

## Gynecological Problems among Women on Hemodialysis

A. M. F. Al-Asser<sup>1</sup>, D. M. K. Eshra<sup>2</sup>, I. K. A. kassem<sup>3</sup>, E.S.S.Ashour<sup>4</sup>

<sup>1</sup>Clinical Instructor at Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University

<sup>2&3</sup> Professors of Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University

<sup>4</sup> Lecturer at Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University

Corresponding Author: A. M. F. Al-Asser

**Abstract:** Chronic kidney disorder (CKD) within the women of procreative age is associated with menstrual and fertility disorders, premature climacteric and sexual dysfunction.

**Purpose:** The purpose of this study was to assess the gynecological problems that occur among women on hemodialysis.

**Method:** A descriptive (cross sectional) research design was utilized.

**Sample:** A purposive sample of 64 women in the reproductive age on hemodialysis were selected.

**Settings:** The study was carried out in hemodialysis units at four settings in Menoufia governorate: Menoufia University Hospital, Shebin El-Kom Teaching Hospital, Sirs-El-ian Hospital and Menouf Hospital.

**Instruments:** An interviewing questionnaire, a menstrual cycle questionnaire, a female sexual function index and a fertility questionnaire were used for data collection.

**Results:** There was a highly statistical significant difference among the study participants between before and after the hemodialysis regarding oligomenorrhea, secondary amenorrhea and menorrhagia. Early menopause, galactorrhea and sexual dysfunction are common among the study participants. Fertility is markedly reduced in hemodialysis women.

**Conclusion:** The majority of the hemodialysis women have gynecological problems which are being neglected.

**Recommendations:** Continuous monitoring for any gynecological abnormalities occurring during the hemodialysis sessions and referral for the gynecological clinic.

**Keywords:** Gynecological problems, women on hemodialysis, menstrual disorders, sexual dysfunction and infertility.

Date of Submission: 09-10-2019

Date of Acceptance: 25-10-2019

### I. Introduction

Chronic renal failure (CRF) could be a grave disease with a poor prognosis. Loss of kidney function results in different health complications poignant all age groups, particularly the adults. These adult patients account for over 10 % of the globe population. The prevalence of the disease continues to rise at a relentless rate (Schipper et al., 2014). Uremia results in the dysregulation of the hypothalamic-pituitary-gonadal axis. Follicular stimulating hormone levels are like to non-uremic women, however luteinizing hormone (LH) levels are elevated. Additionally, lack of cyclic LH release leads to the absence of the LH surge necessary for ovulation. Estradiol and progesterone are decreased in uremic women, which may end in uterine atrophy (Mantouvalos, Metallinos, Makrygiannakis & Gouskos, 2016).

According to Bender & Holley (2015), women with chronic renal disorder undergo varied gynecological issues caused by the disease itself and hemodialysis treatment like, menstrual and fertility disorders, early menopause and sexual dysfunction as a consequence of kidney-mediated endocrine disturbances.

Holley, Schmidt, Bender, Dumler & Schiff, (2014) noted that the menstrual problem is common among women with chronic kidney disease (CKD). It is partly because of abnormal hemorrhage because of platelet dysfunction and as well failure of ovulation or sustain adequate corpus luteum function. Amenorrhea is common by the time the patient reaches the end stage renal disease (ESRD). Menstrual cycle typically remains irregular with scanty flow when the initiation of the dialysis, although normal menstruation is reconditioned in some women. On the opposite hand, excessive menstruation develops generally, resulting in significant blood loss and exaggerated blood transfusion necessities.

Sievertsen, Lim, Nakawatase & Frohman, (2013) showed that hyperprolactinemia is common in women with CKD, because of the increased secretion of prolactin hormone and decreased metabolic clearance of prolactin. Elevated serum levels of prolactin could impair the hypothalamic-pituitary function and contribute to sexual dysfunction and galactorrhea in these patients.

Doss & Polaschek, (2012) added that sexual dysfunction may be a common problem in ESRD women and has received very little attention. It leads to lack of sexual drive and a decrease within the frequency of

sexuality. In several studies conducted with women receiving the hemodialysis treatment, the prevalence of sexual dysfunction among them determined to vary between 41% and 93 % from one study to another. Despite the high prevalence of sexual dysfunction in women undergoing hemodialysis, a small number choose consultation.

Anantharaman & Schmidt, (2018) pointed out that hormonal change because of CKD result in vaginal dryness or painful intercourse. Patients with CKD take several medications and receive many treatments. Side effects of some medications and complications because of uremia will result in fatigue and decreased sexual desire. On the opposite hand, some medications resulted in hormonal changes preventing the woman to experience an orgasm. Some women are anxious because of changes in appearance, like weight loss and fistula that is unattractive for a woman.

Meanwhile, Kendrick, Sharma, Holmen, Palit, Nuccio & Chonchol, (2015) declared that fertility rates among women of childbearing age with CKD are low and complications to both the mother and the fetus are high once pregnancy happens. Rates of pre-eclampsia, intrauterine growth restriction and preterm delivery increase incrementally with the severity of CKD and therefore the physicians still often counsel women with ESRD against the gestation. Discussion of safe and effective birth control is needed for women who wish to delay or avoid pregnancy.

### **Significance of the study**

Chronic renal disorder is a vital explanation for morbidity and mortality worldwide. Internationally the numbers are staggering, estimates concerning 4 million of female, worldwide suffer from ESRD, and therefore the number of the patients diagnosed with the disease continues to be exaggerated at a rate of 5-7% each year. In Egypt, the calculable annual incidence of ESRD is around 74 per million and therefore the total prevalence of patients on chemical dialysis is 264 per million. While, in Menoufia governorate the prevalence was 483 patients per million populations (El-Zorkany, 2017).

Gynecological issues in chronic nephropathy females are a crucial public health problem worldwide, particularly among women of childbearing age. It has been reported that the hypothalamic-hypophyseal regulation is discontinuous in female patients due to a rise in prolactin levels as a result of uremia (Mastrogiamco et al., 2013). Since the LH surge stirred up by estrogen does not happen in women with chronic nephropathy, anovulation, menstrual disorders and infertility develops (Goodwin, 2013). Furthermore, no studies were done regarding assessment of gynecological problems among women on hemodialysis in Menoufia governorate. Therefore the researcher tried to fill in such a spot of data by conducting this study.

### **Purpose of the study**

- To assessing the gynecological problems that occur among women on hemodialysis.

### **Research question**

1-What are the gynecological problems that occur among women on hemodialysis?

## **II. Method**

### **Research Design:**

A descriptive (cross sectional) research design was utilized.

### **Research Settings:**

The existing study was carried out in hemodialysis units at four settings in Menoufia governorate: Menoufia University Hospital, Shebin El-Kom Teaching Hospital, Sirs-Elia Hospital and Menouf Hospital. These settings have been chosen due to the fact they are governmental hospitals and known to have high flow rate of women from rural and urban area. They additionally provide many services to the public clients; one of these services is providing the care to the patients on hemodialysis as hemodialysis sessions three times per week and the session last for four hours. As well as, they grant a range of different services to meet the medical, dietary, financial and social needs of the patients with renal failure.

