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KAP STUDY ON NURSES' MANAGEMENT OF CHRONIC KIDNEY DISEASE PATIENTS WITH HEARING IMPAIRMENT IN THE HEMODIALYSIS UNIT OF BUEA REGIONAL HOSPITAL

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Abstract

Effective patient management in hemodialysis settings depends largely on clear communication, continuous monitoring, patient education, and psychosocial support provided by nurses. However, several factors can significantly hinder care delivery, compromise patient understanding, and negatively affect treatment adherence and safety. Guided by Peplau's Interpersonal Relations Theory which emphasizes therapeutic communication and Orem's Self-Care Deficit Theory which highlights patient participation in care, this study addresses the challenges posed by hearing impairment in achieving effective patient-centered management. This study employs a cross-sectional descriptive survey design to evaluate the management of hearing-impaired CKD patients in the hemodialysis unit of Buea Regional Hospital, specifically to assess nurses' knowledge regarding hearing impairment in CKD patients, examine their attitudes toward managing such patients and evaluate practical patient management strategies used in care delivery. The study population includes all 30 nurses working in the unit, purposively selected based on their direct involvement in patient care. Data are collected using a semi-structured questionnaire to assess knowledge, attitude, and practice, alongside an observational checklist evaluating key patient management practices, including communication adaptation, patient education, monitoring, medication administration, safety, emotional support, interdisciplinary collaboration, and documentation. Methodological technical requirements for the instruments and data validation were abided to. Quantitative analysis was performed with the support of SPSS using frequency, proportions and multiple-response sets, effectiveness tested against a cutpoint of 80% with the Chi-Square Goodness -Of-Fit test, and the influence of knowledge and attitude on practice appraised using Spearman's Rho correlation test. Findings unfold that in aggregate, nurses had positive or good attitude toward the management of CKD patients with hearing impairment in the hemodialysis unit with a very strong majority proportion weight of 91.4%, and at the same time, attitude significantly predicted the outcome of care. On the other hand, nurses' knowledge on the the management of CKD patients with hearing impairment in the hemodialysis unit was moderate (42.3%), thus the need for more in-service training to palliate to this lack, and also having this included in their training programme. This will go a long way to palliate to the difficulties they faced in managing or carrying out procedure with CKD patients with hearing impairment.

Keywords:

Chronic Kidney Disease, Hearing Impairment, Hemodialysis, Nursing Management, Knowledge, Attitude, Practice.

Introduction

Chronic Kidney Disease (CKD) is a progressive and irreversible condition characterized by reduced kidney function or damage lasting at least three months, affecting about 10 percent of adults globally and contributing to significant morbidity and mortality (Kitamura et al., 2019; Lee et al., 2018). CKD often leads to systemic complications, including cardiovascular, metabolic, and neurological disorders, which increase healthcare burden and reduce quality of life. Nurses are central in hemodialysis units, providing patient monitoring, treatment administration, education, and adherence support. Their knowledge, skills, communication abilities, and attitudes significantly influence patient outcomes. Hearing impairment is a common but often overlooked comorbidity, affecting up to 41.7 percent of CKD patients, usually sensorineural and high frequency, and linked to factors such as electrolyte imbalance, hypertension, ototoxic medications, and metabolic changes (Alawiya et al., 2020; Jain et al., 2019). Hearing loss poses challenges in hemodialysis care, limiting patients' understanding, engagement, and adherence, which can compromise safety and treatment effectiveness (Jain et al., 2019; Wang et al., 2024), thus the need to pay sufficient attention to this vulnerable group.

Understanding the Background

From the emergence of dialysis in the 1940s and kidney transplantation in the 1950s to the establishment of comprehensive, evidence-based guidelines, CKD management has profoundly evolved worldwide. Hemodialysis and peritoneal dialysis became established life-saving treatments for end stage kidney disease (ESKD) in high-income countries beginning in the mid-20th century (Tenckhoff et al., 1968). In 1972 the US introduced the Medicare End Stage Renal Disease Program, dramatically expanding access to dialysis via broad public funding (U.S. Congress, 1972). Since then, the development of kidney Disease Improving Global Outcomes (KDIGO) and other professional guideline bodies have standardized CKD staging, prevention and early intervention strategies including risk stratification, blood pressure control, renin angiotensin blockade, Sodium-Glucose Cotransporter 2 inhibitors such as dapagliflozin, and diet and lifestyle modification (KDIGO, 2012; Heerspink et al., 2020). Nurses have played a pivotal historical role in managing chronic kidney disease (CKD), particularly during the early development of renal replacement therapies. In the 1950s, nurses were responsible for technical aspects of hemodialysis including equipment setup, infection prevention, patient assessment, fluid management, documentation, and basic patient education as well as offering comfort and reassurance to patients (Coleman & Merrill, 1952; Hoffart, 1986).

Globally, CKD affects more than 10 percent of the population, representing over 800 million people and contributing significantly to mortality (Bikbov et al., 2020). In Africa, prevalence ranges between 13 and 15 percent, with both traditional and region-specific risk factors contributing to disease burden (Stanifer et al., 2014; Bikbov et al., 2020).

