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Research Article

Assessment of Knowledge and Practice Regarding Hemodialysis Procedure among Nurses at Benghazi Hospital: Cross-Sectional Study

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ABSTRACT

Kidney Services Center-Benghazi in Libya is facing a significant healthcare challenge due to the rising number of kidney failure cases. Nurses play a pivotal role in providing excellent care for these patients. The aim of the study is to evaluate nurses' knowledge and practice of patient management of chronic kidney disease (CKD) at the Kidney Services Center-Benghazi. A cross-sectional descriptive study was carried out among nurses at the Kidney Services Center in Benghazi. A purposive sampling method was employed, involving 85 nurses who worked specifically in the hemodialysis unit, and a response rate of 87.1%. The study was conducted between 5 January and 23 February 2025, utilizing questionnaires to gather data. The reliability analysis utilized Cronbach's $\alpha = 0.647$. Data analysis involved descriptive and inferential statistics. The majority of nurses were consistently assessed for fluid retention, blood pressure, lab values, and complications. 74% educated patients about CKD progression, 66% emphasized medication adherence, and 60% provided information on dietary restrictions and fluid balance. 51% of nurses collaborated with other professionals, and 64% regularly assessed psychological issues. Treatment coordination and psychosocial support were also high, with 75.7% documenting patient care correctly. Dialysis monitoring was also a priority. The study concluded that nurses have good knowledge and clinical practice in managing CKD, including patient education, medication administration, and clinical documentation. However, gaps in interdisciplinary collaboration and psychosocial assessment affect holistic care.

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1. Introduction

Chronic kidney disease (CKD) is a major health concern worldwide, affecting both developing and developed countries [1]. In 2017, CKD ranked as the 12th leading cause of mortality globally [2]. Patients with impaired kidney function require dialysis, and nurses play a crucial role in ensuring these patients receive proper treatment [3]. The Centers for Disease Control and Prevention (CDC) has developed training programs to promote safe dialysis practices, covering hygiene, access care, injection safety, personal protective equipment (PPE), and station disinfection [4][5].

Libya faces significant healthcare challenges due to a rising incidence of kidney failure, with an estimated 5,500 people affected and approximately 600 new cases annually [6]. Nurses are essential in the safe management of hemodialysis (HD) patients, particularly in infection prevention and control (IPC) procedures. However, non-compliance with these practices by some nurses highlights the need for ongoing training. Nurse practitioners also serve as the first line of defense in primary care, where their expertise in CKD can help slow or prevent disease progression to kidney failure [7][8].

Hemodialysis services in Libya encounter considerable systemic and clinical challenges that negatively impact patient outcomes and healthcare quality. A prospective multicenter study involving 38 dialysis centers in Libya reported a concerning one-year mortality rate of 21.2%, with cardiovascular disease and infections accounting for 31% and 16% of deaths, respectively, indicating issues with clinical monitoring and staffing levels [9]. National reviews also reveal a significant staffing deficit, with an average nurse-to-patient ratio of 1:3.7, alongside non-compliance with established dialysis adequacy standards [10]. Infection control remains a critical issue, as approximately 34.9% of dialysis patients test positive for hepatitis B or C, suggesting inadequate infection control measures and the occurrence of nosocomial transmission within dialysis units [11]. Furthermore, routine management of dialysis patients in Libya reveals major deficiencies such as anemia, electrolyte imbalances, and poor mineral control. Studies in Benghazi identified these challenges, while a five-year cohort study in Tripoli reported a high 51.4% mortality rate among chronic hemodialysis patients, with diabetes and hypertension as leading comorbidities. These findings underscore the urgent need for systemic reforms including enhanced nurse training, stricter infection control, and increased government investment in dialysis infrastructure [12].

This study aims to evaluate the knowledge and practices of nurses at Benghazi Hospital regarding hemodialysis patient management. The objective is to identify strengths, weaknesses, and influencing factors to recommend targeted training programs that will improve patient care quality. The problem statement highlights that insufficient knowledge among nurses about chronic kidney disease management is associated with poor practices, resulting in adverse health outcomes for patients.