### **Sample:**

#### **Sample selection:**

A purposive (non-probability) sample from the hemodialysis female patients who fulfilled the following criteria was selected:

#### **The inclusion criteria of the study participants were:**

- Women undergoing hemodialysis for at least three months.
- Women at average age from 20 - 45 years old.

#### **The exclusion criteria of the study participants were:**

- Women who were diagnosed of dementia, depression or other conditions that may impair the ability to answer the questions.
- Women who received antidepressant drugs, radiation therapy and chemotherapy.

**Sample Size:**

According to the review of literature, it revealed that in 2016 the incidence of end stage renal diseases and people who are on hemodialysis worldwide had been 2.62 million. They had been 61% male and 39% female (Couser, Remuzzi, Mendis & Tonelli, 2016). While in Menoufia governorate the prevalence was 483 patients per million population (El-Zorkany, 2017). Also, the medical records at hemodialysis unit in University Hospital and Teaching Hospital revealed that the flow rate of women who are received hemodialysis is 54 women in University Hospital and 60 women in Teaching Hospital.

The total required sample size for the study would be 64 women in the reproductive age that is estimated based on this equation

$$n = \frac{z^2 \times \hat{p}(1 - \hat{p})}{\epsilon^2}$$

Where

z is the z score

ε is the margin of error

n is the population size

ĥ is the population proportion

**Instruments:**

**Instrument I: An interviewing questionnaire:** the researcher developed the interview questions based on an extensive literature review. It consisted of three sections: the first section contained questions related to the socio-demographic traits, the second section contained data related to the previous obstetric history and the third section contained data related to the medical history.

**Instrument II: Anthropometric measurements, it includes:**

A- Height (cm)

B- Weight (kg)

C- Body Mass Index (BMI) = weight (kg) / height (m<sup>2</sup>).

This instrument was adopted from Wohlfahrt-Veje et al., (2014) to determine the body mass index of the study participants.

**A scoring system of the scale: Body mass index (BMI)**

Underweight when BMI is less than 18.5

Normal weight when BMI ranges between 18.5 – 24.99

Overweight when BMI ranges between 25 – 29.99

Obese when BMI is higher than 30

**Instrument III: A menstrual cycle questionnaire:** It was created by the researcher to assess the normality of the menstrual cycle before and after the hemodialysis, the menstrual pain before and after the hemodialysis and the obstetric and gynecological diseases that occur after hemodialysis. It included the following parts:-

**Part I:** age of menarche, irregular periods before and after hemodialysis (polymenorrhea, oligomenorrhea, primary amenorrhea, secondary amenorrhea) duration of amenorrhea and menopausal symptoms.

**Part II:** a menstrual pain which includes: lower back pain, increasing the pain during the activity, decreasing the pain during the activity, abdominal and pelvic pain, pain before and at the beginning of the period, nausea or vomiting accompanied with pain, increasing the pain during the emotional stress and headache.

**Part III:** Obstetric and gynecological diseases which include: uterine fibroid, ovarian cysts, uterine adhesions, fallopian tube adhesions, polycystic ovarian syndrome, endometriosis and galactorrhea.

**Instrument IV (Appendix IV): Female sexual function index (FSFI):** This instrument was adapted from Rosen et al., (2000) to assess the female sexual function. Female sexual function index (FSFI) is one measure that has been prevalent around the world. Initially created in English (Rosen et al., 2000), the scale has been translated into various languages. It was considered to have six sexual aspects (sexual desire, arousal, lubrication, orgasm, satisfaction and pain during the sexual intercourse). It is comprised of 19 questions. It was excessively longer compared to the other scales particularly when sexual function is not an essential endpoint

and it was resulted in questions from the participants around its importance. Adjustments were carried out to create short version of the FSFI to be used for quick assessment and to be compared with the Egyptian culture; it comprised of 9 questions cover all the aspects of the sexual function which are used to assess the level of women's sexual function.

**The instrument consisted of the following:** sexual desire or interest, sexual arousal during the sexual activity or intercourse, level of sexual arousal, difficulty of lubrication ("wet") during the sexual activity or intercourse, reaching orgasm (climax), satisfaction with the sexual relationship with the husband, satisfaction with the overall sexual life, discomforts or pain during the vaginal penetration and level (degree) of pain.

**A scoring system of the female sexual function index:** It is based on the women response to 9 items on a 3 points likert scale. The total score of female sexual function index was 27.

**The score was classified as the following**

- Sexually active:  $\geq 75\%$ , which equals 20 - 27 from the total score.
- Average sexual function: 50 % -74 %, which equals 14-19 from the total score.
- Sexual dysfunction:  $< 50\%$  which equals 13 from the total score.

#### **Instrument V: Fertility questionnaire**

The instrument was created by the researcher to assess the fertility status of the women after the hemodialysis. It included occurrence of conception after hemodialysis, complications during pregnancy (abortion, hypertension, pre-eclampsia, polyhydramnios), fetal complications, referral to the health care provider specialized in obstetrics and gynecology and using the fertility medications.

#### **Validity of the instrument:**

The validity of the instrument was done by five qualified experts (three experts in Maternal and Newborn Health Nursing department at the Faculty of Nursing and two physicians from the Obstetrics and Gynecology department at the Faculty of Medicine). They reviewed the instrument for content accuracy and internal validity. They were also asked to judge the items for completeness and clarity (content validity). Suggestions were incorporated into the instrument.

#### **Reliability of the instrument:**

The reliability of the instrument was done by the researchers for testing the internal consistency of the instrument, using test retest reliability. It was done through the administration of the same instrument to the same subjects under similar conditions on one or more occasions. Scores from repeated testing were compared to test the consistency of the results over the time. Its reliability was assessed by piloting & measuring the related Cronbach's alpha value ( $\text{Alpha} = 0.88$ ).

#### **Approval Letters:**

An official letters was taken from the Dean of the faculty of Nursing, Menoufia University and submitted to the directors of the study settings to carry out the study. An official permission was obtained to carry out the study from the directors of the above mentioned settings for data collection. Also, the approval of the Ethical Committee of the Faculty of Nursing, Menoufia University was obtained.

#### **Ethical Considerations:**

An approval from the Committee of Hearing and Ethics was obtained from Faculty of Nursing, Menoufia University on 14/2/2018. Approaches to ensuring the ethics were considered in the study regarding confidentiality and informed consent. Confidentiality was achieved by the use of closed sheets with the names of the participants replaced by numbers. All participants were informed that the information they provided during the study would be kept confidential and used only for statistical purpose and after finishing the study. The findings would be presented as a group data with no personal participant's information remained.

#### **Pilot study:**

A pilot study was conducted on 10% of the total sample (7 women) according to the selection criteria to test the feasibility, applicability and understandability of the instruments. All hemodialysis women who participated in the pilot study were excluded from the study sample because the researcher made some modification of the instruments.