Across sub–Saharan Africa, CKD management lagged behind due to limited infrastructure, poor access to renal replacement therapy, and late presentation (Stanifer et al., 2014; Bikbov et al., 2020).

In Cameroon, CKD prevalence ranges between 10 and 14 percent, with higher rates among high-risk populations such as hypertensive patients (Kaze et al., 2016; Kaze et al., 2018). The disease is associated with high morbidity, mortality, and financial burden due to limited healthcare coverage (George et al., 2017). CKD management began with the introduction of dialysis during the early 1980s, initially including both peritoneal and hemodialysis, though hemodialysis eventually became the sole modality over the following decades (Kaze et al., 2018). Despite this, patients typically present late with over 70 percent referred at stage G4 to G5 CKD, and more than half of cases involving delayed referrals, resulting in high rates of unplanned emergency dialysis (Halle et al., 2019). Dialysis costs remain largely borne by patients, with significant financial burden and minimal insurance coverage (Ashuntantang et al., 2017). Newer developments include pilot kidney transplantation introduced in 2021 and 2022 (Halle et al., 2022).

Empirical studies have shown that hearing loss is very common among CKD patients who are under hemodialysis and that audible impairments have been quantified across auditory frequency bands among various sub-populations (Adejumo et al., 2018; Dhote, 2025). The deficits are mostly sensorineural and increase as the disease progresses and the length of time it has been on CKD (Adejumo et al., 2018; Terry et al., 2025). As a result, the identification and treatment of hearing impairment have important clinical implications in the nursing practice in hemodialysis departments. If knowledge of CKD is strong among nurses in some settings, in many instances, it still fair to poor about the basics of disease etiology, staging, and management (Adejumo et al., 2018; Liu et al., 2025). Such findings suggest that the baseline CKD knowledge among nurses can be narrow and, by extension, more subtle aspects of hearing impairment, which is an atypical yet, in clinical terms, clinically interesting comorbidity, are probably under-acknowledged. In this regard, the amount of knowledge related to hearing loss in CKD could be even less in the situation of the lack of definite training. The competence to work with hearing-impaired patients requires specialized communication skills and increased sensory awareness usually not highlighted in the standard nephrology training (Qadhi, 2025; Tannenbaum-Baruchi, 2024a). In practice, the lack of routine hearing screening procedures in hemodialysis units is a likely contributor to the lack of knowledge.

Against the background of chronic kidney disease (CKD) patients under hemodialysis that are additionally affected by hearing impairment, the attitudes of nurses assume a special meaning, as it is important to communicate with patients to ensure that they adhere to treatment, provide education, and psychological support. The management of CKD patients on hemodialysis requires a close contact between the nurses and the patients due to the intricacy of the dialysis schedules, patient monitoring, and sustained health education. In case of hearing impairment, there is a possibility of communication barriers affecting the attitude senses of the nurses to patient care. The experience of healthcare professionals in literature suggests that to communicate with hearing-impaired patients, many nurses feel frustrated or uncertain because of the lack of training in sign language or other communication methods (Qadhi, 2025).

As an example, stress can be caused both to the nurse and the patient due to the inability to understand the needs of the patients, explain the treatment processes, or receive the proper feedback (Alanazi *et al*., 2023). Trained nurses, who are aware of communication strategies with hearing-impaired people, or have prior experience working with such patients, will show more positive attitudes and be more confident in the ability to provide care (Elsayed Shrief *et al*., 2024). Research shows that institutional resource inadequacy can be one of the causes of negative attitudes or feelings of helplessness in healthcare professionals, who want to address the needs of patients with hearing loss (Alanazi *et al*., 2023; Qadhi, 2025). These obstacles could also complicate patient-nurse relationships in hemodialysis units where nurses have to pay close attention to their patients because of long periods of dialysis. Nevertheless, in spite of these difficulties, a number of nurses have expressed caring and professional behaviour towards hearing impaired patients (Yue *et al*., 2025).

The management of chronic kidney disease (CKD) patients undergoing hemodialysis requires a wide range of nursing skills, particularly when patients have additional conditions such as hearing impairment. Nursing skills in this context refer to the practical abilities and competencies that enable nurses to communicate effectively, assess patient needs, deliver safe dialysis care, and provide patient education despite communication barriers. Because hemodialysis patients require frequent monitoring, counseling and collaboration with healthcare providers, nurses must possess specialized communication and clinical skills to ensure effective care for patients with hearing impairment (Almarwani et al., 2023; Adejumo et al., 2018). Studies have shown that participation in structured training programs significantly improves nurses' competence in CKD-related care and patient education (Congying *et al*., 2024). Nurses who receive regular clinical training demonstrate higher levels of confidence and performance compared with those who lack such opportunities, thus the paramount importance of knowledge in care and outcome of care. Studies indicate that effective communication skills improve nurses' clinical decision-making, reduce treatment errors, and enhance the overall quality of healthcare delivery (Camedda *et al*., 2023). Formal education and continuing professional development programs play a significant role in improving nurses' knowledge and clinical abilities in managing complex patient conditions. Studies have shown that participation in structured training programs significantly improves nurses' competence in CKD-related care and patient education (Congying *et al*., 2024).

