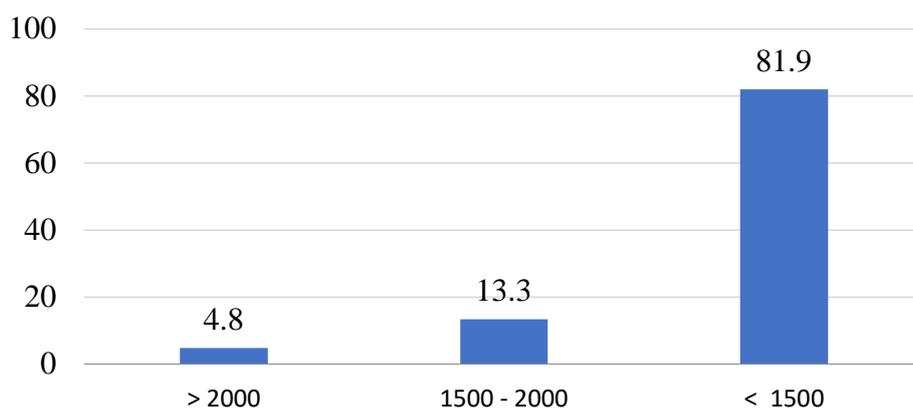
Figure 4.4: Distribution of study participants according to their monthly income

The figure 4.4 showed the distribution of study participants according to their monthly income, it shows that 81.9% of the study participants have monthly income less than 1500 Shekel, 13.3% have monthly income between 1500 – 2000 Shekel, while only 4.8% of them have monthly income more than 2000 Shekel. The researcher explains this is because of the years of experience, and economic situation in the GS, where the employee receives a very limited salary, as this salary is very low for the services provided by the employee, which would affect the quality of nursing care provided in hospitals.

4.6 Level of nurses' knowledge and practice toward Children Undergoing HD

Table 4.4: Level of nurses' knowledge and practice toward Children Undergoing HD

Study domains	Max score	Mean score	Mean percentage*	Level category
Knowledge	20	12.08	60.40	Low
Practice	80	60.12	75.15	Moderate

*Calculated by dividing the mean score on the max mean score

The table 4.4 showed that the mean score of nurses' knowledge toward children undergoing HD is 12.08 out of 20 (60.40%), while the mean score of their practices is

60.12 out of 80 (75.15%). This results are not consistent with the results of Al-Mawsheki et al (2016) which revealed that the total mean of nurses' knowledge regarding patients undergoing dialysis is 73.2%, while it is not consistent with total mean score of practices, in which their result is 60.3%. The differences between both results could be attributed to the differences in the assessment questions regarding knowledge and practices. Also, it could be attributed to the differences in the sample and characteristics of the studied sample.

Moreover, since the assessment questions in the current study were configerted an exam; thus the nurses' answers could be affected by their experience, actual knowledge, their cumulative average within the university, that's why there is a low level of knowledge among nurses.

Furthermore, the results of the current study are consistent with the results Hassona et al (2011), who stated that most of the nurses had unsatisfactory total knowledge regarding HD, This is while disagreement with the results of Moghazy (2013) who reported that nearly two thirds of total nurses had satisfactory knowledge regarding HD. The difference between the current study and Moghazy (2013) is that the majority of the participant within the study of Moghazy (2013) were new graduates and good attendance that it might be due to many factors including new graduation, and attending courses.

Regarding nurses' practices, it is higher than nurses' knowledge, and this could be attributed to the nature of knowledge-related questions and the practices-related questions, in which the nurses would answer more easily if they have been asked in practical terms than in theoretical knowledge. Moreover, Yousif et al (2017) revealed that the majority of the nurses attained a score of knowledge less than "good" which is congruent with the current study results. Additionally, the results of the current study are not consistent with

the results of Abd-Alfatah et al (2016) which showed that the majority of nurses (83.3 %) had a high score of knowledge related to the care of child undergoing HD.

This low level of nurses' knowledge regarding care of a child on HD, which considered not enough to provide nursing care towered child on HD, and reflect the need for enhancing nurses' knowledge regarding child on HD. This may be related to the lack of regular education courses and evidences supported by research, inadequate of continuous clinical supervision and evaluation. In addition, it may be due to unavailability of hospital policy or standard guidelines for nursing dealing with a child on HD care. Other reasons may be related to work overload, lack of nurses' incentives to improve their knowledge and lack of the desire to update knowledge. As well as limited time to upgrade their knowledge and skills with current advancement in technology. In addition, the researcher explained this result to an absence incorporation of a child on an HD care course in a nursing curriculum of the taught nursing program in colleges.

Regarding the moderate level of nurses' practice, from the researcher's point of view, this moderate practice level may be related to the low level of nurses' knowledge. In addition, this result could be explained by the inappropriate ratio of a number of nurses to patients, lack of facilities and equipment in HD units. Also, this level of practices reflects the status of training offered to nurses working in HD units, lack of special training, short period of training courses, lack of clinical expertise, and other factors affect the impact of training offered to nurses working in HD units. As well, lack of nursing care conference during work, invariability of the procedure, and books especially in the studied area. Lack of supervision, and nurses' evaluation against identified standards of a child on HD care. In addition, the Palestinian health care system, job autonomy in nursing is an evident

problem, which directs the nursing care to be based on medical orders, rather than using the nursing process and evidence-based nursing.

Table (4.7) Mean score of participants' responses to knowledge items towards Children Undergoing HD.