**Study procedure:**

- Abroad review related to the study area was prepared comprising electronic dissertations, accessible books, articles and periodicals to formulate a knowledge base relevant to the study area was also done.
- The researcher was constructed and organized the different data collection instruments.
- The data collected started in November 2018 and ended in February 2019.
- The researcher went to the hemodialysis units in the previous mentioned hospitals 3 days weekly (Saturday, Sunday and Tuesday) for four months.
- Each hospital took one month to collect the selected subjects. In the first two weeks from each month the researcher attended at 8.00 am till 2.00 pm and attended at 3.00 pm till 7.00 pm for the other two weeks to collect the data from all women in the reproductive age who attended the hemodialysis sessions.
- During the initial visit, the researcher presented herself to the participants and clarified the purpose of the research study.
- Informed consent was gotten from all participants who met the inclusion criteria. Each participant was informed that participation in the study was voluntary and she can withdraw from the study any time.
- Personal interview was done at the hemodialysis unit for the women of the reproductive age.
- The researcher started the physical examination of the hemodialysis women including the height after the hemodialysis session while the body weight was measured before and after the hemodialysis session. Then calculation of body mass index (BMI) was done through dividing the weight in kg that measured after the hemodialysis session and height in meters squared (wt / h<sup>2</sup>m).
- The researcher faced the woman and asked the questions in Arabic and recorded the answers in the structured instrument. The interview took around 20-30 minutes to be completed for each participant.

**III. Statistical Analysis**

**Data analysis**

The collected data were scored, organized and analyzed utilizing (SPSS) version 22. Descriptive as well as nonparametric statistics were utilized to analyze the data pertinent to the study. The level of significance was set at  $p < 0.05$ . Chi square test McNemar test were utilized to analyze the data.

**IV. Results**

**Table (1):** Socio- demographic Characteristics of the Study Participants (N =64)

Variables	The study participants (N= 64)	
	No.	%
<b>Age / years</b>		
-20 – 29	17	26.6
-30 - 34	13	20.3
-35 – 39	23	35.9
-40 – 45	11	17.2
<b>Residence</b>		
-Urban	25	39.1
-Rural	39	60.9
<b>Marital state</b>		
-Single	7	10.9
-Married	54	84.4
-Divorced	3	4.70
<b>Educational level</b>		
-Illiterate	20	31.25
-Read and write	2	3.12
-Deplume	32	50.0
-Bachelor degree	5	7.80
-Post graduate	5	7.80
<b>Occupation</b>		
-Working	3	4.70
-House wife	61	95.3
<b>Income</b>		
-Enough	42	65.6
-Not enough	22	34.4

**Table (1)** shows the socio-demographic characteristics of the study participants. More than one-third of study participants (35.9%) their ages ranged between 35-39 years. More than three-fifths of them (60.9%) from rural areas. The majority of the study participants (84.4%) were married. Regarding the level of education (50.0%) of the study participants had deplume. About 95.3% of the study participants were housewives. Regarding the income more than two-thirds of them (65.6%) have enough income.

**Table (2): Medical History of the Study Participants (N =64):**

Variables	The study participants (N= 64)	
	No.	%
<b>How long renal failure has occurred?</b>		
- Less than 1 year	3	4.68
- 1 - < 4 years	22	34.37
- 4 - < 8 years	21	32.81
- 8 - <12years	14	21.87
- 12 years	4	6.25
<b>Cause of renal failure</b>		
-Diabetes mellitus	2	3.10
-Hypertension	29	45.3
-Cardiovascular diseases	2	3.10
-Severe anemia	11	17.2
- Complications from medication	10	15.6
-Systemic lupus erythematous	4	6.30
-Preeclampsia	5	7.80
-Other causes	1	1.60
<b>The initiation of the hemodialysis:</b>		
- 1 - < 4 years	24	37.5
- 4 - < 8 years	22	34.4
- 8 - <12 years	16	25.0
- 12 years	2	3.10
<b>Number of dialysis sessions per week</b>		
-Three sessions	64	100
<b>Duration of the session</b>		
- 2 hours	2	3.12
- 4 hours	62	96.88
<b>Compliance</b>		
-Yes	63	98.4
-No	1	1.60
<b>Type of vascular access</b>		
-AV fistula	58	90.6
-A catheter	6	9.40
<b>Complications of vascular access</b>		
-Yes	49	76.6
-No	15	23.4
<b>What are the complications?</b>	<b>N= 49</b>	
-Bleeding	7	14.3
-Inflammation	7	14.3
-Failure of the access	21	42.8
-Itching	10	20.4
-Stenosis of the blood vessels	2	4.10
-Inflammation - failure of the access	2	4.10
<b>Disease acquired after hemodialysis</b>		
-Yes	64	100
-No		
<b>What is it?</b>		
-Hypertension	1	1.60
-Hypotension	4	6.30
-Heart disease	2	3.10
-Anemia	4	6.30
-Thyroid gland disease	1	1.60
-Osteoporosis	4	6.30
-Viral infection	7	10.93
-Hypertension + Anemia+ Osteoporosis	25	39.1
Hypotension+ Anemia+ Osteoporosis+viral infection	16	25.0

**Table (2)** shows the medical history of the study participants. About (34.4%) of the study participants had renal failure since one to four years. More than two- fifths of them (45.3) had renal failure due to the hypertension. About (37.5%) of the study participants began the hemodialysis from one to four years. All the study participants dialyzed three sessions per week and about (96.88%) dialyzed four hours per session. The majority of the study participants (98.4%) maintained the compliance during the hemodialysis sessions. Most of the study participants (90.6%) had A-V fistula and more than three-quarters of them (76.6%) had complications of the vascular access. Failure of the access is the most common complications (42.8%) among the study participants.

All the study participants (100%) had diseases acquired after the hemodialysis. Nearly two-fifths of them (39.1%) had hypertension, anemia and osteoporosis.

**Table (3):** Obstetric History of the Study Participants (N =57):

Variables	The study participants (N=57)	
	No.	%
<b>Number of gravidity</b>		
-Nulligravida	5	8.80
-Primigravida	9	15.8
-Twice	20	35.1
-Morethan 2 times	23	40.3
<b>Number of Parity</b>		
-Nullipara	10	17.5
-Primigravida	10	17.5
-Twice	37	65.0
<b>Mode of delivery</b>	<b>N=47</b>	
-Vaginal delivery	28	59.6
-Cesarean section	19	40.4
<b>Complications of labor</b>	<b>N= 47</b>	
-Yes	15	31.9
-No	32	68.1
<b>Types of complications</b>	<b>N= 15</b>	
-Hypertension	12	80.0
-Intrapartum hemorrhage	3	20.0
<b>Contraceptive use</b>		
-Yes	11	19.3
-No	46	80.7
<b>Contraceptive methods</b>	<b>N=11</b>	
-IUD	9	81.8
-Tubal ligation	2	18.2
<b>Abortion</b>		
-Yes	19	33.3
-No	38	66.7
<b>Types of abortion</b>	<b>N=19</b>	
-Spontaneous	15	79.0
-Therapeutic	4	21.0
<b>Relation between abortion and renal failure</b>	<b>N=19</b>	
-Before	8	42.1
-After	11	57.9
<b>Causes of abortion</b>	<b>N=19</b>	
-Hypertension	6	31.6
-Increased urea & creatinine	6	31.6
-Carry heavy things	1	5.30
-Toxoplasmosis	2	10.5
-Unkown	4	21.0

**Table (3)** shows the obstetric history of the study participants. About (40.3%) of the study participants had more than two pregnancy and about two-thirds of them (65.0%) had two deliveries. Nearly two-fifths of the study participants (59.6%) had normal vaginal delivery. The minority of them (31.9%) had complications during the labor. Hypertension is the most common complications (80.0%) among the study participants. The minority of the study participants (19.3%) used the contraceptive methods and about (81.8%) of them used IUD. Nearly one-third of the study participants (33.3%) had abortion and the majority of them had spontaneous abortion (79.0%). More than fifty percent of abortion (57.9%) occurs after the renal failure. The most common cause of abortion is the hypertension and increased urea & creatinine (31.6%).