Problem statement

Nursing care is expected to be holistic and patient centered, providing timely assessment, monitoring, therapeutic intervention, education, and emotional support tailored to individual patient needs (Hermalia *et al*., 2021; Kanwal *et al*., 2023). Beyond clinical duties, nurses play a critical role in communication, coordination, and collaboration within multidisciplinary teams to optimize health outcomes (Lamb & Norton, 2018; Santos *et al*., 2020). In chronic kidney disease management, particularly in hemodialysis units, nurses are central to patient care, performing complex tasks such as monitoring kidney function, managing fluid and electrolytes, instructing on strict diets and medication, and ensuring adherence to dialysis schedules (Hermalia *et al*., 2021; Kanwal *et al*., 2023).

Competent nursing care requires comprehensive knowledge, clinical and communication skills, and positive professional attitudes. However, gaps in training, inadequate resources, and unstructured protocols often undermine nurses' ability to deliver consistent and effective care, especially in specialized settings like hemodialysis units (Hermalia *et al*., 2021; Lamb &

Norton, 2018). These challenges are compounded when patients have comorbidities such as hearing impairment, which can significantly hinder nurse patient communication. Observations at the Buea Regional Hospital hemodialysis unit indicate that nurses face difficulties explaining treatment procedures, medication instructions, and dietary requirements to hearing impaired patients, resulting in reduced treatment comprehension, non-adherence to dialysis regimens, and higher risk of complications (Agrawal & Singh, 2023; Santos *et al*., 2020; Hermalia et al., 2021; Kanwal et al., 2023)). Therefore, evaluating nurses' competency including knowledge, skills, and attitudes in managing hearing impaired chronic kidney disease patients and addressing gaps in nursing practices is crucial.

Objectives of the Study

To study aims at examining nurses' knowledge and attitude in the effective management of chronic kidney disease patients with hearing impairment in the hemodialysis unit of Buea Regional Hospital.

Specific research objectives

1. To examine the level of nurses' knowledge on the management of CKD patients with hearing impairment in the hemodialysis unit.
2. To explore the attitude of nurses toward caring for CKD patients with hearing impairment in the hemodialysis unit.
3. To appraise nurses' management of CKD patients with hearing impairment in the hemodialysis unit.

Methods

Research Design

This study was a case study employing a cross-sectional descriptive survey design and notably a quantitaive appraoch to assess nurses' competency in the effective management of chronic kidney disease (CKD) patients with hearing impairment in the hemodialysis unit of Buea Regional Hospital.

Population of the Study

The target population focuses on nurses in the hemodialysis unit of Buea Regional Hospital, whose direct patient care and specialized renal training make them well-suited to provide insights on managing hearing-impaired CKD patients.

Inclusion Criteria

The study included nurses who are currently employed and actively working in the hemodialysis unit of Buea Regional Hospital. To ensure that participants have sufficient exposure to managing chronic kidney disease (CKD) patients. Eligible nurses must also be directly involved in patient care and possess experience interacting with hearing-impaired patients, as this is essential for obtaining relevant insights for the study. By focusing on nurses actively engaged in providing care within this specialized unit, the study ensures that participants possess the insights necessary to explore the communication challenges and care strategies related to hearing-impaired patients undergoing hemodialysis.

Exclusion Criteria

Nurses working in hospital units or departments outside the hemodialysis unit were excluded from the study, as their roles do not involve direct management of chronic kidney disease (CKD) patients. Those with less than six months of experience in the hemodialysis unit were also excluded, as they may not have acquired sufficient experience in CKD patient care. Finally, any nurse who declined or withdrew consent to participate in the study were excluded.

Sampling Technique

This study employed purposive sampling targeting the entire cohort but focusing on nurses that meet the inclusive criteria of the study.

Sample Size

Thirty nurses currently employed in the hemodialysis unit of Buea Regional Hospital were sampled and served as the primary participants for data collection (table 1). This was supported by 15 observations.

Table 1: Participant Demographic Characteristics

Characteristic	Category	Frequency (n)	Percentage (%)
Qualification	Nursing Assistant	3	10.0
	HND	8	26.7
	BSc	14	46.7
	Masters	3	10.0
	SRN	2	6.7

Data collection Tools and Procedure

Data was collected using two main tools: A semi-structured questionnaire and an observational checklist. The semi-structured questionnaire measured nurses' knowledge, attitudes, and practices. The knowledge section included multiple-choice and true/false questions to evaluate understanding of CKD management, hearing impairment considerations, and nursing interventions. The attitude section consisted of Likert-scale items to assess perceptions, willingness, and readiness to provide inclusive care for hearing-impaired patients. The practice section included communication adaptation, patient education, monitoring, medication administration, safety, emotional support, interdisciplinary collaboration, and documentation. The last section took care of challenges faced in managing those patients.

