

Demographic Factors Affecting Level of Adherence amongst Hemodialysis Patients in a Single Center of Taif, Saudi Arabia

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Abstract:

Background:

Chronic kidney disease (CKD) is a typical and developing issue around the world; in the United States, >10% of adults displaying proof of damaged in kidney and/or decreased kidney work. Distinguishing CKD requires knowledge of individual hazard and proper laboratory testing. Hemodialysis is an essential life-protection strategy in patients with acute kidney injury (AKI) and chronic kidney illness. Between 25% of patients making dialyses using catheters in the first to start with which are invariably removed in patients with AK. According to the National Kidney Foundation and Kidney Disease Outcomes Quality Initiative.

- No adherence among patients undergoing HD include: failure or shorten the session
- Excessive intake of fluids and foods containing potassium and phosphorus and
- Non-adherence to medication treatment. Non-adherence to attendance at HD session, pre-scribed medications, fluid restrictions, and dietary intake range from 0% to 32.3%, 1.2% to 81%, 3.4% to 74%, and 1.2% to 82.4%, respectively.

Aim of the study: Study the degree of Medication Adherence on patients undergoing hemodialysis in Taif, Saudi Arabia. Identify if there is a correlation between different demographics (gender, socioeconomic level, level of education, age groups) and medication adherence in patients undergoing chronic hemodialysis. **Method:** cross sectional study has been conducted to patients in Haemodialysis Center of King Abdul-Aziz Specialist in Taif our total participants were 178 out of 213. **Results:** the age of these Only(37.6%) of the participated were more than 50 years, while(20.2%) were (50-60) the data ranged from (18 to 90) by mean \pm SD (51.694 \pm 15.662). level of adhere to medication our study shows the data ranging were (0-8) and Mean \pm SD (3.624 \pm 1.593) and the most of participants (48.0%) have 'weak' adhere to medication. Marital status there is a significant relation between Adhere to medication and marital status were $f=2.606$ and $P\text{-value}=0.05$. **Conclusions:** Levels of altered

adherence to hemodialysis among patient must be improved to prevent CKD, its progression, Saudi Arabia. Altered adherence to hemodialysis is still a big concern in Saudi Arabia affecting negatively ESRD patients' treatment outcomes thus causing a huge burden on health care institutions. Demographic factors affecting adherence to hemodialysis. Further research is required to identify barriers and promoters of adherence to hemodialysis in Saudi Arabia.

Keywords: demographic; factors; affecting; level; adherence; hemodialysis; KSA.

1. INTRODUCTION

1.1 BACKGROUND

Chronic kidney disease (CKD) is a rising community health issue characterized as variations from the norm of kidney structure or capacity introduced for >3 months(1,2). In the Kingdom of Saudi Arabia (KSA), CKD is assessed to influence roughly 1.72 million Saudis (3). It is roughly comparing 6% of the populace. When CKD progress to end-stage renal illness it required need to dialysis treatment(1).

In addition there are five stages of chronic kidney disease in which Stage 5 means kidney failure, which is also called End Stage Renal Disease (ESRD)(4). ESRD is a worldwide public health problem(5). According to the dialysis statistics developed by the Saudi Center for Organ Transplantation (SCOT) at the end of 2017, the total number of dialysis patients was 19,659, of these 18,270 were treated with hemoedialysis (HD) and the remaining 1,389 with peritoneal dialysis (PD). The incidence of treated end-stage renal disease was estimated at 163 cases/ per million population, while the prevalence was estimated to be 604 cases/per million population (6).

End Stage Renal Disease (ESRD) undergoing hemodialysis (HD) is one of the chronic diseases with effects on patient's quality of life. Patients undergoing hemodialysis must adhere to a very restricted diet and fluid intake. These patients require four hours of dialysis sessions three times a week at dialysis unit. These results in a loss of time that affects employment, leisure and social relationships(7). Chronic kidney disease (CKD) is a condition in which the kidneys are damaged and become unable to filter blood (8). Patients undergoing HD experience multiple problems such as sodium and water retention(9), hyperphosphatemia, fatigue, heart disease or diabetes mellitus. The management of such health issues involves several variations in the patient's lifestyle.(10)

Patients with ESRD require renal substitution treatment, for example, dialysis (hemodialysis or peritoneal dialysis) or a kidney transplantation so as to make up for the loss

of kidney work which is an essential capacity so as to endure (11). Patients going through hemodialysis generally visit the clinic or dialysis unit three times each week with every meeting enduring four hours (12). ESRD perpetrate critical unfavorable consequences for the patient's personal satisfaction (QoL) including the social, financial related and psychological well-being aspects (13). Patients going through HD may experience the ill effects of adverse events, for example, fluid overload, hyperphosphatemia with abnormalities in calcium, hyperkalemia, hypotension or heart disease(14).

Adherence is characterized as "the range to which an individual's conduct coordinates the concurred suggestions of a medical services supplier regarding following a suggested diet, taking prescription and additionally actualize a way of life change "(15). The duty regarding acquiring a decent restorative outcome vigorously depends on the patient's degree of adherence to endorsed drugs, diet proposal, liquid limitation and complete adherence to HD meetings (16). Non-adherence to remedial suggestions can have a genuine effect in the result of HD treatment. These results incorporate; a low endurance rate in correlation with everyone in a similar age gathering, additionally non-adherence has been recommended as a danger factor for dreariness and mortality(17,18)

The literature review highlights that there are past research tend towards estimating the adherence about HD patients. A cross sectional Palestinian investigation directed utilizing an End stage renal disease Adherence Questionnaire ESRD-AQ demonstrated ageneral moderate or weak adherence (19). This research's uncovered that in contrast with woman's patients, male patients demonstrated more elevated levels of adherence(20). Another research led utilizing the 4-thing Morisky Medication Adherence Scale (MMAS-4) demonstrated a weak adherence(21). A Saudi based population research estimated the degree of prescription adherence on patients on hemodialysis and results indicated that 31.46% of the 89 patients had low adherence to drug, 40.45% demonstrated medium adherence and just 28.09% had high adherence to medicine. Results demonstrated that being older, married had positively affected the degree of drug adherence(22). There is additionally systematic review research which indicated a few potential patient-related variables that are connected to higher paces of non-adherence, these elements are: younger age, non-Caucasian, illness meddling family life, smoker, and living single and being separated or bereaved (23).