2. Methodology

2.1 Study design, setting, population and period

This was a cross-sectional analytical study to evaluate the knowledge and practices of nurses concerning chronic kidney disease (CKD) patient management between 5 January and 23 February 2025. This design was chosen to facilitate an analysis of the associations among nurses' demographic characteristics, their comprehension of CKD management, and their application of these practices. The study focused on registered nurses working in the haemodialysis units at Benghazi Kidney Hospital, recognizing their direct role in the care of dialysis patients. A prerequisite for participation is a minimum of six months' experience within a dialysis unit, intended to ensure a foundational understanding of

established procedures. Exclusions newly employed or recently hired staff and administrative personnel who do not engage in direct patient care. The study encompasses both male and female nurses across various work shifts to achieve a representative cross-section of the nursing workforce. The research will be carried out in designated referral hospital within Benghazi, Libya, which serve as treatment centre for patients diagnosed with chronic kidney disease. This institution may encompass specialized renal dialysis units as well as general medical wards where the management of CKD is a standard component of care. The intended participants for this research are registered nurses currently providing care within rental units, dialysis centre, or relevant internal medicine departments situated in the selected hospital in Benghazi.

2.2 Study sample

The study utilized a purposive sampling method to select participants from the nursing staff at Benghazi Kidney Hospital, specifically targeting the 85 nurses working in the haemodialysis unit due to their direct involvement in the procedures. The final sample size was influenced by nurse availability and willingness to participate during the data collection period. A total of 74 questionnaires were collected, with 11 nurses being on leave this time. Response rate was 87.1% All participants provided informed consent after being informed of the study's objectives. The recruited nurses represented a variety of ages, educational backgrounds, and experience levels, allowing for a broad analysis of knowledge and practice differences and aiding in the identification of strengths and areas for improvement in haemodialysis care nursing practices.

2.3 Inclusion and exclusion criteria

The inclusion criteria for participants were registered nurses working in haemodialysis

units who had spent at least six months of experience working in the dialysis unit departments and were willing to provide informed consent. Conversely, exclusion criteria for the study include nurses who are on leave during the data collection period, interns or student nurses, and nurses employed in departments not associated with CKD management.

Eligible nurses assessed for eligibility
(n = 85)
↓
Nurses who completed the questionnaire
(n = 74)
↓
Non-respondents / excluded
(n = 11)

Figure 1: Flow diagram of nurse participation in the study

Of the 85 eligible nurses, 74 completed the questionnaire, yielding a response rate of 87.1%.

2.4 Data collection instrument

Data were collected by using a structured, self-administered questionnaire. This questionnaire is organized into three distinct sections: Section A will collect demographic data such as age, gender, education level, and years of experience; Section B will assess knowledge related to CKD management through multiple-choice or true/false questions; and Section C will evaluate practice using Likert scale items to gauge routine patient management activities. The questionnaire will be adapted from previously validated tools identified in the literature and will undergo expert review to confirm its face and content validity [13]14][15]. A reliability test for the questionnaire was made, and the reliability of the questionnaire was [0.647], indicating a moderate but acceptable level of internal consistency for exploratory research, the questionnaire questions were designed from previous studies [16] [17]. To suit the environment and place of study.

2.5 Data Analysis

The study data were analysed by statistical

program for the Social Sciences (SPSS) version 23. Descriptive statistics (means, standard deviations, frequencies) will be used to summarize data. Inferential statistics

3 Results and discussion

3.1 Demographic characteristics

Table 1 shows the demographic variables that the study participants had (59%) of the participants were female, and (45%) of the participants had a bachelor's degree. Such a high level of qualification is likely contributing to the overall strong practice scores observed, where 93.2% of nurses demonstrated good practice.

Table 1: Demographic Characteristics of the Study Participants (n = 74)

Variable	Category	Frequency (n)	Percentage (%)
Sex	Male	30	41
	Female	44	59
Age (years)	Less than 25	12	16
	25–35	33	45
	36–45	26	35
	More than 45	3	4
Educational qualification	Diploma	12	16
	Bachelor	33	45
	Graduate studies	3	4
	Other	26	35
Years of experience	Less than 1 year	4	5
	1–5 years	30	41
	6–10 years	23	31
	More than 10 years	17	23
Special training course about hemodialysis	Yes	59	80
	No	15	20

This supports the argument by Thomas & Aggarwal that advanced education and clinical training are critical predictors of quality care in nephrology settings [18]. Most of the subjects (45%) were between 25–35 years old; this younger workforce may correlate with higher adaptability and openness to continuous professional development, as supported by Iacono et al. [19], who found that younger nurses tend to engage more actively in ongoing training. (41%) of the participants had experience ranging from (1-5 years), and (87%) of the participants had attended a special training course about hemodialysis procedure.