Nurses' practical skills were equally assessed using a structured observational checklist, whichwas document demonstration of essential competencies, such as communication techniques, patient assessment, and implementation of nursing interventions. Observations were conducted during routine patient care to minimize disruption and capture authentic nursing practices.

Validity of the Instrument

A major concern in research is the validity of the procedures and conclusions. Validity is the quality of a data gathering instrument or procedure that enables it to measure what it is supposed

to measure. A valid research finding is one in which there is similarity between the reality that exists in the world and the research results (Mugenda and Mugenda, 2003). Content validity, construct validity, face validity, internal validity and external validity were given prime attention. The questionnaire and the observational checklist were developed based on a review of relevant literature and pretested with a small sample of nurses outside the study population to ensure clarity, reliability, and validity.

Reliability of data collection instruments

Cronbach Alpha Reliability coefficient enabled the researcher to ascertain whether the internal consistency of the responses was satisfactory to an acceptable level (Cronbach, 1951; Nana, 2018).

Table 2: Reliability of observations

Cronbach's Alpha	N	N of Items	Variance
0.718	15	10	0.045

The internal consistency assumption was not violated with a very high Cronbach's Alpha reliability coefficient (0.718), thus indicating a strong consistency in the observations. The variance was very closed to zero, thus implying that we are more likely to be faced with a skewed observation tilting more toward positive or negative perception (Table 2).

Table 3: Reliability of the questionnaire

Conceptual components	Cronbach's Alpha	N of cases	N of Items	Variance
Knowledge	0.643	30	7	0.121
Attitude	0.583	30	10	0.047
Practice	0.657	30	24	0.017
IVM	0.574	30	41	0.074

The internal consistency assumption was generally not violated with high Cronbach's Alpha reliability coefficients ranging from 0.583 for attitude to 0.657 for practice with the value for the integrated value mapping (IVM) of 0.574, all above the acceptable threshold of 0.5. This therefore indicates a strong consistency and objectivity in the responses. The variance was closed to zero for attitude and practice, thus implying that we are more likely to be faced with a skewed observation tilting more toward positive or negative perception. As for knowledge, the distribution might be slightly skewed (Table 3).

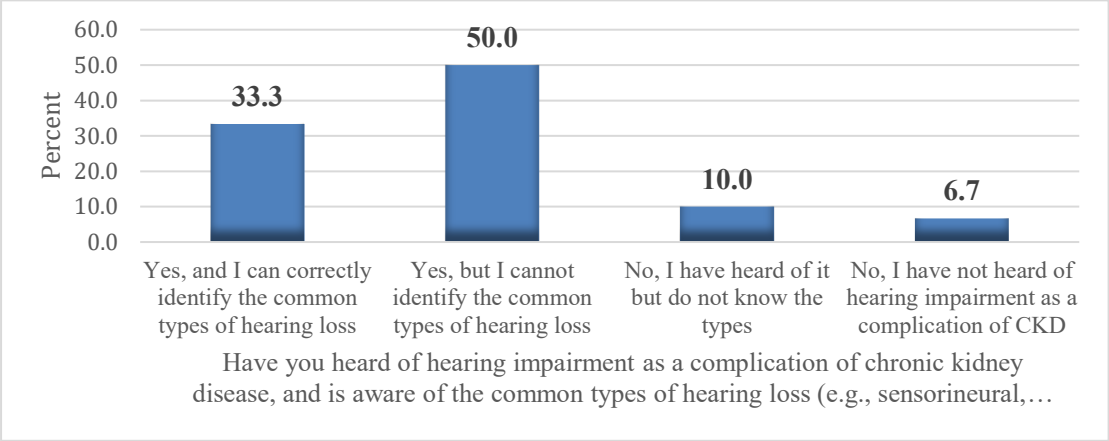
Missing Value Analysis

No missing value was recorded as all the entry fields were deemed compulsory.

Findings

Nurses' knowledge on the management of CKD patients with hearing impairment in the haemodialysis unit

Have heard of hearing impairment as a complication of chronic kidney disease, and is aware of the common types of hearing loss (e.g., sensorineural, conductive)