**Table (4):** Menstrual Pain among the Study Participants (N =50)

Variables	The study participants (N=50)					
	Before dialysis		After dialysis		Mc Nemar test	P value
	No.	%	No.	%		
-Lower back pain	14	28.0	13	26.0	0.04	0.826
-Abdominal and Pelvic pain	7	14.0	5	10.0	0.13	0.701
-Pain before and at the beginning of period	2	4.00	2	4.00	--	--
- Lower back pain +abdominal and pelvic pain +increase the pain during the activity	27	54.0	26	52.0	0.03	0.857
	0	0.00	2	4.00	2.02	0.153

- Nausea or vomiting accompanied with pain	0	0.00	2	4.00	2.02	0.153
-Decreasing pain during the activity or during the passing of stool						

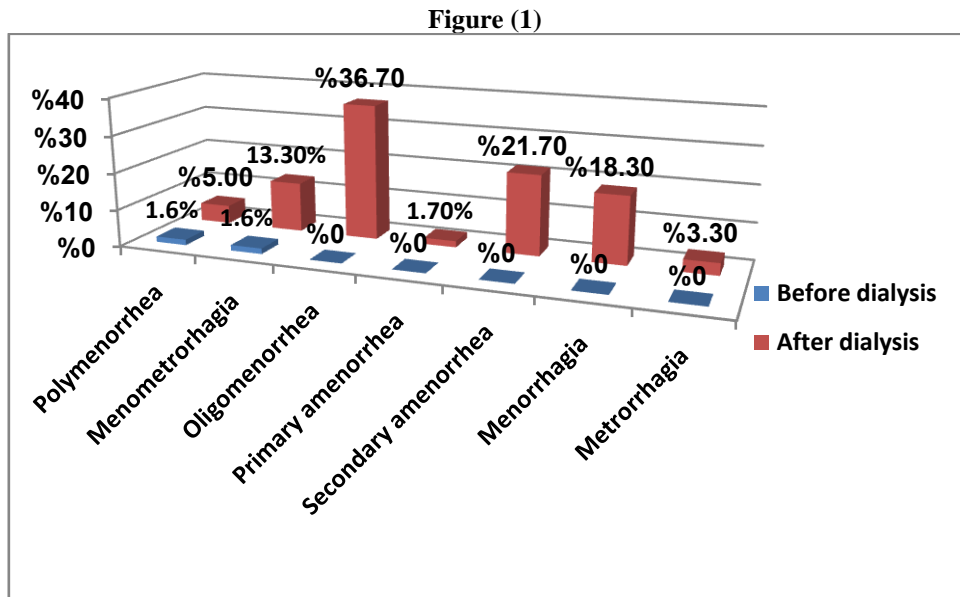
**Table (4):**Shows the menstrual pain among the study participants. It represented that there was no statistically significant difference regarding the menstrual pain between before and after starting the hemodialysis sessions.

**Table (5):** Fertility Rates among the Study Participants (N =57):

Variables	The study participants (N=57)	
	No.	%
<b>Conception after the hemodialysis</b>		
-Yes	18	31.6
-No	39	68.4
<b>If yes, How many?</b>	<b>N=18</b>	
-One	15	83.3
-Two	2	11.1
-Three	1	5.60
<b>Complications during the pregnancy</b>	<b>N=18</b>	
-Yes	17	94.4
-No	1	5.6
<b>What are the complications?</b>	<b>N=17</b>	
- Abortion	11	64.7
- Hypertension	5	29.4
- Polyhydramnios	1	5.9
<b>Women who continue the pregnancy are there fetal complications?</b>	<b>N=7</b>	
-Yes		
-No	6	85.7
	1	14.3
<b>If yes, what is it?</b>	<b>N=6</b>	
-Intrauterine growth restriction	1	16.7
-Still birth	5	83.3
<b>Referred to health care provider specialized in obstetrics</b>		
-Yes	26	45.6
-No	31	54.4
<b>Use fertility medications</b>		
-Yes	8	14.0
-No	49	86.0

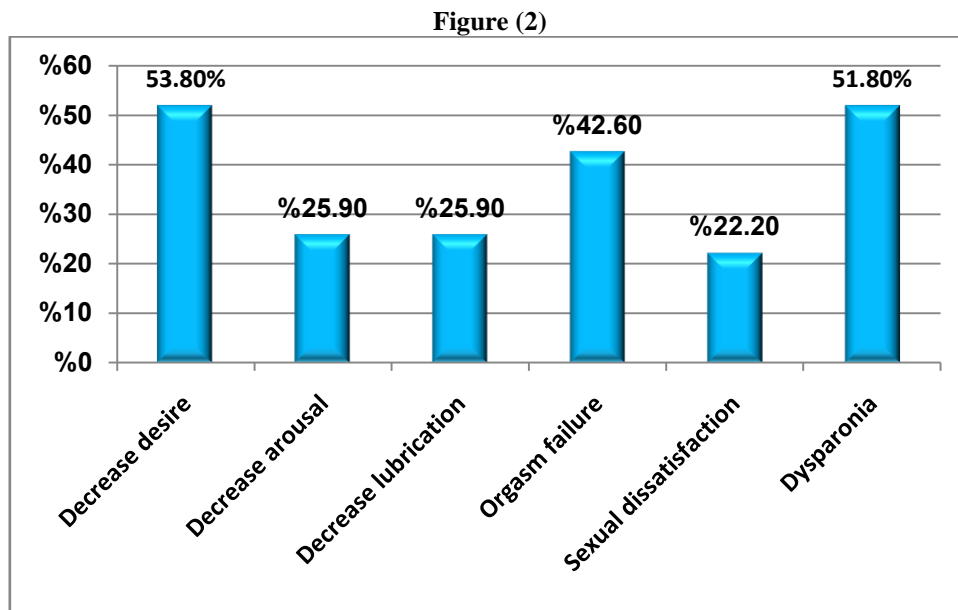
**Table (5)** shows the fertility rates among the study participants. The results reflected that the minority of the study participants (31.6) achieved the conception after the hemodialysis and the majority of them (83.3%) achieved the conception for one time. About (94.4%) of them have complications during the pregnancy. Abortion was the most common complications (64.7%) among the study participants. About (85.7%) of the study participants who continued the pregnancy had fetal complications. Still birth was the most common complications among them (83.3%). More than one-half of the study participants (54.6%) are not referred to the health care provider specialized in obstetrics and the minority of them (14.0%) used the fertility medications.