No.	Item	False No. (%)	True No. (%)	Rank
1.	The Definition of chronic renal failure is	63 (75.9)	20 (24.1)	20
2.	What are the causes of CKD	18 (21.7)	65 (78.3)	1
3.	All the following are Symptoms of chronic renal failure except	37 (44.6)	46 (55.4)	16
4.	All the following Are considered Potential complications for chronic renal failure except	19 (22.9)	64 (77.1)	2
5.	Which of the following is considered definition of hemodialysis	33 (39.8)	50 (60.2)	3
6.	All the following medications given to hemodialysis patient except	30 (36.1)	53 (63.9)	11
7.	All the following is considered Indications for hemodialysis except	62 (74.7)	21 (25.3)	18
8.	How often must hemodialysis usually be done	24 (28.9)	59 (71.1)	7
9.	Which dietary mineral must be limited for a person on hemodialysis	23 (27.7)	60 (72.3)	4
10.	Types of investigation taken from patient monthly	37 (44.6)	46 (55.4)	17
11.	which of the following is considered Pre-dialysis nursing care	26 (31.3)	57 (68.7)	8
12.	All the following is consider Complications that can occur during dialysis except	36 (43.4)	47 (56.6)	15
13.	All the following is consider Post-dialysis nursing care except	23 (27.7)	60 (72.3)	5
14.	The nurse can prevent hypotension that occur during hemodialysis by all of the following except	62 (74.7)	21 (25.3)	19
15.	The patient that undergoing hemodialysis should increase all of the following type of diet except	33 (39.8)	50 (60.2)	4
16.	The symptoms which may see in children undergoing hemodialysis is	31 (37.3)	52 (62.7)	12
17.	Which of the following consider from the nursing role in pediatric hemodialysis unit	23 (27.7)	60 (72.3)	6
18.	All the following are True about arteriovenous (AV) fistula except	20 (24.1)	63 (75.9)	3
19.	Complications related to vascular Access in Hemodialysis are	28 (33.7)	55 (66.3)	9
20.	To keep access site for long time the nurse should avoid of the following practice	29 (34.9)	54 (65.1)	10

As shown in table (4.7), according this results the highest statement in knowledge regarding nurses care of children on HD was "what are the causes of CKD" with mean 78.3%, followed by the statement, "All the following Are considered Potential complications for chronic renal failure except" with mean 77.1 %. While the lowest statement was; " The Definition of chronic renal failure" with mean 24.1%.

Table (4.8) Mean score of participants' responses to practice items towards Children Undergoing HD.

No.	Item	Mean	SD	Mean%	Rank
1.	Paying attention to patient I.D.	1.518	.687	75.9	25
2.	Introducing him/her self as a health care provider to the patient before starting procedure	1.614	.537	80.7	4
3.	The nurse explain hemodialysis procedure to client	1.530	.650	76.5	21
4.	Nurse preparing the necessary equipment before starting procedure	1.611	.659	80.7	5
5.	Nurse washed Hand before doing procedure	1.638	.575	81.9	2
6.	Nurse washed Hand after doing procedure	1.530	.738	76.5	22
7.	Nurse use aseptic technique when giving shunt care	1.626	.599	81.3	3
8.	Nurse use aseptic technique when applying or changing dressings	1.747	.464	87.3	1
9.	Nurse use aseptic technique when starting or completing dialysis	1.554	.648	77.7	13
10.	Nurse checking patient body weight before hemodialysis treatment	1.566	.666	78.3	12
11.	Nurse checking patient fluid status before hemodialysis treatment	1.433	.718	71.7	34
12.	Nurse checking patient peripheral edema before hemodialysis treatment	1.373	.638	68.7	36
13.	Nurse checking patient lung & heart sounds before hemodialysis treatment	1.060	.770	53.0	40
14.	Pre-session patient nurses assess for nausea, dizziness, muscle cramp and skin condition	1.120	.669	56.0	38
15.	Nurse assessing the condition of vascular access	1.506	.704	75.3	27
16.	Nurse checking patient vital signs before, during and after hemodialysis	1.542	.703	77.1	18
17.	Nurse checking patient's consciousness during procedure	1.614	.640	80.7	6
18.	Nurse proper use of infection control methods	1.494	.687	74.7	30

No.	Item	Mean	SD	Mean%	Rank
19.	Nurse clean the site of catheter or arteriovenous fistula before starting dialysis	1.506	.687	75.3	28
20.	Nurse prepare of hemodialysis machine according to the protocol	1.614	.640	80.7	7
21.	Nurse withdraw a sample of blood from the patient to determine the level of serum electrolytes and waste product	1.554	.609	77.7	14
22.	Nurse monitoring physical status before for evidence of physiologic imbalance and change	1.481	.650	74.1	32
23.	Nurse providing patient with entertainment materials like books, magazines…etc during hemodialysis treatment	1.265	.717	63.3	37
24.	Nurse encouraging patient to express feelings and concerns	1.385	.677	69.3	35
25.	Nurse ensuring that every medication should be given at the prescribed time such as heparin	1.578	.627	78.9	11
26.	Nurse measure all sources of I & O. weigh routinely	1.554	1.261	77.7	15
27.	Nurse administer IV solutions /volume expanders during dialysis as indicated	1.433	.684	71.7	33
28.	Nurse during dialysis, watch for complications that can occur during hemodialysis	1.602	.661	80.1	80
29.	Nurse monitor vital signs Post-dialysis	1.578	.607	78.9	10
30.	Nurse educate families about the disease and its implications	1.542	.629	77.7	16
31.	Nurse educate child and family about diet and physical exercise	1.542	.610	77.1	19
32.	Nurse Report hypotension or hypertension	1.602	.583	80.1	9
33.	Nurse always alert for possible bleeding	1.494	.669	74.7	31
34.	Nurse check weight and compare (weight loss should be close to fluid removal goal set during treatment)	1.506	.722	75.3	29
35.	Nurse document unusual findings	1.542	.703	77.1	20
36.	Nurse assess access site for bruits, exudate, signs of infection or bleeding	1.530	.631	76.5	23
37.	Nurse properly performs post dialysis vascular access care	1.554	.736	77.7	17
38.	Nurse document hemodialysis procedure	1.518	.650	75.9	26
39.	Nurse allow patient to eat any food	1.108	.855	55.4	39
40.	Nurse check weight in order to detect the accumulative gain between one session and another	1.530	.721	76.5	24