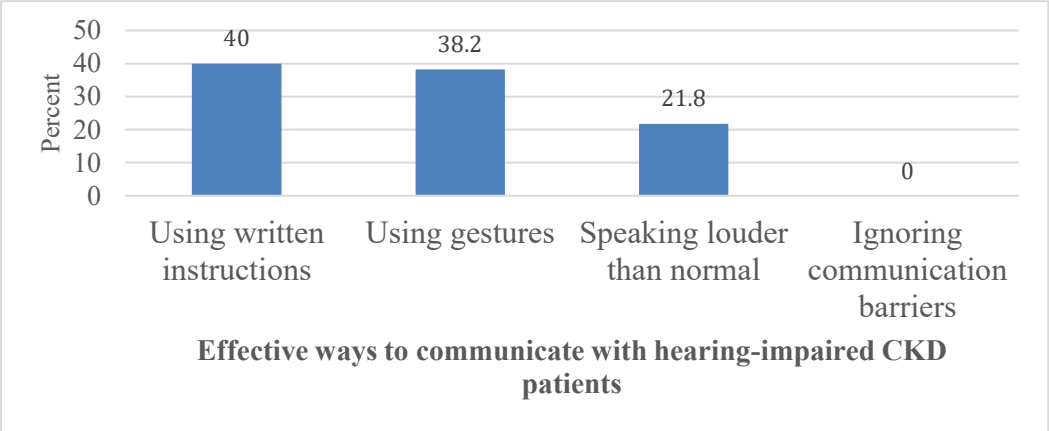


N=30

Figure 1: Have heard of hearing impairment as a complication of chronic kidney disease, and is aware of the common types of hearing loss (e.g., sensorineural, conductive)

A proportion of 6.7% of the nurses had setback in this frame as they have not heard of hearing impairment as a complication of CKD, which is not appropriate for proper care (Figure 1).

Effective ways to communicate with hearing-impaired CKD patients

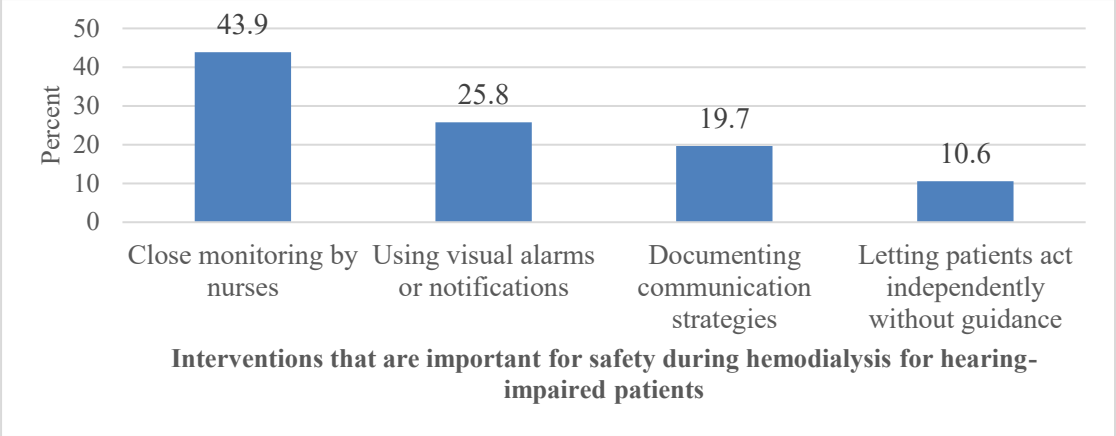


N=30

Figure 2: Effective ways to communicate with hearing-impaired CKD patients

None of the nurses had wrong answer to this question as no one took the wrong option which was 'Ignoring communication barriers' (Figure 2).

Interventions that are important for safety during hemodialysis for hearing-impaired patients

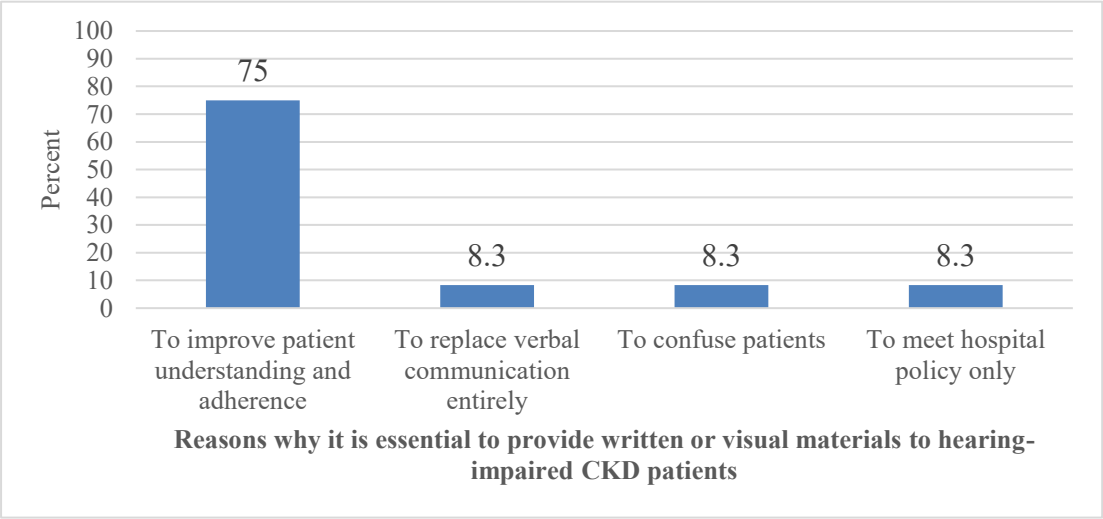


N=30

Figure 3: Interventions that are important for safety during hemodialysis for hearing-impaired patients

A proportion of 10.6% of the nurses had wrong answer to this question as they let patients act independently without guidance, which is not ok (Figure 3).