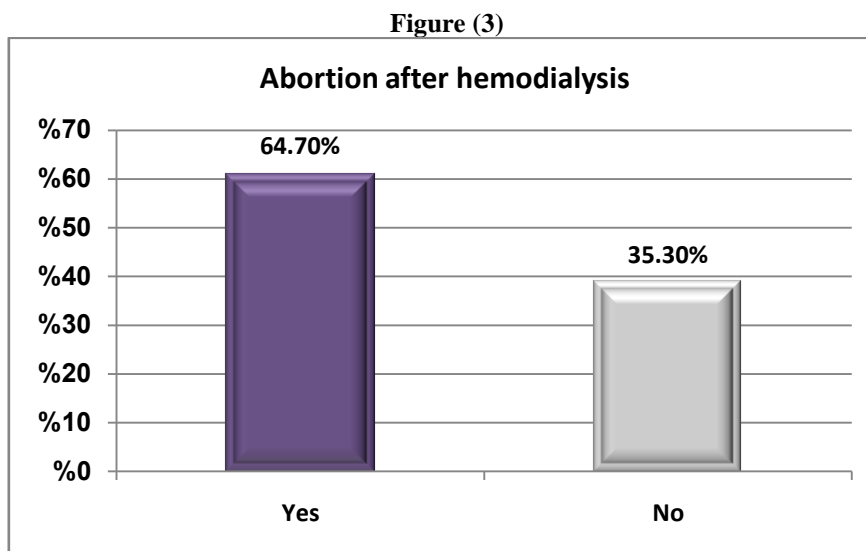
**Menstrual Cycle Disorders before and after the Hemodialysis Sessions among the Study Participants**

**Figure (1):** Shows the menstrual cycle disorders before and after the hemodialysis sessions among the study participants. As evident from the figure, more than one-third of the study participants (36.70%) had oligomenorrhea. More than one-fifth of them (21.70%) had secondary amenorrhea and about (18.30%) have menorrhagia with a highly statistically significant difference between before and after starting the hemodialysis sessions.



**Sexual Dysfunction among the Study Participants**

**Figure (2):** Shows the sexual dysfunction among the study participants. As evident from the figure, all domains of sexual dysfunction were affected. These disorders included: decreased the sexual desire (53.80%), decreased the sexual arousal (25.90%), decreased the vaginal lubrication (25.90%), failure to achieve the orgasm (42.60%), sexual dissatisfaction (22.20%) and dyspareunia (51.80%).



**Occurrence of abortion after Hemodialysis Sessions among the Study Participants**

**Figure (3):** Shows the occurrence of abortion after hemodialysis sessions among the study participants. As evident from the figure, about (64.70%) of the study participants who achieved the conception after hemodialysis had abortion after the pregnancy.

## V. Discussion

The findings of the present study succeed to answer the research question. The discussion encompasses the socio-demographic characteristics, medical history, obstetric history and the menstrual cycle questionnaire. Also, the female sexual function index (FSFI) and the fertility questionnaire.

The present study revealed that about one third of the study participants aged between 35 to 39 years old. This finding might be because the end stage of renal disease is more common among the middle adulthood persons and also due to the toxic exposure to the environmental pollutants such as water pollution. This comes in agreement with **Lin et al., (2016)** in china who mentioned in their study about "menstrual disturbances in premenopausal women with end-stage renal disease: A Cross-Sectional Study" that the mean age of the women was  $34.7 \pm 5.3$  years. This finding was in opposite with **Al-Turkiet al., (2014)** in Saudi Arabia, who study "the reproductive and gynecological issues in Saudi women with end stage renal disease". Their findings revealed that the average age of the women included in the study was  $51.5 \pm 17.1$  years.

Regarding the residence, the present study revealed that nearly two-thirds of the study participants resided the rural areas. This finding might be attributed to the lack of adequate health care services in these rural areas. This finding is in consistent with that found by **Abdalla et al., (2014)**, in Egypt, who investigated "epidemiological study of end stage renal disease at Ain Shams University Hospital" and found that more than two thirds of the study participants were from the rural areas.

The present study showed that about half of the study participants had secondary education. This may be interpreted as the rural residents usually prefer to have secondary education and then got married. These study results come in agreement with **AlKot et al., (2016)** in Egypt who investigated "the quality of life in patients on renal dialysis in urban area, Dakahlia governorate in Egypt" and demonstrated that the majority of the patients had secondary education. This is not consistent with a study conducted in Egypt by **Mansour et al., (2014)** who study "the impact of educational program on protein balance among the hemodialysis patients", and they found that half of the study participants had university education.

Regarding the marital status, the present study revealed that the majority of the hemodialysis women were married. This might be explained as in the middle age most of the women in the rural area are married. These findings are in agreement with **Garofyllou et al., (2017)** in Athens, who study "quality of life in patients undergoing hemodialysis " and stated that (71.4%) of the patients were married. On the other hand, **Armaly et al., (2012)** conducted a study in Israel entitled "major depressive disorders in chronic hemodialysis patients in Nazareth: identification and assessment" and reported that the majority of the hemodialysis patients were unmarried.

Regarding the occupation, the present study revealed that the majority of the study participants were housewives. The reason for the high rates of unemployment may be due to HD treatment 3 to 4 hours three times per week and having vascular access which is generally unacceptable to most employers. The patients also had more disease-related disability and more limited work opportunities because the hemodialysis affects the

physical, psychological, social, environmental, and general health of the patients that made them unable to work. These findings are supported by the study of **Thenmozhi, (2018)** in India, who investigated "the quality of life of patients undergoing hemodialysis". It was reported that more than 50% of the study participants were housewives. On the other hand, **Nakayama et al., (2015)** conducted a study in Japan about "social functioning and socioeconomic changes after introduction of regular dialysis treatment and impact of dialysis modality: a multi-center survey" and reported that about 63% of the study patients were working.

Regarding the duration of renal failure, the present study results showed that more than one-third of the study participants had renal failure since one to four years. This finding comes in accordance with **Joshi et al., (2017)** in Nepal, who study "assessment of quality of life in patients undergoing hemodialysis using WHOQOL-BREF questionnaire: a multicenter study" and showed that the majority of the patients in their study were diagnosed with renal failure for a duration of 5 years or less. This finding is in opposite to **Tel and Tel, (2011)** in Turkey, who investigated "quality of life and social support in hemodialysis patients" and reported that more than two-fifths of the patients (40.2%) had renal failure for periods more than four years.

The present study revealed that the leading known cause of end stage kidney disease is hypertension. This might be due to the high prevalence of hypertension among the Egyptian population. This finding is similar to that reported in a number of governorates in Egypt, in Minia governorate that the main cause of kidney disease was hypertension (20%) in a study conducted by **Elminshay, (2011)** entitled "end stage renal disease in the EL-Minia governorate, Upper Egypt: an epidemiological study". In El-Sharkia governorate, hypertension (31.8%) was the first cause of end stage kidney disease as postulated by **Ghonemy et al., (2016)** who investigated "the epidemiology and risk factors of chronic kidney disease in El-Sharkia Governorate, Egypt".