3.2 Knowledge regarding haemodialysis among study participants

Most participants adhered to essential dialysis monitoring protocols, with over 60% regularly evaluating laboratory results and monitoring blood pressure and fluid retention. These findings align with international studies, such as Alashek et al. (2019), which highlighted nurses in Libya effectively following standard procedures. Berenguer et al. (2019) found that healthcare professionals with specialized training in chronic kidney disease demonstrated better monitoring practices, emphasizing the importance of continuous training for improved dialysis care quality [20] [21] [22]. Most nurses regularly educated patients about CKD progression (74.3%) and medication adherence (66.2%). This emphasis reflects global standards for CKD management, which prioritize patient empowerment and knowledge as part of self-management strategies [23][24]. However, the variability seen in some practices, such as interdisciplinary collaboration (only 51.4% always), reveals gaps that could impact holistic patient care. while a small minority never or seldom perform these duties. With high "always" replies for guaranteeing appropriate medication usage (76.7%) and accurate recording (75.7%), the somewhat lower rates for nutritional and fluid education, however, point to the need for more regular practice in these areas as well as strong participant expertise in treatment coordination.

While the study shows a commendable level of clinical engagement, the presence of moderate scores (6.8%) and "sometimes" responses across multiple domains suggests the need for more standardized protocols and reinforced training in areas such as collaboration and psychosocial care. Investing in continuous professional education and team-

based care approaches could address these discrepancies and enhance consistency [25]. These findings underscore the multifaceted role of nurses in CKD care, beyond physical management, aligning with findings from Berenguer et al. [20], who advocate for integrated psychosocial support in chronic illness care.

Female nurses (n = 44) demonstrated a higher mean total score (M = 66.52, SD = 5.55) compared with male nurses (n = 30; M = 64.00, SD = 6.68). The standard error of the mean was lower among female nurses, indicating less variability in their scores. Table 2 presents descriptive statistics only.

An independent samples t-test was conducted to examine differences in mean total scores between female and male nurses. The mean difference was 2.52 points (95% CI: −0.40 to 5.44). This difference was **not statistically significant**, t (72) = 1.77, p = 0.081. The effect size indicated a moderate effect (Cohen's d = 0.42). however, the current study identified no statistically significant difference in total scores between female and male nurses, despite a moderate effect size. This finding aligns with the research conducted by Elhaddad et al., which indicated no notable gender differences in nurses' knowledge and practices concerning CKD management within a Libyan healthcare context [16]. A cross-sectional study in Saudi Arabia by Alshahrani et al. indicated that nurses' clinical performance was not significantly affected by gender, implying that professional training and experience may be more critical than gender in influencing performance outcomes [26]

Table 4 summarizes the continuous variables, where age was coded into four categories with a mean of 2.28 (SD = 0.79), suggesting that participants were mainly in the mid-age groups. The mean total score was 65.5 (SD = 6.12), with scores ranging from 46 to 75, reflecting generally high knowledge levels among participants.

A one-way analysis of variance (ANOVA) was conducted to examine differences in total scores across educational levels. The results indicated no statistically significant difference between the groups, F (3, 70) = 0.197, p = 0.898. This suggests that educational level did not have a significant effect on total score among the study participants.
Figure 2 indicates that 95% of participants have good knowledge and practice, while 5% have a medium level. This indicates a high overall level of knowledge among the participants.

The study's findings in Benghazi contrast substantially with previous reports regarding Libya's overall healthcare system, which frequently highlighted higher infection rates and inadequate staffing [17]. The high performance of nurses in this study may suggest current improvements or targeted efforts in nurse education and practice; however, a national assessment is necessary. Unlike some global studies, this research found no instances of "poor practice," which could be due to strong institutional support, ongoing training, or potential self-assessment biases.