Reasons why it is essential to provide written or visual materials to hearing-impaired CKD patients

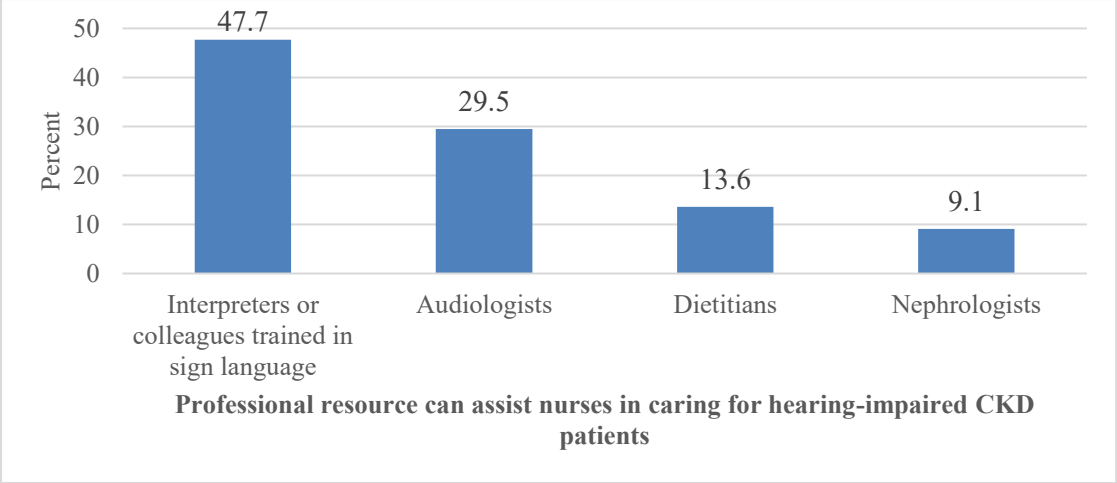


N=30

Figure 4: Reasons why it is essential to provide written or visual materials to hearing-impaired CKD patients

A proportion of 8.3% of the nurses had wrong answer to this question as they took the wrong options 'to confuse patients' and 'to meet hospital policy only' (Figure 4).

Professional resource can assist nurses in caring for hearing-impaired CKD patients

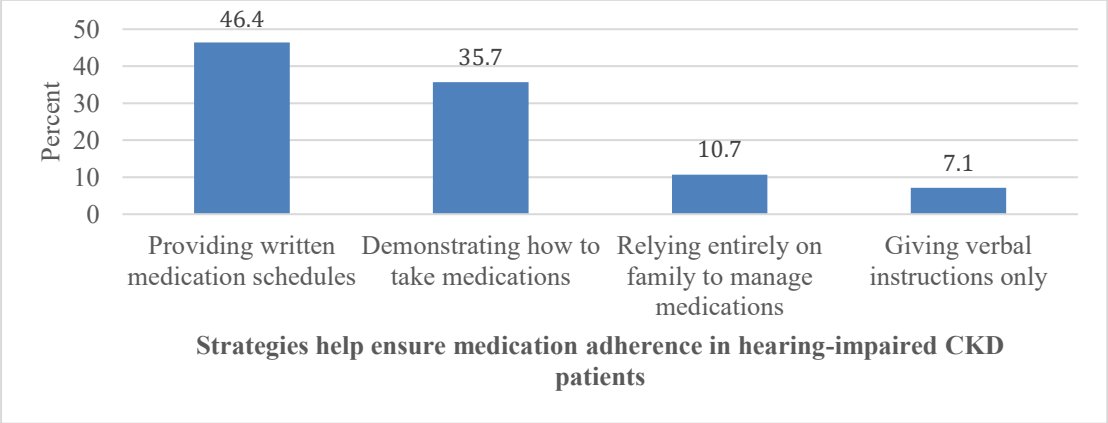


N=30

Figure 5: Professional resource can assist nurses in caring for hearing-impaired CKD patients

A proportion of 13.6% of the nurses had wrong answer to this question as they took the wrong option 'dietitians' (Figure 5).