As shown in table (4.8), according this results the highest statement in practice regarding nurses care of children on HD was " Nurse use aseptic technique when applying or changing dressings " with mean 87.3%, followed by the statement, " Nurse use aseptic technique when giving shunt care " with mean 81.3%. While the lowest statement was; "Nurse checking patient lung & heart sounds before hemodialysis treatment" with mean 53.0%.

4.7 Relationship between Nurses' Knowledge and Practices towards Children Undergoing HD

Table 4.5: Relationship between Nurses' Knowledge and Practices towards Children Undergoing HD

Variable	Nurses' knowledge	
Nurses' practices	Pearson Correlation	P-value[*]
	0.704	<0.001[*]

*Correlation is significant at the 0.01 level (2-tailed)

The table 4.5 showed that there is a significant strong correlation between nurses' knowledge and their practices toward children undergoing HD (p<0.001). These results could be attributed to the fact that with an increase in the level of knowledge, the level of practice would be increased as a result. Also, this result of the current study demonstrates that there is a relation between nurses' knowledge and their practices. Thus, it can be said that practice is depended on knowledge of children with CKD and HD. To provide effective, efficient, and holistic care, nurses must rely on sound theoretical principles to develop and implement the plan of care. As progress into the 21st century, nurse scholars, scientists, researchers, and practitioners must place theory-guided practice at the core of nursing.

The results of the current study related to this relationship, this is not consistent with the results of Abd-Alfatah et al (2016) which revealed that this study showed that there is no statistical significant difference between nurses' knowledge and their practice. Also, this result does not agree with Hassan (2010) who stated that there is no significant difference between nurses' knowledge and their practice.

4.8 Differences in the Level of Nurses' Knowledge and Practices with regard to their Demographic Factors

Table 4.6: Differences in the Level of Nurses' Knowledge and Practices with regard to their Qualification

Variable	N	Mean (SD)	df	F	P value*
Nurses' Knowledge					
Diploma	20	12.60 (5.18)			
Bachelor	55	12.25 (4.33)	2, 80	1.28	0.283
Master	8	9.62 (5.31)			
Nurses' Practice					
Diploma	20	62.50 (14.51)			
Bachelor	55	60.38 (12.78)	2, 80	1.57	0.213
Master	8	52.37 (14.51)			

*One-way ANOVA

The table 4.6 showed that there is no significant statistical difference in the level of nurses' knowledge toward children undergoing HD with regard to their educational qualification (p>0.05). Also, there is no significant difference in the level of nurses' practices toward children undergoing HD with regard to their educational qualification (p>0.05). These

results congruent with the study conduct by Mohamed (2009) who found that no statistically significant differences between "nurses knowledge and practices" and their qualification, Also the result are consistent with Hassan (2010) who stated that there is no significant difference between nurses' knowledge scores, and practice with age, moreover the current study disagreed with Abd Alfatah et al (2016) who said that there is statistical significant difference between nurses' knowledge scores, and practice with age. These results could be explained by the fact that with different educational levels, the care for the child did not differ even if the nurses have a master's degree or diploma. Additionally, based on the researchers' point of view, these results could be explained by that all study participants' received their knowledge from similar sources. In addition, the nurses usually didn't reflect their nursing education in a university in their actual nursing care. After they are hired by a healthcare organization nurses are often taught "how we work here" by "older" experienced nurses

Table 4.7: Differences in the Level of Nurses' Knowledge and Practices with regard to their Gender

Variable	Mean (SD)		t statistics	p-value[*]
	Male	**Female**	**(df)**	
Nurses' Knowledge	12.46 (4.35)	11.20 (5.28)	1.137	0.259
Nurses practices	60.20 (12.26)	59.92 (17.30)	0.086	0.932

[*]Independent sample *t*-test

The table 4.7 showed that there is no significant statistical difference in the level of nurses' knowledge toward children undergoing HD with regard to their gender (p>0.05). Also, there is no significant statistical difference in the level of nurses' practices toward children undergoing HD with regard to their gender (p>0.05). These results are consistent with

Bakey (2012) who found that no statistically significant relationship between gender and nurses' practices. These results could be explained by the fact that with different gender, the care for the child during HD did not differ. Studies related to the association with gender are lacking within previous studies.

Table 4.8: Differences in the Level of Nurses' Knowledge and Practices with regard to their Marital Status

Variable	Mean (SD)		t statistics (df)	p-value
	Single	**Married**		
Nurses' knowledge	9.53 (4.21)	12.55 (4.61)	-2.419 (81)	0.031[*]
Nurses practices	53.00 (8.63)	61.44 (14.28)	- 2.056 (81)	0.043[*]

[*]Independent sample t-test

The table 4.8 showed that there is a significant statistical difference in the level of nurses' knowledge toward children undergoing HD with regard to their marital status (p<0.05), married nurses have significantly higher mean level of knowledge than singles. Also, there is a significant statistical difference in the level of nurses' practices with regard to their marital status (p<0.05), in which married nurses have significantly higher mean level of practices than singles (p<0.05). the current study is consistent with the results of Bakey (2012) who stated that there was a significant relationship at (p<0.05) level between nurses' practice and their marital status. The researcher explained this is because most nurses in the HD unites are married and have an average age of 30-40 years, which can give nurses more experience and skill.