1.2 Rationale

There are very few studies have been performed to assess demographic factors affecting level of Adherence amongst Hemodialysis Patients this will help in screening haemodialysis patients for non-adherence to medication and thus early recognition and intervention can be

done. In addition, understanding which age group has higher rates of non-adherence to medication can add beneficial information in the future for nephrologists and nurses which age group should be highly targeted for screening of adherence to medication. This will also allow targeting susceptible age groups and emphasizing on medication instructions which consequently decreases the rate of medication non adherence. Focusing on level of education and its relation to medication adherence can also help identify if patients with specific level of education require more/less require more attention and follow up on their medication regime.

1.3 Aim of the study:

To determine the degree of Medication Adherence on patients undergoing haemodialysis in Taif, Saudi Arabia and

Identify if there is a correlation between different demographics(age groups, gender, marital status, number of children, level of education, occupation) and medication adherence in patients undergoing chronic haemodialysis .

1.4 Objectives :

- Determine the level of Medication Adherence on patients undergoing haemodialysis in Taif, Saudi Arabia
- Determine the correlation between different demographics factors to and medication adherence in patients undergoing chronic

2. Methodology:

2.1 Study design

This study is a cross sectional has been conducted to determine the degree of Medication Adherence on patients undergoing haemodialysis in Taif, Saudi Arabia and Identify if there is a correlation between different demographics and medication adherence in patients .

2.2 Study area :

This study has been conducted in Haemodialysis Center of King Abdul-Aziz Specialist of Taif Saudi Arabia .

2.3 Study population :

This study has towards determine the degree of Medication Adherence on patients undergoing haemodialysis in Taif, Saudi Arabia.

2.4Inclusion criteria:

Willing and able to participate in the study.

Over the age of 18

Diagnosed with End Stage Renal disease and undergoing Chronic Haemodialysis i.e., More than 6 months .

2.5 Exclusion Criteria:

A patient whose native language is not Arabic has been excluded from the study as this may influence the results of study given that the survey has been in Arabic language.

2.6 Sample size :

The sample size calculated using the Raosoft calculator has be sample size will be 178 out of 213 patients in Haemodialysis Center of King Abdul-Aziz Specialist of Taif. Which has been increased by 10% to overcome the non-respondents .

2.7 Sampling Technique:

The researcher has used simple randomization between patients in Haemodialysis Center of King Abdul-Aziz Specialist of Taif. Once the questionnaire is translated to Arabic it has be distributed to patients receiving haemodialysis in the haemodialysis centre along with the following information; age, gender, marital status and level education and how long they have been doing haemodialysis from each participant of the study.

2.8 Data collection tool .

The GR-Simplified Medication Adherence Questionnaire is a self-administered questionnaire that consists of 6 items of which four are dichotomous (Yes/No), one is Likert-type while one is open: (1) “Do you always take your medication at the appropriate time?” (2) “When you feel bad, have you ever discontinued taking your medication?” (3) “Have you ever forgotten to take your medication?” (4) “Have you ever forgotten to take your medications during the weekend?” (5) “In the last week, how many times did you fail to take your prescribed dose?” (6) “Since your last visit, how many whole days have gone by in that you did not take your medication?” (Theofilou, 2012).

In order to modify the GR-SMAQ for patients undergoing HD, a group of experts (5 patients undergoing HD, 3 hemodialysis nurses and 3 nephrologists) was asked about the degree of understanding, appropriateness and relevance of the scale. The following changes were made by the group: item 4 was amended as follows: “Have you ever forgotten to take your medications during the time interval between two dialysis sessions?” Also. Item 1 was removed as the right time of taking medication is likely to coincide with HD sessions. Finally, item 6 was, also, not included because patients undergoing HD visit dialysis clinics day by day. Four additional items were introduced to achieve the modification of the GR-SMAQ for patients undergoing HD.

2.9 Data Collection technique:

The GR-Simplified Medication Adherence Questionnaire HD (GR-SMAQ) has been translated to Arabic Language. Then the researcher has been distributed the questionnaire personally to all participant patients in Haemodialysis Center of King Abdul-Aziz Specialist of Taif. After approval from higher authorities acquired, during the working hours, specifically between the break time. Where a short introduction about the research and its importance were presented. Afterward, the researcher has handled the questionnaire. The GR-SMAQ is an 8 item tool that can be self-administrated by haemodialysis patients.

2.10 Study variables:

- Dependent variable: the level of Adherence amongst Hemodialysis Patients
- Independent variables: demographic Factors (specialty, age, gender, marital status, level of education, number of children and occupation) .

2.11 Data entry and analysis :

SPSS program has been used to analyze the data of this study. We have been measuring the Validity of the Arabic version of the Simplified Medication Adherence Questions using Cronbach alpha. ANOVA test and Independent T Test will be used to calculate the correlation between demographic groups and the level of medication adherence . p- value of less than 0.05 has been adopted for statistical significance.

2.12 Pilot study:

The questionnaire has been applied to 10% of the sample size of hemodialysis Patients in a single center of Taif in Saudi Arabia .