Strategies help ensure medication adherence in hearing-impaired CKD patients

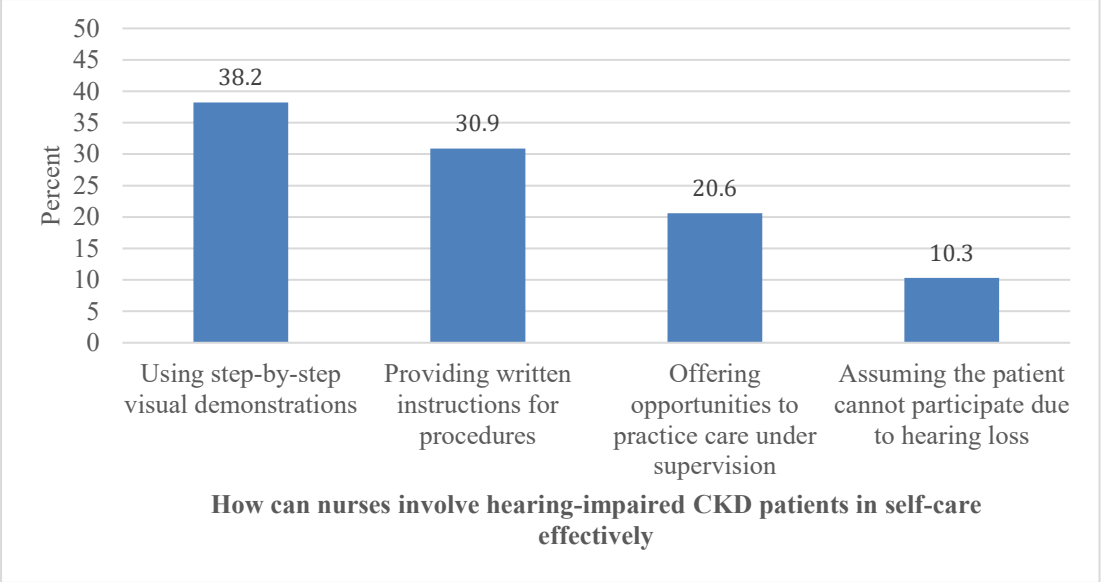


N=30

Figure (Figure 6): Strategies help ensure medication adherence in hearing-impaired CKD patients

A proportion of 10.7% and 7.1% of the nurses had wrong answer to this question as they took the wrong options 'relying entirely on family to manage medications' and 'giving verbal instructions only'.

How can nurses involve hearing-impaired CKD patients in self-care effectively



N=30

Figure 7: How can nurses involve hearing-impaired CKD patients in self-care effectively

A proportion of 20.6% of the nurses had wrong answer to this question as they took the wrong options 'offering opportunities to practice care under supervision'.

Table 4: Computing knowledge aggregated score

Items	N	Percent of Cases
Have heard of hearing impairment as a complication of chronic kidney disease, and are you aware of the common types of hearing loss (e.g., sensorineural, conductive)	28	93.3%
Using written instructions	22	73.3%
Using gestures	21	70.0%
Speaking louder than normal	12	40.0%
Close monitoring by nurses	29	96.7%
Using visual alarms or notifications	17	56.7%
Documenting communication strategies	13	43.3%
To improve patient understanding and adherence	27	90.0%
To replace verbal communication entirely	3	10.0%
Audiologists	13	43.3%
Nephrologists	4	13.3%

Interpreters or colleagues trained in sign language	21	70.0%
Providing written medication schedules	26	86.7%
Demonstrating how to take medications	20	66.7%
Using step-by-step visual demonstrations	26	86.7%
Providing written instructions for procedures	21	70.0%
Offering opportunities to practice care under supervision	14	46.7%
MRS	317	62.2%

Considering a total number of expected responses of 750, thus the proportion weight of right responses is (317/750) *100=42.3%. Therefore, in aggregate, less than a majority weight of nurses had good knowledge of the management of CKD patients with hearing impairment in the hemodialysis unit, far below the cutpoint for effectiveness set at 80%. Knowledge then was not effective as to foster good management of CKD patients with hearing impairment in the haemodialysis unit.

Attitudes of Nurses towards Caring for CKD Patients with Hearing Impairment in the Hemodialysis Unit

Table 5: Attitudes Toward CKD Patients with Hearing Impairment

Statements	SA	A	D	SD	SA & A	D & SD	Mean	SD
I feel confident in my ability to communicate effectively with hearing-impaired CKD patients	36.7% (11)	56.7% (17)	3.3% (1)	3.3% (1)	93.3% (28)	6.7% (2)	3.3	0.7
Managing hearing-impaired CKD patients requires extra effort, and I am willing to provide it	60.0% (18)	40.0% (12)	0.0% (0)	0.0% (0)	100% (30)	0.0% (0)	3.6	0.5
Hearing-impaired CKD patients can achieve the same treatment outcomes as patients without hearing impairment.	36.7% (11)	40.0% (12)	0.0% (0)	23.3% (7)	76.7% (23)	23.3% (7)	2.9	1.2
I am motivated to improve my skills in caring for hearing-impaired CKD patients.	36.7% (11)	56.7% (17)	0.0% (0)	6.7% (2)	93.3% (28)	6.7% (2)	3.2	0.8
Effective communication with hearing-impaired CKD patients is essential for providing quality care.	66.7% (20)	30.0% (9)	0.0% (0)	3.3% (1)	96.7% (29)	3.3% (1)	3.6	0.7
I feel comfortable asking colleagues or interpreters for assistance when caring for hearing-impaired CKD patients.	33.3% (10)	56.7% (17)	0.0% (0)	10.0% (3)	90.0% (27)	10.0% (3)	3.1	0.9
Caring for hearing-impaired CKD patients contributes positively to my professional development.	40.0% (12)	50.0% (15)	0.0% (0)	10.0% (3)	90.0% (27)	10.0% (3)	3.2	0.9
MRS	44.3% (93)	47.1% (99)	0.5% (1)	8.1% (17)	91.4% (192)	8.6% (18)	3.3	0.8

In aggregate, nurses had positive or good attitude toward the management of CKD patients with hearing impairment in the hemodialysis unit with a very strong majority proportion weight of 91.4%.