Table 4.9: Differences in the Level of Nurses' Knowledge and Practices with regard to their Status of Receiving Training Courses

Variable	Mean (SD)		t statistics (df)	p-value[*]
	Received	Not received		
Nurses' Knowledge	12.06 (3.69)	12.09 (5.18)	-0.030 (81)	0.976
Nurses practices	61.25 (10.48)	59.44 (15.59)	0.567 (81)	0.576

[*]Independent sample *t*-test

The table 4.9 showed that there is no significant statistical difference in the level of nurses' knowledge toward children undergoing HD with regard to their status of receiving training courses (p>0.05). Also, there is no significant difference in the level of nurses' practices with regard to their status of receiving training courses status (p>0.05). The results of the present study are consistent with the results of Abd-Alfatah et al. (2016) which revealed that there is no statistical significance difference between having a training course and level of knowledge. The results of the current study also agree with Soliman (2007) who stated that there was no statistically significant difference between nurses who received training programs and those who did not receive training programs. This disagrees with Ali (2011) who stated that the nurses who had attended the training program had an excellent score and a very good score of their knowledge. The researcher explained this because most nurses in the HD units don't have training courses regarding nursing of children on dialysis. Also, ineffective implementation of training programs for health care providers in hospital settings, less frequent sessions to sustain their impact, and a short period of training. In addition, the researcher suggests either that the content of children with HD

care taught in the training course was limited or that this group of nurses had difficulty in translating theory into practice.

Table 4.10 Differences in the Level of Nurses' Knowledge and Practices with Regard to the Presence of Manual Procedure at the Hospital

Variable	Mean (SD)		t statistics (df)	p-value[*]
	Present	Not present		
Nurses' Knowledge	12.89 (3.79)	10.40 (5.79)	2.338 (81)	0.022[*]
Nurses practices	63.01 (12.70)	54.11 (14.45)	2.860 (81)	0.005[*]

[*]Independent sample *t*-test

The table 4.10 showed that there is a significant statistical difference in the level of nurses' knowledge toward children undergoing HD with regard to presence of manual procedure at the hospital ($p<0.05$), the nurses' who said that their hospital have manual procedure; have significantly higher mean level of knowledge than who did not. Also, there is a significant difference in the level of nurses' practices with regard to the presence of manual procedure at the hospital ($p<0.05$), the nurses' who said that their hospital has manual procedure; have a significantly higher mean level of practices than who did not. This is because nurses who know there is a manual procedure in the department have more knowledge and skill on how to deal with children undergoing HD according to international guidelines.

Table 4.11 Differences in the Level of Nurses' Knowledge and Practices with Regard to their Experience

Variable	N	Mean (SD)	df	F	P-value*
Nurses' Knowledge					
1 < 5	31	12.54 (4.29)			
5 -10	26	11.46 (4.43)	2, 80	0.383	0.683
> 10	26	12.15 (5.35)			
Nurses' Practice					
1 < 5	31	61.48 (13.63)			
5 -10	26	59.50 (11.94)			
> 10	26	59.11 (16.15)	2, 80	0.240	0.787

*One-way ANOVA

The table 4.11 showed that there is no significant statistical difference in the level of nurses' knowledge toward children undergoing HD with regard to their level of experience (p>0.05). Also, there is no significant difference in the level of nurses' practices with regard to their level of experience (p>0.05). This result is not consistent with the results of Abd-Alfatah et al. (2016) which showed that there was a significant relationship between total level of nurses' knowledge regarding renal failure and HD therapy and years of experience. Moreover, the results of the current study are not consistent with the results of Abd-Alfatah et al. (2016) which showed that there was a significant relationship between total level of nurses' practice regarding HD therapy and years of experience. But this study was consistent with the result of Bakey (2012) which showed that there has been a no significant relationship between years of experience in the HD unit and nurses' practices. Moreover, the results of the current study are not consistent with the results of Hassan (2010) which shows that there was a statistically significant difference between nurse's

knowledge scores with their duration of the experience. The differences in the current study results and other results could be attributed to the differences in the sample size and sampling process. Also, This result could be explained by the larger part of the study participants had less than 5 years' work experience in HD unites. Theorized that the higher scores of the nurses with less experience may be related to their more recent formal education. On another hand, the longer a nurse works in the HD unites the more opportunity there may be to increase knowledge through both experience and education. In addition, it considered an open area, which may lead to sharing knowledge and practices between the overall nurses work within the department.