2.13 Ethical considerations

1. The study was approved from the Scientific Research Center Research Ethics Committee consultants for validation.
2. Patients, who met the criteria, after being informed about the aim of the study, gave their written consent and completed the above-mentioned questionnaires. Participants' anonymity was protected and safety of the material was maintained.
3. Acknowledgment for all the supervisors, advisors, helpers, facilitators, and participants for their contribution.

2.14 Relevance & expectations:

- Knowing the size of the problem about the level of Adherence amongst Hemodialysis Patients
- To develop increase awareness demographic factors affecting level of Adherence amongst Hemodialysis Patients

2.15 Budget : Self-funded study .

3. Result

Response rate:

A total sample size has be 173 out of 213 patients of Haemodialysis in a single center at Center of King Abdul-Aziz Specialist of Taif city.

Table 1: Description of socio-demographic data(Age, Gender, Marital status, No of children, Level of education, Occupation) for participants. (N = 173)

| | N | % |
|--------------------|---------------|------|
| Age | | |
| <30 | 17 | 9.8 |
| 30-40 | 26 | 15.0 |
| 40-50 | 30 | 17.3 |
| 50-60 | 35 | 20.2 |
| More than 50 | 65 | 37.6 |
| Range | 18-90 | |
| Mean±SD | 51.694±15.662 | |
| Gender | | |
| Male | 88 | 50.9 |
| Female | 85 | 49.1 |
| Marital status | | |
| Single | 41 | 23.7 |
| Married | 111 | 64.2 |
| Divorced | 6 | 3.5 |
| widow | 15 | 8.7 |
| No of children | | |
| Non | 48 | 27.7 |
| One | 10 | 5.8 |
| Two | 13 | 7.5 |
| Three or more | 102 | 59.0 |
| Level of education | | |
| Primary | 47 | 27.2 |
| Preparatory | 28 | 16.2 |
| High school | 26 | 15.0 |
| Bachelor's degree | 36 | 20.8 |
| Master | 30 | 17.3 |

| | | |
|-------------------|-----|------|
| Doctorate | 6 | 3.5 |
| Occupation | | |
| Employee | 28 | 16.2 |
| Unemployed | 102 | 59.0 |
| Retired | 43 | 24.9 |

Regarding age of these Only(37.6%)of the participated were more than 50 years, while(20.2%)were(50-60)the data ranged from(18 to 90)by mean \pm SD(51.694 \pm 15.662).

Regarding the Gender of the respondents were male (50.9%) while female were (49.1%). Approximately more than half of participant married(64.2%)and (23.7%)were single while the widow and divorced were respectively(8.7%, 3.5%) . The majority of the participated they have three or more children were(59.0%)followed by they have no children were(27.7%).

Regarding the level of education the majority of the participated had primary education were(27.2%), followed by Bachelor's degree were(20.8%) but the Master and Doctorate were respectively(17.3%, 3.5%), while Preparatory and high school were respectively(16.2%, 15.0%), (59.0%)were Unemployed, followed by(24.9%)Retired and(16.2%)were employed
Table 2:distribution of participants' responses to the(GR-SMAQ)HD items is presented in this table

| Adhere to medication | N | % |
|---|----------|----------|
| If you feel worse, do you stop taking your medicines? | | |
| No | 41 | 23.7 |
| Yes | 132 | 76.3 |
| Do you ever forget to take your medicines? | | |
| No | 102 | 59.0 |
| Yes | 71 | 41.0 |
| Have you ever forgotten to take your medications during the time interval between two dialysis sessions? | | |
| No | 68 | 39.3 |
| Yes | 105 | 60.7 |
| How often did you not take your medicine over the last week? | | |
| 6-10 times | 6 | 3.5 |
| 3-5 times | 29 | 16.8 |
| 1-2 times | 46 | 26.6 |
| Never | 92 | 53.2 |
| Last month, how often did you shorten the session on your own initiative? | | |
| 4-5 times | 16 | 9.2 |
| 3times | 19 | 11.0 |
| 2times | 20 | 11.6 |
| 1time | 16 | 9.2 |

| | | |
|--|-----|------|
| I did not shorten the session | 102 | 59.0 |
| Last month, on average how many minutes did you shorten the session with your own initiative? | | |
| >30mins | 34 | 19.7 |
| 21-30mins | 7 | 4.0 |
| 11-20 mins | 11 | 6.4 |
| <10 mins | 19 | 11.0 |
| I did not shorten the session | 102 | 59.0 |
| During the last week, how often did you follow the instructions on fluid restrictions? | | |
| Never | 23 | 13.3 |
| Rarely | 16 | 9.2 |
| Half of the time | 23 | 13.3 |
| Most of the time | 46 | 26.6 |
| Every time | 65 | 37.6 |
| During the last week, how often did you follow the instructions on diet? | | |
| Never | 36 | 20.8 |
| Rarely | 14 | 8.1 |
| Half of the time | 27 | 15.6 |
| Most of the time | 41 | 23.7 |
| Every time | 55 | 31.8 |

If you feel worse, do you stop taking your medicines most of participated answer Yes were(76.3%)while answer NO were (23.7%). While do you ever forget to take your medicines the majority of the participated answer Yes were(59.0%)while answer NO were (41.0%). have you ever forgotten to take your medications during the time interval between two dialysis sessions most of participated answer Yes were(60.7%)while answer No were (39.3%).