In relation to the hemodialysis sessions information, the present study findings showed that the majority of the study participants were on 3 hemodialysis sessions per week. Moreover, the majority of them were scheduled on 4 hours hemodialysis per session. This may be rationalized as the dialysis keeps the body in balance by removing the waste products, salt and extra water to prevent them from building up and accumulating in the body, maintain the fluids and electrolytes balance and control the blood pressure. This finding is also in the same line with **Ibrahim et al., (2016)** in Egypt, who investigated "quality of care assessment and adherence to the international guidelines considering dialysis, water treatment and protection against transmission of infections in university hospital based dialysis unit in Cairo" and found that the patients received 2-3 weekly hemodialysis sessions.

The present study revealed that the majority of the hemodialysis women use the arteriovenous fistula as a vascular access. This is attributed to the fact that it provides long-term patency, fewer complications, higher blood flow rates and lower infection rates than- the arteriovenous graft or catheters. This finding comes in agreement with **Stojceva -Taneva&Selim (2014)** in Macedonia, who conducted a study, entitled "vascular access in hemodialysis patients registry data". They reported that about Eighty-nine percent of the patients undergoing hemodialysis had arteriovenous fistula.

The results of the present study clarified that nearly one-fifth of the study participants were nulliparous. This may be rationalized as the fertility rate diminishes as the glomerular filtration rate declines, with menstrual cycle irregularities developing in many women once the glomerular filtration rate is below 15 mL/min. Anovulation as uremia leads to dysregulation of the hypothalamic-pituitary-gonadal axis. Estradiol and progesterone are decreased which can result in uterine atrophy. Also hyperprolactinemia and sexual dysfunction contribute to lower pregnancy rates in women on dialysis. This finding is in harmony with **Swaroop, Zabaneh&Parimoo (2017)** in America, who investigated "pregnancy in end-stage renal disease patients on hemodialysis: two case reports". Their findings revealed that more than one third of the hemodialysis women were nulligravida and nullipara.

The present study findings showed that about one-third of the study participants had complications during labor and hypertension is the most common complications that lead to obstetric acute renal failure. This is probably because of the hypertension injured uterine nerves may express (purinergic) mechanoreceptors that are sensitive to "stretch", activating uterorenal nerves that cause renal cortical vasoconstriction and proteinuria which, if sustained, may result in acute renal failure. The findings of the present study are similar to a study conducted in Canada, by **Mehrabadi et al., (2014)**, who study "hypertensive disorders of pregnancy and the recent increase in obstetric acute renal failure in Canada: population based retrospective cohort study". They stated that the increase in obstetric acute renal failure in Canada between 2003 and 2010 was restricted to women with hypertensive disorders especially pronounced among women with pre-eclampsia.

The present study clarified that there was a highly statistical significant difference among the study participants between before and after starting the hemodialysis regarding the menstrual disturbance which includes oligomenorrhea, secondary amenorrhea, menorrhagia, menometorrhagia, polymenorrhea and primary amenorrhea. Nearly two-fifths of the study participants had oligomenorrhea, more than one-fifth of them had secondary amenorrhea and nearly one-fifth of them had menorrhagia. This might be due to the disruption of the hypothalamic-pituitary-gonadal axis at various levels. It is hypothesized to be the major leading factor for

lowering the estrogen level and menstrual irregularities in women with chronic kidney disease during the premenopausal period. The reasons for the defect in the hypothalamus are numerous and include elevated levels of prolactin, endorphins, and leptin which all inhibit GnRH release from the hypothalamus.

The present study findings are in accordance with numerous relevant studies. **Matuszkiewicz-Rowinska et al., (2014)** in Warsaw, who investigated "endometrial morphology and pituitary–gonadal axis dysfunction in women of reproductive age undergoing chronic hemodialysis—a multicenter study" and mentioned that 73% of women with end stage renal disease on hemodialysis were under the age of 45 years old had menstrual disorders. Nearly half of the women with menstrual disorders reported amenorrhea, polymenorrhea and oligomenorrhea. Also **Aldeeb, Emam, Khidr & Hassan (2015)** in Mansoura, who study "evaluation of gynecological problems among hemodialysis women". They reported that the most of dialysis women had oligomenorrhea (32.3%), menometrorrhagia (22.6%) and secondary amenorrhea (12.9%) with a highly significant difference between before and after the hemodialysis.

The present study findings showed that there was no statistically significant difference regarding the menstrual pain between before and after starting the hemodialysis. This comes in agreement with **Aldeeb, Emam, Khidr & Hassan (2015)** in Mansoura, who study "evaluation of gynecological problems among hemodialysis women", and found that the percentage of the menstrual pain before the hemodialysis similar to that after the hemodialysis.

The present study findings revealed that more than two-fifths of the hemodialysis women were experienced sexual dysfunction with a percentage of (64.30 %) and all the domains of sexual function were affected. Such as, decreased the sexual desire, decreased the sexual arousal, decreased the vaginal lubrication, failure to achieve the orgasm, sexual dissatisfaction and dyspareunia due to vaginal dryness. This is probably due to the disorders in ovary function, changing in sexual hormones level, psychological problems, vascular and neurological disorders, suffering from chronic illnesses, medications, anemia and negative body image (potentially related to the presence of catheters and fistulas).

The present study findings are in harmony with numerous relevant studies, including **Asadifard & Bahrami Babaheidari, (2013)** in Iran, who investigated "sexual dysfunction of women with chronic renal failure undergoing hemodialysis and factors related to it" and found that 100% of 100 Irish women undergoing hemodialysis with almost the same distribution in different domains. Meanwhile, **Seethala & Weisbord (2013)** in USA, about "sexual dysfunction in women receiving maintenance dialysis", found that about 80% of women undergoing hemodialysis had lower score of sexual function index. A multi-centric cross-sectional study was conducted by **Strippoli et al., (2012)** in Italy to investigate "sexual dysfunction in women with ESRD requiring hemodialysis". They reported that 84% of the women on hemodialysis had sexual dysfunction. Also, **Teuwafeu et al., (2016)** in Cameroon who carried out a study entitled "sexual function and correlates in women undergoing maintenance hemodialysis in Cameroon: A Multi-centric Study". They stated that about 75% of the women on hemodialysis had a lower score of sexual function and all domains of sexual function were affected.

The present study findings revealed that there was significant correlation between the sexual function and the age of the study participants. These findings are supported by **Strippoli et al., (2012)** in Italy, who conducted a study about "sexual dysfunction in women with ESRD requiring hemodialysis" and stated that the prevalence of sexual dysfunction increased by 8% per 1-year. Also, **Aribi et al., (2015)** in Spain, who conducted a study about "sexual disorder in hemodialysis patients", reported that the risk of sexual dysfunction increased in patients at a more advanced age. This finding is not in congruence with a study conducted in Turkey, by **Yilmaz & Özaltn (2010)** who investigated "sexual problems of individuals with peritoneal dialysis therapy". The results showed that there was no significant correlation between the age of the study participants and the sexual problems.

The present study findings reflected that more than two-thirds of the hemodialysis women do not achieve the conception after the hemodialysis. This might be due to the endocrine abnormalities that decrease the fertility, menstrual regularities and sexual dysfunction. Moreover, when the pregnancy occurs, hypertension, abortion, intrauterine growth restriction, preterm delivery, stillbirth, and other complications can decrease the rate of a successful outcomes.