Table 4.12 Differences in the Level of Nurses' Knowledge and Practices with Regard to their Graduation College

Variable	N	Mean (SD)	df	F	P-value*
Nurses' Knowledge					
Islamic University of Gaza	36	2.30 (1.32)	4, 78	2.524	0.047
University College of Applied Sciences	16	2.56 (2.56)			
Al- Azhar University	7	1.28 (0.755)			
Palestine College of Nursing	16	3.00 (1.19)			
Others	8	2.81 (1.04)			
Nurses' Practice					
Islamic University of Gaza	36	3.05 (1.49)	4, 78	3.822	0.007
University College of Applied Sciences	16	3.50 (1.41)			
Al- Azhar University	7	1.42 (0.53)			
Palestine College of Nursing	16	3.87 (1.35)			
Others	8	3.56 (1.41)			

*One-way ANOVA

The table 4.12 showed that there is a significant statistical difference in the level of nurses' knowledge toward children undergoing HD with regard to their Graduation College ($p < 0.05$). Tukey Post hoc was conducted to know the differences between which college is better knowledge, the test showed that the difference is between the nurses' who are graduate from Palestine College of Nursing with other colleges reported in this study in favor to those who are graduate from Palestine College of Nursing. In addition, there is a significant difference in the level of nurses' practices with regard to their Graduation

College (P<0.05). Tukey Post hoc was conducted to know the differences between which college are better with their practice, the test shows that the nurses who are graduate from Palestine College of Nursing had better practice from nurses graduate from others college. Based on researchers' point of view, Palestine College of Nursing is the only specialized college in nursing education just, while other colleges are inclusive of other disciplines and thus may be less quality of education where universities may not pay much attention to a particular discipline and leave the other and therefore it is logical that this result for the benefit of Palestine College of Nursing.

Table 4.13 Differences in the Level of Nurses' Knowledge and Practices with Regard to their Age group

Variable	N	Mean (SD)	df	F	P value*
Nurses' Knowledge					
< 30	29	11.48 (4.71)			
30 - <40	43	11.95 (4.64)	2, 80	1.386	.256
≥ 40	11	14.18 (4.35)			
Nurses' Practice					
< 30	29	59.55 (11.41)			
30 - <40	43	59.79 (15.01)	2, 80	.254	.776
≥ 40	11	62.90 (15.94)			

*One-way ANOVA

Table 4.13 showed that there were no significant differences in the level of nurses' knowledge and practices between their different age groups (P>0.05). These results are not consistent with Abd Alfatah et al (2016) who stated that there is a significant difference between nurse's knowledge scores and the age of studied nurses. While these results

inconsistent with the study conducted by Lydia et al (2016) who found that there are no significant differences in the nurses' knowledge between their different age groups.

Based on the researchers' point of view, the older existing staff knowledge and practices might influence the knowledge and practice of new nurses. In clinical areas, the preferred method of learning is through observation and emulating a role model who is 'the expert' of the ward. Thus, it is disconcerting that novice nurses may follow inappropriate practices of ward staff rather than the theory taught in college. In addition, HD units considered open areas, which leads to exchange knowledge and practices between nurses worked in HD units despite their ages.

Table 4.14 Differences in the Level of Nurses' Knowledge and Practices with Regard to their Place of work

Variable	N	Mean (SD)	df	F	P-value*
Nurses' Knowledge					
Al Shifa Medical Complex	45	12.46 (4.45)	3, 79	2.826	.044
Al Rantisy Hospital	11	10.90 (4.72)			
Al Aqsa Hospital	10	15.00 (1.69)			
Nasser Hospital	17	10.11 (5.49)			
Nurses' Practice					
Al Shifa Medical Complex	45	58.80 (10.63)	3. 79	2.313	.082
Al Rantisy Hospital	11	61.45 (12.35)			
Al Aqsa Hospital	10	70.10 (9.55)			
Nasser Hospital	17	56.88 (21.15)			

*One-way ANOVA

Table 4.14 showed that there were significant differences in the nurses' knowledge between their different places of work (P<0.05). Tukey Post hoc was conducted to know the differences between which groups, the test shows that the difference is between the nurses' who are working in Al Aqsa Hospital in favor to those who are working in other hospitals, it reported that the nurses whom work in Al Aqsa Hospital had better knowledge from whom work in other hospitals. These results agree with Mohamed (2009) who reported that there was a high statistically significant difference between nurse's knowledge scores and working place, Also these results congruent with AL Mawshki et al (2016) who found that there is a significant difference between nurse's knowledge and their working place.

On other hand this table 4.14 show was were no significant differences in the nurses' practices and their different places of work (P>0.05). These results disagree with a study conducted by AL Mawshki et al (2016) who found that there is a significant difference between nurse's practice and their working place.

Based on the researchers' point of view, the workload, occupancy ratio within different HD units, daily work pressure as well as other factors may lead to decreased quality of care provided by nurses' towared children on HD. In addition, these circumstances lead to decrease nurses' ability to acquire new knowledge and update their practices. Al Aqsa Hospital had less occupancy ratio and workload, Also The dialysis department at Al-Aqsa Hospital is a newly established department and the number of patients and dialysis machines is lower than other hospitals, so the working pressure is lower and allows the nurse to develop himself, information and high-quality performance.

Chapter Five

Conclusion and Recommendation

This chapter represents the conclusion of findings and results which were clarified previously from the analysis. Also, this chapter includes recommendations for the decision-makers to focus on improving and increasing the nurse's knowledge and practice of nursing care in general departments especially the nurses who working in HD units.

5.1 Conclusion

Chronic kidney disease a major health problem worldwide with increasing incidence and prevalence that is threatening to bring on the onset of a real 'epidemic'(Brück et al. 2015). This study revealed the presence of knowledge gap. The existing knowledge gap in key area of nurses care in children on HD which can greatly affect the success of childcare service and maybe increase complications to children on HD.

This study has used descriptive, analytical and cross-sectional design to provide a comprehensive assessment of nurses' knowledge and practice regarding nursing care of children undergoing HD at governmental hospitals at GS.

The major findings in this study were that the nurses had low knowledge, the mean score of nurses knowledge was (60.40%), and had moderate practice, the mean score of nurses practice was (75.15%).