Regarding how often did you not take your medicine over the last week, the majority of the participated answer never were(53.2%). while follow by 1-2 times were (26.6%) but the 3-5 times were(16.8%) regarding the last month, how often did you shorten the session on your own initiative the majority of the participated answer I did not shorten the session were(59.0%) follow by 2 times and 3 times were respectively(11.6%, 11.0%) but the 4-5 times and 1 times were(9.2%), regarding the last month, on average how many minutes did you shorten the session with your own initiative the majority of the participated answer I did not shorten the session were(59.0%) follow by >30mins and <10mins were respectively(19.7%, 11.0%), regarding During the last week, how often did you follow the instructions on fluid restrictions the majority of the participated answer Every time and most of the time were respectively(37.6%, 26.6%)follow by never and half of the time were

(13.3%), regarding During the last week, how often did you follow the instructions on diet the majority of the participated answer Every time and most of the time were respectively(31.8%, 23.7%)follow by never and half of the time were respectively (20.8%, 15.6).

Table 3:Description the Level ofAdhere to medication

| Adhere to medication | | | Score | |
|----------------------|-----|-------|-------|-------------|
| | N | % | Range | Mean±SD |
| Weak | 83 | 48.0 | 0-8 | 3.624±1.593 |
| Average | 73 | 42.2 | | |
| High | 17 | 9.8 | | |
| Total | 173 | 100.0 | | |

Regarding the level of adhere to medication our study shows the data ranging were (0-8) and Mean± SD (3.624±1.593) and the most of participants (48.0%) have 'weak' adhere to medication. While 'average' the participants were (42.2%), followed by 'high' adhere to medication were (9.8%).

Figure 1:Description the Level ofAdhere to medication

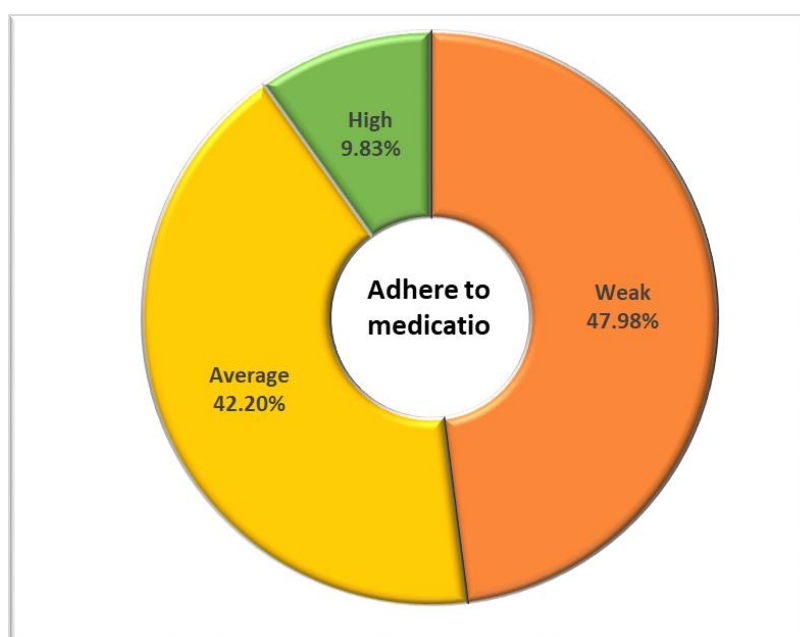


Figure 1 Description the Level of Adhere to medication

Figure 2 Histogram with normal curve description level of adhere to medication and frequency

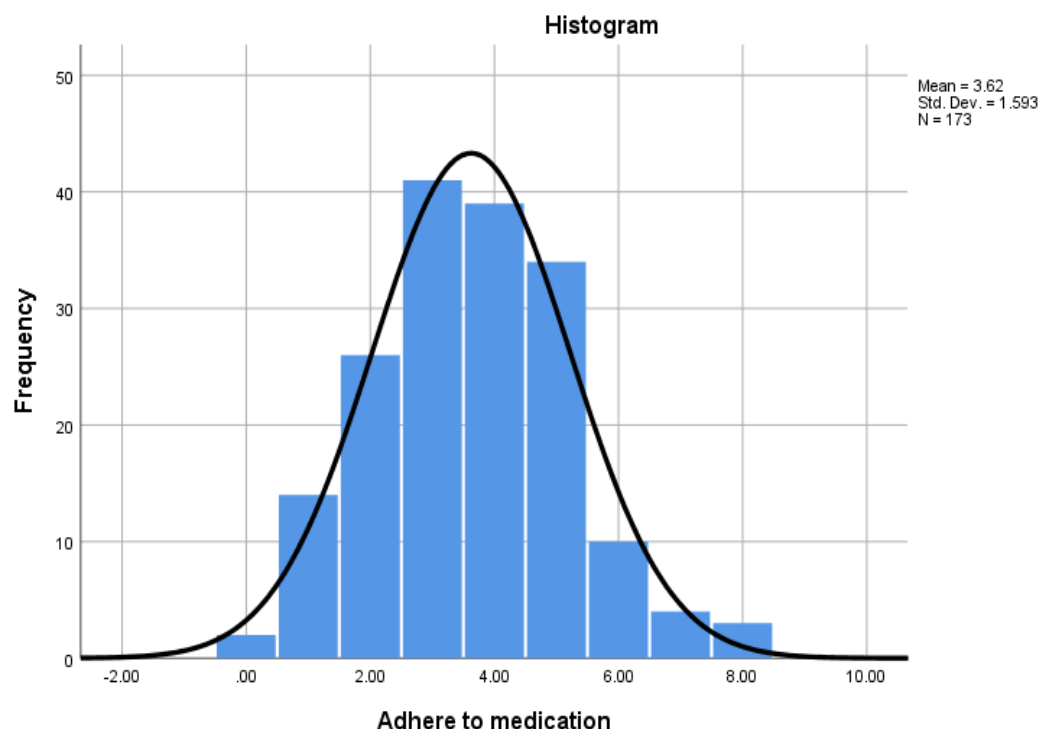


Fig (2): Histogram with normal curve description level of adhere to medication and frequency