The present study findings are in accordance with **Nadeau-Fredette, Hladunewich, Hui, Keunen & Chan (2015)** in Canada, who investigated "end-stage renal disease and pregnancy" and showed that the pregnancy rate is rare among the hemodialysis women. Also, **Tangren, Nadel, Hladunewich (2018)** in USA, who conducted a study about "pregnancy in end stage renal disease". Their findings revealed that the fertility rates are low in women on dialysis and the physicians frequently counsel the women with ESRD against the pregnancy. Moreover, **Kendrick et al., (2015)** in India, who study "kidney disease and maternal and fetal outcomes in pregnancy". They found that the complications are high to both the mother and the fetus when pregnancy occurs during the hemodialysis.

## VI. Conclusion

According to the results of the present study, it is concluded that:

Menstrual irregularities, sexual dysfunction and infertility were reported by a higher proportion of hemodialysis women while a smaller proportion of women reported early menopause and galactorrhea. The prevalence of menstrual irregularities among hemodialysis women was high and the women developed different menstrual disorders such as, oligomenorrhea, secondary amenorrhea, menorrhagia, metrorrhagia, menometrorrhagia, polymenorrhea and primary amenorrhea.

Sexual dysfunction is a common problem among hemodialysis women. All the domains of sexual function were affected Such as, decreased sexual desire, decreased sexual arousal, decreased vaginal lubrication, failure to achieve the orgasm, sexual dissatisfaction and dyspareunia. It was significantly associated with the increased age of the study participants.

Fertility is markedly reduced in hemodialysis women and when the pregnancy occurs, it was associated with fetal and maternal complications such as, abortion, hypertension, intrauterine growth restriction and stillbirth. The present study also reported that early menopause occurs among the hemodialysis women before the age of 45 years old and it was associated with vasomotor symptoms such as hot flushes, night sweating, sleep problems and insomnia.

Therefore, the present study could answer the research question stating, what are the gynecological problems that occur among women on hemodialysis?

## VII. Recommendations

In light of the study findings, the following recommendations are proposed:

- Ongoing health education for the hemodialysis women about the common gynecological problems is needed and also the ways to alleviate it.
- Encourage the hemodialysis women for the immediate informing about any abnormalities that may be suspected for any gynecological problems and referral to the gynecological clinic.
- Encourage the hemodialysis women for routine gynecological follow up.

### Further studies:

- The effect of hemodialysis on vaginal infection and how to prevent it.
- Utilization of different updating effective interventions for hemodialysis women with galactorrhea.
- Reapplication of the study to further setting using a larger sample
- Assess the gynecological problems among women before and after renal transplantation.

## References

- [1]. Abdallah MA., Baki AH., Adel Hakim S., &Kamel CR., (2014); Epidemiological study of end stage renal disease at Ain Shams University Hospital. A five year retrospective study. *Life Science Journal*. 11(12):1060-1069. <http://www.lifesciencesite.com>.
- [2]. Aldeeb A., Emam M., Khidr N., & Hassan S., (2015); Evaluation of Gynecological Problems among Hemodialysis Women. *IOSR Journal of Nursing and Health Science* e-ISSN: 2320-1959,p- ISSN: 2320-1940 4(5): 82-91. [www.iosrjournals.org](http://www.iosrjournals.org).
- [3]. AlKot M., Kora M., Salama A., Kasem Z., &Refat W., (2016); Quality of Life in Patients on Renal Dialysis in Urban Area, Dakahlia Governorate ,Egypt. *The Egyptian Journal of Community Medicine*. 34 (3).
- [4]. Al-Turki HA., Al-Hwiesh AK., Al-Muhanna FA., Taha IS., &AlAwdahs N., (2014); Reproductive and gynaecological issues in Saudi women with end stage renal disease. *Journal of Pakistan Medical Association*, Volume 64, Issue 3. *J Pak Med Assoc*. 64(3):337-8.
- [5]. Aribi L., Masmoudi R., Ben Houidi A., Charfeddine F., Jarraya F., Hachicha J., &Amami O., ( 2015); Sexual disorder in hemodialysis patients. *La tunisieMedicale*, 93( 2), pp.79– 84.
- [6]. Armaly Z., Farah J., Jabbour A., Bisharat B., Qader AA., Saba S., &Bowirrat A., (2012); Major depressive disorders in chronic hemodialysis patients in Nazareth: identification and assessment. *Neuropsychiatric disease and treatment*, 8, 329–338. doi:10.2147/NDT.S31903.
- [7]. Asadifard F., &BahramiBabaheidari T., (2013); Sexual dysfunction of women with chronic renal failure undergoing hemodialysis and factors related to it. *Iran J Crit Care Nurs*. 2013; 5(4):204-13.
- [8]. Bender FH., & Holley JL., (2015); Most nephrologists are primary care providers for chronic dialysis patients: results of a national survey. *Am J Kidney Dis*199; 28: 67–71.
- [9]. De Villiers T., Pines A., & Panay N., (2013) ; Updated 2013 International Menopause Society recommendations on menopausal hormone therapy and preventive strategies for midlife health. *Climacteric*. 2013;16:316-337.
- [10]. Doss, F., &Polaschek, N., (2012) ; Assessing sexual dysfunction in people living on dialysis in a New Zealand renal service. *Ren. Soc. Aust. J*. 8(3), 104–108
- [11]. ElMinshay O., (2011) ; End stage renal disease in the EL-Minia governorate, Upper Egypt: an epidemiological study. *Saudi J Kidney Dis Transpl* 2011; 22:1048–1054.
- [12]. El-Zorkany KM., (2017) ; Maintenance hemodialysis in Menoufia governorate, Egypt: Is there any progress?. *J Egypt SocNephrol Transplant* [serial online] 2017[cited 2019 Jun 22];17:58-63. Available from: <http://www.jesnt.eg.net/text.asp?2017/17/2/58/215224>.
- [13]. Garofyllou G., Kelesi M., Georgia G., Konstantinos T., Georgia F., Kaba E., &Stavropoulou A., (2017) ; Quality of Life of Patients Undergoing Hemodialysis, *Health and Research Journal VL3 DO 10.5281/zenodo.227102*.