The results showed that there is a significant strong correlation between nurse's knowledge and nurses' practice. When comparing the socio-demographic variables and nurses' knowledge and practice the results showed that There were significant differences in the nurses' knowledge and practice with regard to marital status, present of manual procedure, different graduation college and there were significant differences in the nurses' knowledge between their different places of work (P<0.05). On the other hand, There were not found statistical differences in knowledge and practices with other factors: age, gender, education qualification, training courses and experience in HD units (P >0.05).

5.2 Recommendations

Based on the findings of the current study, the researcher would emphasize many useful recommendations that may help in promoting and improving nursing care towards children with HD.

1. Continuous nursing educational and in-service training programs on dialysis unit should be well organized within all HD units in GS.

2. The multidisciplinary approach must be used in caring for children requiring long term dialysis. Available resources should include the child, the child's family, the nurse, and other dialysis staff, renal dietitian, the nephrologists, the social worker and psychologist

3. Periodic assessment of knowledge and practice for all nurses dealing or providing care to children undergoing HD therapy.

4. Emphasize the importance of continuous training based on actual need assessment of nurses caring for children undergoing HD therapy.

5. Manual Procedures should be available in HD units as a reference for all nurses.

6. Knowledge and skills to maintain and improve the level of practice.

7. Encourage nurses and motivate them to update their knowledge and practices by using the system of gifts and rewards.

8. Further researches should be done on a large sample to generalize the results of this study

9. Advanced research studies are needed using other methodological approaches to assess and improve the performance of nurses working in HD units.

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Annexes

Annex (1) Palestine map, Gaza strip map and West Bank map

Annex (2) Self-administered questionnaire

استبانة

Assessment of Nurses' Knowledge and Practice Related to Nursing Care of Children

Undergoing HD in Gaza Strip

عزيزي/عزيزتي المشارك/ة

انا الباحث محمد خميس محمد قاسم طالب ماجستير بجامعة القدس ابو ديس كلية المهن الصحية تخصص تمريض اطفال، اقوم بإجراء هذا البحث كمتطلب رئيس من متطلبات الحصول على شهادة الماجستير. ان الهدف الرئيسي لهذه الدراسة هو تقييم الجانب المعرفي والعملي للرعاية التمريضية المقدمة للأطفال الذين يخضعون لغسيل الكلى في قطاع غزة من وجهة نظر الممرضين والممرضات العاملين داخل اقسام غسيل الكلى في المستشفيات الحكومية. اثمن عاليا مشاركتكم الهامة في هذه الدراسة والتي من الممكن ان تستغرق حوالي ١٥ دقيقة. وان هذا البحث لن يستخدم الا لأغراض البحث العلمي فقط.

يرجى اجابة جميع الاسئلة الواردة وفقا لما لديك من معرفة وممارسة عملية.

ولكم جزيل الشكر والتقدير

الباحث/ محمد قاسم

جوال رقم : ٠٥٩٩٠٩٣٦٤

Part I: Personal Data of Nurses

Age: …………………………years

Years of Experience: ……………...years

Gender: Male ☐   Female ☐

Qualification: Master ☐ Bachelor ☐   Diploma 3 years ☐   Diploma 2 years ☐

Graduation college: Islamic university ☐   University College of Applied Sciences ☐

Al Azhar university ☐ Palestine College of Nursing ☐   Others ☐

Place of work :

 Al Shifa Medical Complex ☐   Al-Rantisy hospital ☐

 al-Aqsa hospital ☐ Nasser hospital ☐ Al-Najjar hospital ☐

Marital status: Single ☐ Married ☐ Divorced ☐ Widow ☐

Residence: North Gaza ☐   Gaza ☐   Middle governorate ☐

        Khan Younis ☐ Rafah ☐

Attending training courses concerned to HD: Yes ☐ No ☐

If the Answer Yes, please answer question 9 and 10

Duration of training:

less than one month ☐   One month ☐   Two months ☐   6 months and more ☐

Place of training: internal ☐ external ☐

Presence of manual procedure in dialysis unit: Yes ☐   No ☐

Monthly income:.................... NIS

Working hours weekly:.................. Hours

Working shift during questionnaire filling: Day ☐   Evening ☐ Night ☐

Part II: Knowledge Part

Select the most accurate answer for the following questions:

1. **The Definition of chronic renal failure is :**
   1. Chronic kidney disease occurs when kidneys are no longer able to clean toxins and waste products from the blood. This can happen a sudden just.
   2. Chronic kidney disease is a slow and progressive loss of kidney function over a period of several years.
   3. Chronic kidney disease is defined as the presence of kidney damage or an estimated glomerular filtration rate (GFR) less than 100 ml/min, persisting for 3 months or more.
   4. All Above

2. **What are the causes of chronic kidney disease (CKD)?**
   A. Type 1 or type 2 diabetes   B. High blood pressure
   C. Glomerulonephritis   D. Prolonged obstruction of the urinary tract
   E. Recurrent kidney infection   F. All Above

3. **All the following are Symptoms of chronic renal failure except :**
   A. Itching   B. Muscle cramps   C. Nausea and vomiting
   D. Polyuria   E. Oliguria   F. Loss of appetite

4. **All the following Are considered Potential complications for chronic renal failure except :**
   A. Fluid retention   B. Hyperkalemia   C. cardiovascular disease   E. Anemia   F. Hypokalemia

5. **Which of the following is considered a definition of HD :**
   A. A medical procedure to remove fluid and waste products from the blood and to correct electrolyte imbalances
   B. Is a process of purifying the blood of a person whose kidneys are not working normally
   C. It is a procedure used to remove toxic wastes from the blood of a patient with acute or chronic renal failure.
   D. All Above

6. **All the following medications given to HD patient except :**
   A. Erythropoietin Iron   B. Active Vitamin D
   C. Phosphorus binders   D. NSAIDs (nonsteroidal anti-inflammatory **drugs**)

7. **All the following is considered Indications for HD except** :
   A. Severe fluid overload
   B. Severe metabolic alkalosis
   C. intractable hyperkaliemia;
   D. uremic symptoms (nausea, pruritus, malaise)
   E. chronic kidney disease (CKD) stage 5.