Table 4: Describe the relation of the Demographic data (age, gender , marital status, No of children,level of education, Occupation) and adhere to medication

| Demographic data | | N | Adhere to medication | | F or T | ANOVA or T-test | |
|--------------------|---------------|-----|----------------------|---------|--------|-----------------|---------|
| | | | Mean | ± SD | | test value | P-value |
| Age | <30 | 17 | 3.294 | ± 1.160 | f | 2.100 | 0.083 |
| | 30-40 | 26 | 3.269 | ± 1.485 | | | |
| | 40-50 | 30 | 3.500 | ± 1.306 | | | |
| | 50-60 | 35 | 3.343 | ± 1.552 | | | |
| | More than 50 | 65 | 4.062 | ± 1.802 | | | |
| Gender | Male | 88 | 3.466 | ± 1.446 | t | -1.333 | 0.184 |
| | Female | 85 | 3.788 | ± 1.726 | | | |
| Marital status | Single | 41 | 3.293 | ± 1.230 | f | 2.606 | 0.05* |
| | Married | 111 | 3.631 | ± 1.629 | | | |
| | Divorced | 6 | 3.333 | ± 1.366 | | | |
| | widow | 15 | 4.600 | ± 1.993 | | | |
| No of children | Non | 48 | 3.333 | ± 1.191 | f | 1.210 | 0.308 |
| | One | 10 | 3.500 | ± 2.014 | | | |
| | Two | 13 | 3.308 | ± 1.653 | | | |
| | Three or more | 102 | 3.814 | ± 1.699 | | | |
| Level of education | Primary | 47 | 4.106 | ± 1.970 | f | 1.786 | 0.118 |
| | Preparatory | 28 | 3.536 | ± 1.527 | | | |
| | High school | 26 | 3.538 | ± 1.503 | | | |

| | | | | | | |
|-------------------|--------------------------|-----|---------------|---|-------|-------|
| | Bachelor's degree | 36 | 3.222 ± 1.290 | | | |
| | Master | 30 | 3.367 ± 1.159 | | | |
| | Doctorate | 6 | 4.333 ± 1.966 | | | |
| Occupation | Employee | 28 | 3.357 ± 1.420 | f | 0.472 | 0.624 |
| | Unemployed | 102 | 3.667 ± 1.679 | | | |
| | Retired | 43 | 3.698 ± 1.505 | | | |

Regarding age, results show no significant relation between Adhere to medication and age were $f=2.100$ and $P\text{-value}=0.083$, increase(in more than 50 years than 40-50 and 50 -60 years), the mean +SD respectively were $(4.062\pm1.802, 3.500\pm1.306$ than $3.343\pm1.552)$.

Regarding gender show no significant relation between Adhere to medication and gender were $t=-1.333$ and $P\text{-value}=0.0184$, increase in the female than male , the mean +SD respectively were $(3.788 \pm 1.726$ than $3.343 \pm 1.552)$)

Regarding marital status there is a significant relation between Adhere to medication and marital status were $f=2.606$ and $P\text{-value}=0.05$, increase(in widow than Married), the mean +SD respectively were $(4.600\pm1.993$ than $3.333 \pm 1.366)$

Regarding No of children, shows no significant relation between Adhere to medication and no of children were $f=1.210$. and $P\text{-value}=0.308$, increase(Three or more, than one and non-children), the mean +SD respectively were $(3.814\pm1.699$ than $3.500\pm2.014, 3.333\pm1.191)$. About level of education there is no significant relation between Adhere to medication and level of education were $f=1.786$ and $P\text{-value}=0.118$ increase(in doctorate, primary, master than high school), the mean +SD respectively were $(4.333\pm1.966, 4.106\pm1.970, 3.367\pm1.159$ than $3.538\pm1.503)$

Regarding the Occupation show no significant relation between Adhere to medication and occupation, were $f=0.472$ and $P\text{-value}=0.624$ increase(in retired, unemployed, than employee), the mean +SD respectively were $(3.698\pm1.505, 3.667\pm1.679, \text{ than } 3.357\pm1.420)$.

4 .Discussion

This study was carried out in Taif, Saudi Arabia for hemodialysis patients. A total sample size has been in current study, 173 patients of 213 patients undergoing hemodialysis in a single center at Center of King Abdul-Aziz Specialist of Taif city. Of these (50.9%) were males and(49.1%) females. the data ranged from age was (18 to 90)by mean +SD(51.694 ± 15.662)years, the Gender of the respondents were male (50.9%) while female were (49.1%). Approximately more than half of participant married(64.2%)and (23.7%)were single. The majority of the participated they have three or more children were(59.0%), the

level of education the majority of the participated had primary education were(27.2%), (59.0%)were Unemployed.(Table 1).

If you feel worse, do you stop taking your medicines most of participated answer Yes were(76.3%). While do you ever forget to take your medicines the majority of the participated answer Yes were(59.0%). have you ever forgotten to take your medications during the time interval between two dialysis sessions most of participated answer Yes were(60.7%). How often did you not take your medicine over the last week, the majority of the participated answer never were(53.2%). The last month, how often did you shorten the session on your own initiative the majority of the participated answer I did not shorten the session were(59.0%), the last month, on average how many minutes did you shorten the session with your own initiative the majority of the participated answer I did not shorten the session were(59.0%), regarding During the last week, how often did you follow the instructions on diet the majority of the participated answer Every time and most of the time were respectively(31.8%, 23.7%) , distribution of participants' responses to the(GR-SMAQ)HD items is presented in this (Table 2).