- [14]. Ghonemy TA., Farag SE., Soliman SA., El-okely A., & El-hendy Y., (2016) ; Epidemiology and risk factors of chronic kidney disease in the El-Sharkia Governorate, Egypt. *Saudi J Kidney Dis Transpl* 2016; 27:111–117.
- [15]. Goodwin NJ., Valenti C., Hall JE., & Friedman EA., (2011) ; Effects of uremia and chronic hemodialysis on the reproductive cycle. *Am J ObstetGynaecol* 2011;100:528-35.
- [16]. Holley JL., Schmidt RJ., Bender FH.,Dumler F.,& Schiff M., (2014) ; Gynecologic and reproductive issues in women on dialysis. *Am J Kidney Dis* 29(5):685–690
- [17]. Ibrahim S.,Darwish H., Abed El-Rahaman M.,&Belal D., (2016) ; Quality of care assessment and adherence to the international guidelines considering dialysis, water treatment and protection against transmission of infections in University Hospital Based Dialysis Unit in Cairo, Egypt, *Med. J. Cairo Univ.*; 77 (1): 155-160.*J Am SocNephrol*, 23 (2012), pp. 1631-1634.
- [18]. Joshi U.,Subedi R.,Poudel P.,Ghimire P. R.,Panta S.,&Sigdel, M. R., (2017) ; Assessment of quality of life in patients undergoing hemodialysis using WHOQOL-BREF questionnaire: a multicenter study. *International journal of nephrology and renovascular disease*, 10, 195–203. doi:10.2147/IJNRD.S136522.
- [19]. Kendrick J., Sharma S., Holmen J.,Palit S.,Nuccio E.,&Chonchol M., (2015) ;Kidney disease and maternal and fetal outcomes in pregnancy. *Am J Kidney Dis* ,Volume 66, Issue 1, Pages 55–59.
- [20]. Lin C. T., Liu X. N., Xu H. L.,& Sui H. Y., (2016) ; Menstrual Disturbances in Premenopausal Women with End-Stage Renal Disease: A Cross-Sectional Study. *Medical principles and practice: international journal of the Kuwait University, Health Science Centre*, 25(3), 260–265. doi:10.1159/000444879
- [21]. Mansour MA., Youssef HM.,Salameh TN.,&Yaseen RW., (2014) ; Impact of education program on protein balance among hemodialysis patient. *World Journal of Medical Sciences*; 11 (1): 69-77.
- [22]. Mantouvalos H.,Metallinos C.,Makrygiannakis A.,&Gouskos A., (2016) ; Sex hormones in women on hemodialysis. *Int J GynecolObstet* 2016; 22: 367–370.
- [23]. Mastrogiacomo I., DeBesi L., Serafini E., Zussa S., Zucchetta P., &Romagnoli GF., (2013) ; Hyperprolactinemia and sexual disturbances among uremic women on hemodialysis. *Nephron J vol: 37: P. 195- 196*
- [24]. Matuszkiewicz-Rowinska J.,Skorzewska K.,Radowski S.,Niemczyk S.,Sokalski A.,&Przedlacki J., (2014) ; Endometrial morphology and pituitary–gonadal axis dysfunction in women of reproductive age undergoing chronic haemodialysis—a multicenter study. *Nephrol Dial Transplant* 19:2074–2077.
- [25]. Mehrabadi A., Liu S., Bartholomew S., Hutcheon JA., Magee L A., Kramer M S., & Liston RM., (2014) ; Hypertensive disorders of pregnancy and the recent increase in obstetric acute renal failure in Canada: population based retrospective cohort study *BMJ* 2014; 349 :g4731
- [26]. Nadeau-Fredette AC., Hladunewich M., Hui D., Keunen J., Chan C.T., (2015) ; End-stage renal disease and pregnancy. *Adv Chronic Kidney Dis*. 2013 May; Volume 20, Issue 3, Pages 246–252. doi: 10.1053/j.ackd.2013.01.010.
- [27]. Nakayama M., Ishida M., Ogihara M., Hanaoka K., Tamura M., & Kanai H., (2015) ; Social functioning and socioeconomic changes after introduction of regular dialysis treatment and impact of dialysis modality: a multi-centre survey of Japanese patients. *Nephrology*. 2015;20:523–30.
- [28]. Rosen R.,Brown C.,Heiman J.,Leiblum S.,Meston C.,Shabsigh R.,Ferguson D.,&D'Agostino R Jr., (2000) ; The female sexual function index (FSFI): A multidimensional self-report Instrument for Assesment of Female Sexual Function. *Journal of Sex and Marital therapy*. 2000; 26:191-208.
- [29]. Schipper, K., Abma, T. A., Koops, C., Bakker, I., Sanderman, R., &Schroevvers, M. J., (2014) ; Sweet and sour after renal transplantation: A qualitative study about the positive and negative consequences of renal transplantation. *British Journal of Health Psychology*, 19, 580– 591. <https://doi.org/10.1111/bjhp.12057>
- [30]. Seethala S., Hess R.,Bossola M., Unruh M.,&Weisbord SD., (2013) ; Sexual dysfunction in women receiving maintenance dialysis. *Hemodial Int*. 2013;14(1):55-60. <https://doi.org/10.1111/j.1542-4758.2009.00404>.
- [31]. Stojceva-Taneva O.,&Selim G., (2014) ; Vascular access in hemodialysis patients - registry data. *Hippokratia*, 18(3), 209–211.
- [32]. Strippoli GF.,Vecchio M., Palmer S., De Berardis G., Craig J.,Lucisano G., Johnson D., Pellegrini F.,&Nicolucci A., (2012) ;Collaborative Depression and Sexual Dysfunction (CDS) in Hemodialysis Working Group, Sexual dysfunction in women with ESRD requiring hemodialysis. *Clinical journal of the American Society of Nephrology : CJASN*, 7(6), 974–981. doi:10.2215/CJN.12601211
- [33]. Swaroop, R., Zabaneh, R., &Parimoo, N., (2017) ; Pregnancy in end-stage renal disease patients on hemodialysis: two case reports. *Cases journal*, 2, 8139. doi:10.4076/1757-1626-2-8139.
- [34]. Tangren J.,Nadel M.,&Hladunewich M A., (2018); Pregnancy and End-Stage Renal Disease. *Blood Purif* 2018;45:194-200. Vol.45, No. 1-3doi: 10.1159/000485157
- [35]. Tel H.,& Tel H., (2011) ; Quality of life and social support in Hemodialysis patients. *Pak J Med Sci* January - March 2011 Vol. 27 No. 1 pp. 64-67
- [36]. Teuwafeu D, Ashuntantang G, Essi M.J, Kaze F, Maimouna M, Balepna J.Y, Gobina R, Kengne A.P &Ndjitoyap E.C (2016). Sexual Function and Correlates in Women Undergoing Maintenance Hemodialysis in Cameroon: A Multi-centric Study. *The Open Urology & Nephrology Journal*, Volume: 9, PP 51-59. DOI: 10.2174/1874303X01609010051.
- [37]. Thenmozhi, P. T., (2018) ; Quality of life of patients undergoing hemodialysis. *Asian Journal of Pharmaceutical and Clinical Research*, 11(4), 219-223. <https://doi.org/10.22159/ajpcr.2018.v11i4.24007>.
- [38]. Wohlfahrt-Veje C., Tinggaard J., Winther K., Mouritsen A., Hagen CP., Mieritz MG., de Renzy-Martin KT., Boas M., Petersen JH., &Main KM., (2014) ; Body fat throughout childhood in 2647 healthy Danish children: agreement of BMI, waist circumference, skinfolds with dual X-ray absorptiometry. *European Journal of Clinical Nutrition*. 2014 Jun;68(6):664-70. doi: 10.1038/ejcn.2013.282. Epub 2014 Jan 29.
- [39]. Yilmaz M., &Özaltın G., (2010) ; Sexual problems of individuals with peritoneal dialysis therapy. *Firat Health Services Journal*, 5(14), PP. 97–112.