8. **How often must HD usually be done?**
   A. Every day   B. Once a week   C. Twice a week   D. 3 times a week

9. **Which dietary mineral must be limited for a person on HD?**
   A. Potassium   B. Iron   C. Magnesium   D. Phosphorus

10. Types of investigation taken from patient monthly :
   A. Potassium level   B. (CBC)   C. Urea & creatinine D. Ferritin and Iron E. All Above

11. which of the following is considered Pre-dialysis nursing care :
   A. Assess Weight   B. Taking Vital signs   C. measure Potassium level
   D. Review Medications   E. Checking access site   F. All Above

12. All the following is to consider Complications that can occur during dialysis except :
   A. Nausea & Vomiting   B. Itching   D. Headaches & Back pain
   E. hypertension   F. Muscle cramps

13. All the following is to consider Post-dialysis nursing care except :
   A. Monitor BP; report hypotension or hypertension   B. Watch for bleeding
   C. Check weight and compare   D. Document unusual findings
   E. Assess access site   F. Give antibiotics to prevent infection

14. The nurse can prevent hypotension that occurs during HD by all of the following except :
   A. Patient education
   B. Accurate patient assessment
   C. Target weight assessment
   D. Withhold anti-hypertensives
   E. Rise sodium level intake

15. The patient that undergoing HD should increase all of the following type of diet except :
   A. Calories   B. Protein   C. Carbohydrates   D. Cholesterol   F. Na & Potassium

16. The symptoms which may see in children undergoing HD is :
   A. Poor appetite   B. Slow growth   C. Hypertension   D. Hyperactivity   F. A & B

17. which of the following consider from the nursing role in pediatric HD unit :
   A. Perform dialysis to filter toxins and waste products from the blood.
   B. Perform HD to patients as ordered by nephrologists.
   C. Maintain and manage dialysis machines, systems, and equipment.
   D. Monitor and assess vital signs of dialysis patients.
   E. All the above

18. All the following are True about arteriovenous (AV) fistula except :
   A. A surgically created connection between an artery and vein in the arm of patients
   B. With an arteriovenous fistula, blood flows directly from an artery into a vein
   C. The place of Arteriovenous fistulas usually in the wrist just
   D. It stays functional longer than other access types

19. Complications related to vascular Access in HD are :
A. Infection catheter B. Clotting central venous   C. Thrombosis & Stenosis D. All above

20. To keep access site for a long time the nurse should avoid of the following practice :
   A. Assess fistula for infection
   B. Assess circulation in the distal portion of the extremity
   C. Auscultate for bruit
   D. No IV or blood draws in that arm
   E. Take BP from same arm having a fistula

Part III: Practice part :

- The following table measures the practical experience, please put the appropriate answer as you do while working with patients

No.	Item	Yes Always	Some times	No Never
1.	Paying attention to patient I.D.			
2.	Introducing him/her self as a health care provider to the patient before starting the procedure			
3.	The nurse explain the HD procedure to client			
4.	Nurse preparing the necessary equipment before starting the procedure			
5.	The nurse washed Hand before doing the procedure			
6.	The nurse washed Hand after doing the procedure			
7.	Nurse use aseptic technique when giving shunt care			
8.	Nurse use aseptic technique when applying or changing dressings			
9.	Nurse use aseptic technique when starting or completing dialysis			
10.	Nurse checking patient body weight before HD treatment			
11.	Nurse checking patient fluid status before HD treatment			
12.	Nurse checking patient peripheral edema before HD treatment			
13.	Nurse checking patient lung & heart sounds before HD treatment			
14.	Pre-session patient nurses assess for nausea, dizziness, muscle cramp and skin condition			
15.	The nurse assessing the condition of vascular access			
16.	Nurse checking patient vital signs before, during and after HD			
17.	Nurse checking patient's consciousness during the procedure			
18.	Nurse proper use of infection control methods			
19.	Nurse clean the site of catheter or AVF before starting dialysis			
20.	Nurse prepare of HD machine according to the protocol			
21.	Nurse withdraw a sample of blood from the patient to determine the level of serum electrolytes and waste product			
22.	Nurse monitoring physical status before for evidence of physiologic imbalance and change			
23.	Nurse providing patient with entertainment materials like books, magazines…etc during HD treatment			
24.	Nurse encouraging patient to express feelings and concerns			

25.	Nurse ensuring that every medication should be given at the prescribed time such as heparin			
26.	Nurse measure all sources of I & O. weigh routinely			
27.	Nurse administer IV solutions /volume expanders during dialysis as indicated			
28.	Nurse during dialysis, watch for complications that can occur during HD			
29.	Nurse monitor vital signs Post-dialysis			
30.	Nurse educate families about the disease and its implications			
31.	Nurse educate child and family about diet and physical exercise			
32.	Nurse Report hypotension or hypertension			
33.	The nurse always alert for possible bleeding			
34.	Nurse check weight and compare (weight loss should be close to fluid removal goal set during treatment)			
35.	Nurse document unusual findings			
36.	Nurse assess access site for bruits, exudate, signs of infection or bleeding			
37.	Nurse properly performs post-dialysis vascular access care			
38.	Nurse document HD procedure			
39.	Nurse allow the patient to eat any food			
40.	Nurse check weight in order to detect the accumulative gain between one session and another			