Several measures have been constructed for the evaluation of patient adherence. Most of them focus on measure of medication and behavioral barriers to adherence(24). The findings from this study revealed low adherence in(48.0%) of adhere to medication ESRD participants. The findings are consistent with findings from other studies that estimated 50% of patients on hemodialysis not adhering to at least part of their dialysis regimen(25).Similarly, thirty-nine percent of the study population missed their dialysis sessions at least once. This is also similar to the findings of Duong et al. and Al-Khattabi who revealed 42% and 44% of ESRD patients that missed their dialysis sessions, respectively(26, 27). Contrarily, a study done by Tamie Nakao et al(28). highlighted non adherence rate of only 15 % among ESRD patients. It cannot be overstated that non adherence has significant poor health outcomes and therefore patients with ESRD and undergoing hemodialysis should be encouraged to complete their dialysis sessions as prescribed. Findings of our study differ considerably from the findings of developed countries such as Japan and Sweden, where the missed dialysis sessions were nearly zero (29). It is also noted that the level of adhere to medication our study shows the data ranging were (0-8) and Mean \pm SD (3.624 \pm 1.593) and the most of participants (48.0%) have 'weak' adhere to medication. While 'average' the participants were (42.2%), followed by 'high' adhere to medication were (9.8%).(Table 3 and figure 1, 2)

Additionally, the findings of the our study showed that age was no statistically significantly relation between the Adhere to medication, and age were $f=2.100$ and $P\text{-value}=0.083$, increase(in more than 50 years), the mean $+SD$. This contrast with other study the findings of the study showed that age was statistically significantly associated with Adhere to medication. However, it is noted that the effect of age is clinically quite small despite a statistically significant association that exists. The only difference seems to be in the mean ages between the age groups under 60s and over 60s. Also the our results are contrasts with findings of Gerard et al. (30), who revealed the average age of their patients as 45 and 46 years, respectively. The results are not surprising as it is important to note that individuals at this stage of life are beginning to make a significant impact of their lives; some of them have families and adherence is paramount to be able to support their families. Also, in developing countries, ESRD affects the population of under 50 years who are economically productive. Contrary to other studies, the mean age of patients with ESRD was 53 , whereas in the USA ESRD is more frequent in adult above 70 years, mainly due to longer survival rates among ESRD patients(31)

Also gender show no significant relation between Adhere to medication and gender were $t=-1.333$ and $P\text{-value}=0.0184$, increase in the female than male , the mean $+SD(3.788 \pm 1.726$ than 3.343 ± 1.552)This is in contrary to study done by Chirona et al in which the majority of ESRD participants were males rather than females.(32). Who revealed that the males were representing 57% and 43% were females. Contrary to these findings are the findings of Vargas et al.(13) that showed the predominance of females (65%). Yet for Duong et al. (26), study the males represented 47%. Gender was not associated with adherence to hemodialysis. However, this is in contrary to study done by Naalweh et al.(19), where male patients had significantly higher overall adherence scores than females ($p = 0.034$). In our study the marital status had the is a significant relation between Adhere to medication and marital status were $f=2.606$ and $P\text{-value}=0.05$, increase(in widow than Married), the mean $+SD$ respectively were (4.600 ± 1.993 than 3.333 ± 1.366)

There is a significant relation between Adhere to medication and marital status were $f=2.606$ and $P\text{-value}=0.05$, increase(in widow than Married), the mean $+SD$ respectively were (4.600 ± 1.993 than 3.333 ± 1.366). No significant relation between Adhere to medication and number of children were $f=1.210$. and $P\text{-value}=0.308$, increase(Three or more), the mean $+SD$ respectively were (3.814 ± 1.699). Our results are consistent with other studies in which the rates of adherence to hemodialysis among(ESRD) events were higher in unmarried patients compare to married patients with (ESRD)and those with CKD (25).

In our study no significant relation between Adhere to medication and level of education were $f=1.786$ and $P\text{-value}=0.118$ increase(in doctorate, primary, master than high school), the mean \pm SD respectively were (4.333 ± 1.966 , 4.106 ± 1.970 , 3.367 ± 1.159 than 3.538 ± 1.503). Similar to the findings another studies Varying levels of education were not significantly associated with the level of adherence to hemodialysis among ESRD population. This shows that ESRD affects both educated and no educated people meaning that knowledge alone is not a predictor of adherence to hemodialysis(19). However, a decreased level of education can contribute to reduced levels of understanding leading to no adherence and poor level of following medical instructions in favor of ESRD treatment(24) . On the contrary, increased level of education facilitates capturing and conveyance of information regarding concerns of the disease ESRD as well as importance of hemodialysis treatment.

The Occupation show no significant relation between Adhere to medication and occupation, were $f=0.472$ and $P\text{-value}=0.624$ increase(in retired, unemployed, than employee), the mean \pm SD respectively were (3.698 ± 1.505 , 3.667 ± 1.679 , than 3.357 ± 1.420). This is also similar to the findings by Mushi et al. Three-quarters of the participants were unemployed meaning that they did not have any monthly income. Moreover, there was no significant association between occupation, income, and adherence to hemodialysis among ESRD patients. However, dialysis in low income countries is an expensive procedure (33), and it is more likely that patients from low and middle income countries who cannot afford the dialysis sessions will have to skip some sessions of dialysis due to low economic status, where only few in need can afford hemodialysis treatment. This is the likely cause of non-adherence of hemodialysis among ESRD patients in Rwanda for example. Because of the high cost for hemodialysis treatment the KSA cover the entire cost in a number of ways for example health insurance .Nevertheless, which fully caters for all costs for hemodialysis without shortfall? However, There is a small percentage were self-sponsored, private medical insurances were covering percentage of the participants were covered by the community based health insurance and these do not cater fully for hemodialysis treatment as patients are expected to pay the shortfall. Because of the high cost for hemodialysis treatment and lack of adequate health insurance, some patients ended up with missing or withdrawing from the treatment(30) .