Table 2: Comparison of Mean Total Scores by Sex (n = 74)

Sex	N	Mean	Std. Deviation	Std. Error Mean
Male	30	64.0	6.68	1.22
Female	44	66.52	5.55	0.84

Table 3. Independent Samples Test

t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Cohen's d
-1.77	72	0.081	-2.52	1.43	-0.42

Table 4: Summary of Continuous Variables (n = 74)

Variable	N	Minimum	Maximum	Mean ± SD
Age (coded categories)	74	1	4	2.28 ± 0.79
Total Score	74	46	75	65.50 ± 6.12

Table 5: One-Way ANOVA Results for Total Score by Educational Level

Source	Sum of Squares	df	Mean Square	F (p-value)
Between Groups	22.819	3	7.606	0.197 (p = 0.898)
Within Groups	2707.681	70	38.681	
Total	2730.500	73		

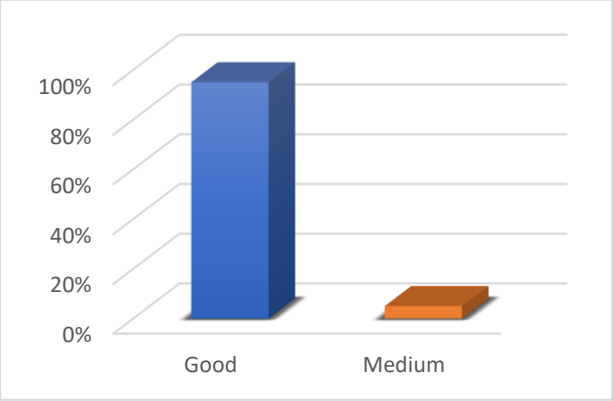


Figure 2: The percentage of knowledge and practice among the study participants (n = 74).

Table 6. Multiple Linear Regression Analysis of Factors Affecting Nursing Practice

Variable	B	SE	t	p-value
Constant	69.32	3.40	20.41	<0.001
Age (years)	3.52	1.54	2.29	0.025
Female (ref = Male)	-0.89	1.56	-0.57	0.570
Years of experience	-1.97	1.36	-1.45	0.151
Training (Yes)	-0.01	3.42	-0.00	0.997

Model statistics: $R^2 = 0.109$, Adjusted $R^2 = 0.057$, $F = 2.11$, $p = 0.089$, $n = 74$.

Multiple linear regression analysis showed that age was a statistically significant predictor of nursing practice scores ($p = 0.025$). Gender, years of haemodialysis experience, and prior haemodialysis training were not significantly associated with practice scores.

4. Conclusions

This study assessed the knowledge and practice of nurses in haemodialysis care in Benghazi, revealing that over 95% of participants demonstrated good adherence to monitoring procedures, patient education, and medication management. No nurses were found to have poor practice, indicating a strong commitment to care standards. While female nurses scored slightly higher than males, this difference was not statistically significant, nor was educational level linked to practice scores. Age emerged as the only significant predictor of nursing performance, suggesting that experience enhances skills in dialysis care. However, areas such as interdisciplinary collaboration and psychosocial support presented gaps which could negatively affect the delivery of holistic patient care, highlighting the need for ongoing standardization and improvement in non-technical aspects of practice.

While these findings are encouraging, especially when compared to previous studies in other countries like Iraq, Saudi Arabia, Nepal, and Egypt, there's still room for improvement. Specifically, collaboration among healthcare teams and providing psychological support to patients needs more focus. Building on these positive results, the aim should be to further enhance performance and spread these good practices throughout the system.

Recommendation

Based on the study findings, several recommendations are made:

Eenhance interdisciplinary collaboration among healthcare professionals to improve patient care.

Prioritize ongoing professional development that includes nutritional counselling and psychosocial support; standardize clinical and educational protocols to ensure consistent care.

Emphasize comprehensive management of chronic kidney disease (CKD) through patient-centred education and self-management; and conduct larger, multi-centre studies for validation and to reduce self-reporting bias.

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Conflicts of Interest

No conflicts of interest.

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