Annex (3) Name of panels of expert

Dr. Hamza Abd Eljwwad

Dr. Samer El Nawajha

Dr. Mohammed Abu Hasira

Dr. Mohammed El jerjawy

Dr. Moatassem Salah

Mr. Khader Hssona

Annex (4) Helsinki committee for ethical approval

المجلـس الفلسطيـني للبحـث الصحـي

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/313/18

الاسم:

Name: MOHMMED K. QASSEM

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:

Assessment of Nurses' Knowledge and Practice Related to Nursing Care of Children Undergoing Hemodialysis In Gaza Strip

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/313/18 in its meeting on 05/02/2018

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

Signature

Member

Member

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

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Annex (5) Permission to collection data

State of Palestine
Ministry of health

دولة فلسطين
وزارة الصحة

التاريخ:21/07/2019
رقم المراسلة 343917

السيد : رامي عيد سليمان العبادله   المحترم

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

السلام عليكم ،،،

الموضوع/ تسهيل مهمة الباحث// محمد قاسم

التفاصيل //
بخصوص الموضوع أعلاه، يرجى تسهيل مهمة الباحث/   محمد خميس قاسم
الملتحق ببرنامج ماجستير تمريض الاطفال ـ كلية المهن الصحية ـ جامعة القدس في إجراء بحث بعنوان:ـ
"Assessment of Nurses' Knowledge and Practice Related to Nursing Care of Children
Undergoing Hemodialysis at Gaza Strip

"

حيث الباحث بحاجة لتعبئة استبانة وإجراء مقابلات مع عدد من مقدمي الخدمات التمريضية للأطفال في أقسام غسيل
الكلى في مستشفيات قطاع غزة، بما لا يتعارض مع مصلحة العمل وضمن أخلاقيات البحث العلمي، ودون تحمل الوزارة
أي أعباء أو مسئولية

وتفضلوا بقبول التحية والتقدير،
ملاحظات/
1. تسهيل المهمة الخاص بالدراسة أعلاه صالح لمدة 3 أشهر من تاريخه.

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

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عنوان الدارسة: تقييم الجانب المعرفي والعملي للرعاية التمريضية المقدمة للأطفال الخاضعين لغسيل الكلى في المستشفيات الحكومية في قطاع غزة.

إعداد: محمد خميس قاسم.

إشراف: د. معتصم سعيد صلاح.

ملخص الدراسة

قد يتعرض الأطفال المصابين بأمراض الكلى والفشل الكلوي والخاضعين لجلسات غسيل كلوي لعدد من المشاكل التي تهدد الحياة والتي ترتبط بزيادة المضاعفات والوفيات، بسبب طبيعة هذا المرض والمضاعفات المصاحبة له. لهذا من المهم وجود ممرضين مهنين يعملون في وحدات أقسام غسيل الكلى، وأن تكون هذه الوحدات مؤهلة بأحدث الأجهزة والتقنيات الحديثة، والتي بدورها توفر رعاية ذات جودة متقدمة وبالتالي تقلل من عدد وفيات الأطفال والمضاعفات التي قد تحدث أثناء جلسات الغسيل الكلوي للأطفال.

هدف الدراسة:

هدفت هذه الدراسة إلى تقييم معرفة وممارسات الممرضين فيما يتعلق بالأطفال المصابين بمرض الفشل الكلوي والخاضعين لجلسات غسيل كلوي.

منهجية الدراسة:

هذه الدراسة وصفية تحليلية مقطعية، أجريت الدراسة في وحدات الغسيل الكلوي التابعة للمستشفيات الحكومية "مجمع الشفاء–مستشفى ناصر–مستشفى الرنتيسي– مستشفى الأقصى". وشملت ٨٣ ممرض من العاملين في أقسام الغسيل الكلوي المذكورة سابقا، وقد تم جمع البيانات من خلال استبيان تم تصميمه من قبل الباحث وقد عرض على عدد من الخبراء للتحكيم، "العدد الإجمالي للممرضين كان "٩٠".ممرض حيث إن نسبة الاستجابة كانت ٩٢% بواقع ٨٣ ممرض هم الذين شملتهم الدراسة.

أهم النتائج:

أظهرت نتائج التحليل الإحصائي وجود علاقة ذات دلالة إحصائية إيجابية بين مستوى المعرفة لدى الممرضين والممارسات العملية لديهم (p value = 0.000). كما أن مستوى المعرفة كان متدني (60.40%)، بينما مستوى الممارسة التمريضية كان متوسط (75.15%)، وكان هناك فروق ذات دلالة إحصائية بين مستوى المعرفة والممارسات التمريضية و مكان العمل، الحالة الاجتماعية، مكان التخرج وأيضا وجود كتيب يدوي يوضح إليه العمل في أقسام غسيل الكلى . ولا توجد علاقة بين المتغيرات الاجتماعية–الديموغرافية الأخرى ومعرفة وممارسات الممرضين العاملين في أقسام الغسل الكلوي للأطفال.

التوصيات:

يوصي الباحث بتوفير برامج تعليمية وتدريبية للممرضين العاملين في وحدات الغسيل الكلوي، وذلك لرفع مستوى جودة الرعاية المقدمة للأطفال المصابين بأمراض الكلى والخاضعين للغسيل الكلوي.