This situation is different from that of Europe, where the majority of ESRD patients on renal replacement therapy were covered at 100% (31). In Georgia also RRT including hemodialysis therapy is covered by the state at 100% (27), as well as in US where ESRD patients are covered by Medicare without considering their age and in Libya and other

developed countries where the access to dialysis therapy is free for ESRD Libyan patients(28). The duration of ESRD was not associated with level of adherence to hemodialysis.(Table 4)

5. Conclusion

The major finding of this study was demographic factors that affect adherence to medication amongst hemodialysis patients. Health care providers and particularly nurses who care for patients and stay with them for longer hours need to advocate for patients with ESRD in view of completing their sessions for compliance and adherence to hemodialysis. Further research is required to identify barriers and promoters of adherence to HD among patients with ESRD. Thus, determining patient demographic factors can help to identify those who are at higher risk of worse medication adherence and poorer outcomes. It is important to design interventions to improve medication adherence and outcomes that take into account subgroups, such as unmarried patients, who are at higher risk for no adherence and poorer outcomes. Inclusion of other potential factors related to marital status and medication adherence in future studies will provide further insight into the relationships among demographic factors, medication adherence and outcomes.

6. References

1. Lewington, A. J., Cerdá, J., & Mehta, R. L. (2013). Raising awareness of acute kidney injury: a global perspective of a silent killer. *Kidney international*, 84(3), 457-467.
2. Hughes, K., Gardner, A., & McArdle, J. (2011). Audit of factors associated with the intactness of central venous catheter exit site dressings for northern Australian haemodialysis patients. *Renal Society of Australasia Journal*, 7(3).
3. Murtagh, F. E., Marsh, J. E., Donohoe, P., Ekbal, N. J., Sheerin, N. S., & Harris, F. E. (2007). Dialysis or not? A comparative survival study of patients over 75 years with chronic kidney disease stage 5. *Nephrology Dialysis Transplantation*, 22(7), 1955-1962.
4. Chávez-Becerril, G. B., Pérez-Jiménez, A. K., & Orozco-González, C. N. (2019). Relationship between the adherence to diet and nutritional education in patients with dialysis at the General Hospital of Atlacomulco and the General Hospital of San Felipe del Progreso, State of Mexico. *Población y Salud en Mesoamérica*, 17(1), 149-173.

5. Centers for Disease Control and Prevention. (2019). Chronic kidney disease in the United States, 2019. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention.
6. Al Amer, H. S., Dator, W. L., Abunab, H. Y., & Mari, M. (2017). Cryotherapy intervention in relieving arteriovenous fistula cannulation-related pain among hemodialysis patients at the King Khalid Hospital, Tabuk, Kingdom of Saudi Arabia. *Saudi Journal of Kidney Diseases and Transplantation*, 28(5), 1050.
7. Adam, S., Badawi, M., Zaher, G., Alshehri, B., Basaeed, A., Jelani, M., & Kashqari, A. (2018). The prevalence of APOL1 gene variants in a cohort of renal disease patients in Western Saudi Arabia. *Saudi Journal of Kidney Diseases and Transplantation*, 29(4), 793.
8. Polkinghorne, K. R., Seneviratne, M., & Kerr, P. G. (2009). Effect of a vascular access nurse coordinator to reduce central venous catheter use in incident hemodialysis patients: a quality improvement report. *American journal of kidney diseases*, 53(1), 99-106.
9. Al Wakeel, J., Al Harbi, A., Bayoumi, M., Al-Suwaida, K., Al Ghonaim, M., & Mishkiry, A. (2012). Quality of life in hemodialysis and peritoneal dialysis patients in Saudi Arabia. *Annals of Saudi medicine*, 32(6), 570-574.
10. Russo, G. E., Morgia, A., Cavallini, M., Centi, A., Broccoli, M. L., Cicchinelli, A., ... & Pugliese, F. (2010). Quality of life assessment in patients on hemodialysis and peritoneal dialysis. *Giornale italiano di nefrologia: organo ufficiale della Societa italiana di nefrologia*, 27(3), 290-295.
11. Qunibi, W. Y., Hootkins, R. E., McDowell, L. L., Meyer, M. S., Simon, M., Garza, R. O., ... & Nolan, C. R. (2004). Treatment of hyperphosphatemia in hemodialysis patients: the Calcium Acetate Renagel Evaluation (CARE Study). *Kidney international*, 65(5), 1914-1926.
12. Agarwal, R., Sinha, A. D., Pappas, M. K., Abraham, T. N., & Teegne, G. G. (2014). Hypertension in hemodialysis patients treated with atenolol or lisinopril: a randomized controlled trial. *Nephrology Dialysis Transplantation*, 29(3), 672-681.
13. Kehl-Pruett, W. (2006). Deep vein thrombosis in hospitalized patients: a review of evidence-based guidelines for prevention. *Dimensions of Critical Care Nursing*, 25(2), 53-59
14. , R. B., Jones, L., Terry, C., Nicholas, S. B., Kopple, J., Forge, N., ... & Norris, K. C. (2008). Community-partnered approaches to enhance chronic kidney disease

- awareness, prevention, and early intervention. *Advances in chronic kidney disease*, 15(2), 153-161.
15. Antlanger, M., Hecking, M., Haidinger, M., Werzowa, J., Kovarik, J. J., Paul, G., ... & Säemann, M. D. (2013). Fluid overload in hemodialysis patients: a cross-sectional study to determine its association with cardiac biomarkers and nutritional status. *BMC nephrology*, 14(1), 266.
 16. Dekker, M. J., Marcelli, D., Canaud, B. J., Carioni, P., Wang, Y., Grassmann, A., ... & van der Sande, F. M. (2017). Impact of fluid status and inflammation and their interaction on survival: a study in an international hemodialysis patient cohort. *Kidney international*, 91(5), 1214-1223.
 17. Kugler, C., Maeding, I., & Russell, C. L. (2011). Non-adherence in patients on chronic hemodialysis: an international comparison study. *Journal of nephrology*, 24(3), 366.
 18. Mumtaz, M., & Hussain, N. . (2020). Rheumatoid Arthritis and the Role of VEGF Gene: An Overview. *Journal of Scientific Research in Medical and Biological Sciences*, 1(2), 75-90. <https://doi.org/10.47631/jsrmb.v1i2.93>
 19. Leggat, J. E., Orzol, S. M., Hulbert-Shearon, T. E., Golper, T. A., Jones, C. A., Held, P. J., & Port, F. K. (1998). Noncompliance in hemodialysis: predictors and survival analysis. *American Journal of Kidney Diseases*, 32(1), 139-145.
 20. Wong, M. M., McCullough, K. P., Bieber, B. A., Bommer, J., Hecking, M., Levin, N. W., ... & Tomo, T. (2017). Interdialytic weight gain: trends, predictors, and associated outcomes in the International Dialysis Outcomes and Practice Patterns Study (DOPPS). *American Journal of Kidney Diseases*, 69(3), 367-379.
 21. Naalweh, K. S., Barakat, M. A., Sweileh, M. W., Al-Jabi, S. W., Sweileh, W. M., & Sa'ed, H. Z. (2017). Treatment adherence and perception in patients on maintenance hemodialysis: a cross-sectional study from Palestine. *BMC nephrology*, 18(1), 178.
 22. Geldine, C. G., Bhengu, B., & Manwere, A. (2017). Adherence of adult Chronic Kidney Disease patients with regard to their dialysis, medication, dietary and fluid restriction. *Research Journal of Health Sciences*, 5(1), 3-17.
 23. Neri, L., Martini, A., Andreucci, V. E., Gallieni, M., Rey, L. A. R., Brancaccio, D., & MigliorDialisi Study Group. (2011). Regimen complexity and prescription adherence in dialysis patients. *American journal of nephrology*, 34(1), 71-76.
 24. Alkatheri, A. M., Alyousif, S. M., Alshabanah, N., Albekairy, A. M., Alharbi, S., Alhejaili, F. F., ... & Qandil, A. M. (2014). Medication adherence among adult

- patients on hemodialysis. *Saudi Journal of Kidney Diseases and Transplantation*, 25(4), 762.
25. Ghimire, S., Castelino, R. L., Lioufas, N. M., Peterson, G. M., & Zaidi, S. T. R. (2015). Nonadherence to medication therapy in haemodialysis patients: a systematic review. *PloS one*, 10(12), e0144119.
 26. Lam, W. Y., & Fresco, P. (2015). Medication Adherence Measures: An Overview. BioMed Research International.
 27. Clark, S., Farrington, K., & Chilcot, J. (2014, January). Nonadherence in dialysis patients: prevalence, measurement, outcome, and psychological determinants. In *Seminars in dialysis* (Vol. 27, No. 1, pp. 42-49).
 28. Duong C. M., Olszyna D. P., Nguyen P. D., McLaws M.-L. Challenges of hemodialysis in Vietnam: Experience from the first standardized district dialysis unit in Ho Chi Minh City. *BMC Nephrology*. 2015;16(1, article no. 122) doi: 10.1186/s12882-015-0117-2.
 29. Al-Khattabi, G. (2014). Prevalence of treatment adherence among attendance at hemodialysis in Makah. *Int J Med Sci Public Health*, 3(5), 592-598.
 30. Ahmed, M. M. E., A., I. ., & M., A. E.-R. . (2020). Microbiological and Immunological Studies on Brucellosis in a Hospital in Al-Madinah Al-Munawarah. *Journal of Scientific Research in Medical and Biological Sciences*, 1(2), 24-44. <https://doi.org/10.47631/jsrmb.v1i2.103>
 31. Tamie Nakao, R., Gorayeb, R., & Cardeal da Costa, J. A. (2016). Factors associated with treatment adherence of Brazilian patients undergoing hemodialysis. *Actualidades en Psicología*, 30(121), 77-90.
 32. Geldine, C. G., Bhengu, B., & Manwere, A. (2017). Adherence of adult Chronic Kidney Disease patients with regard to their dialysis, medication, dietary and fluid restriction. *Research Journal of Health Sciences*, 5(1), 3-17.
 33. Gérard, C., Roger, K. A., Aïda, L. M., Gaoussou, S., Hien, K. M., & Adama, L. (2016). Epidemiological profile of chronic hemodialysis patients in Ouagadougou. *Open Journal of Nephrology*, 6(02), 29.
 34. Kramer, A., Pippias, M., Noordzij, M., Stel, V. S., Afentakis, N., Ambühl, P. M., ... & Barbullushi, M. (2018). The european renal association–european dialysis and transplant association (ERA-EDTA) registry annual report 2015: a summary. *Clinical kidney journal*, 11(1), 108-122.

35. Chironda¹, G., Manwere, A., Nyamakura, R., & Chipfuwa⁴, T. (2014). Perceived health status and adherence to haemodialysis by End Stage Renal Disease patients: A case of a Central hospital in Zimbabwe.
36. Mersal, F. A., El-Sedawy, D. S. E. D., & Mersal, N. A. (2016). Effect of nursing guideline on dietary and fluid compliance among patients undergoing hemodialysis. *Journal of Health, Medicine and Nursing ISSN 2422-8419 An International Peer-reviewed Journal*, 26.