They were all of the opinion that managing hearing-impaired CKD patients requires extra effort, and they were willing to provide it, followed by those that agreed that effective communication with hearing-impaired CKD patients is essential for providing quality care 96.7% (29), feeling confident in one's ability to communicate effectively with hearing-impaired CKD patients 93.3% (28), having the same percentage with those who agreed to be motivated to improve their skills in caring for hearing-impaired CKD patients, then came those that feel comfortable asking colleagues or interpreters for assistance when caring for hearing-impaired CKD patients 90.0% (27), having the same percentage with those that were of the opinion that caring for hearing-impaired CKD patients contributes positively to their professional development, then, been the least but at a very strong majority, those that agreed that hearing-impaired CKD patients can achieve the same treatment outcomes as patients without hearing impairment 76.7% (23),

Considering Chi-Square Goodness-Of-Fit test with cutpoint for effectiveness set at 80%, 91.4% was above 80% though not significantly ($\chi 2$=3.365; P=0.066), thus attitude was effective as to foster good management of CKD patients with hearing impairment in the haemodialysis unit.

Nurses' Management of CKD Patients with Hearing Impairment in the Hemodialysis Unit

Table 6: Nurses' practices of the management of CKD patients with hearing impairment in the hemodialysis unit

Activity	SA	A	D	SD	SA & A	D & SD	Mean	SD
Uses alternative communication methods (written instructions, gestures, visual aids, or sign language) effectively.	50.0% (15)	46.7% (14)	3.3% (1)	0.0% (0)	96.7% (29)	3.3% (1)	3.5	0.6
Provides clear, understandable written instructions for medications and ensures comprehension.	40.0% (12)	60.0% (18)	0.0% (0)	0.0% (0)	100% (30)	0.0% (0)	3.4	0.5
Educates patients on CKD management, dialysis procedures, diet, and fluid control using visual aids or simplified materials.	53.3% (16)	33.3% (10)	3.3% (1)	10.0% (3)	86.7% (26)	13.3% (4)	3.3	1.0
Monitors vital signs, dialysis parameters, and patient symptoms with consideration for hearing limitations.	40.0% (12)	43.3% (13)	16.7% (5)	0.0% (0)	83.3% (25)	16.7% (5)	3.2	0.7
Ensures the environment is safe and conducive (minimizes noise, provides visual alarms or alerts).	36.7% (11)	46.7% (14)	10.0% (3)	6.7% (2)	83.3% (25)	16.7% (5)	3.1	0.9
Encourages and supports patient adherence to medication, dialysis schedules, and self-care practices.	26.7% (8)	53.3% (16)	16.7% (5)	3.3% (1)	80.0% (24)	20.0% (6)	3.0	0.8

Provides emotional support, reduces isolation, and advocates for patient needs in the care plan.	40.0% (12)	50.0% (15)	10.0% (3)	0.0% (0)	90.0% (27)	10.0% (3)	3.3	0.7
Collaborates with audiologists, dietitians, social workers, and other professionals for holistic care.	50.0% (15)	15.0% (15)	0.0% (0)	0.0% (0)	100% (30)	0.0% (0)	3.5	0.5
Demonstrates patience, clear verbal and non-verbal cues, and confirms patient understanding consistently.	60.0% (18)	36.7% (11)	3.3% (1)	0.0% (0)	96.7% (29)	3.3% (1)	3.6	0.6
Keeps accurate records of patient progress, interventions, and outcomes considering communication challenges.	40.0% (12)	56.7% (17)	0.0% (0)	3.3% (1)	96.7% (29)	3.3% (1)	3.3	0.7
MRS	43.7% (131)	47.7% (143)	6.3% (19)	2.3% (7)	91.3% (274)	8.7% (26)	3.3	0.7

In aggregate, nurses' practices of the management of CKD patients with hearing impairment in the hemodialysis unit was generally perceived as satisfactory at a very strong majority proportion weight of 91.3%.

All of them provided clear, understandable written instructions for medications and ensured comprehension, having the same proportion with those that collaborated with audiologists, dietitians, social workers, and other professionals for holistic care, followed by 96.7% (29) that used alternative communication methods (written instructions, gestures, visual aids, or sign language) effectively, having the same proportion with those that demonstrated patience, clear verbal and non-verbal cues, and confirmed patient understanding consistently, as well as those that kept accurate records of patient progress, interventions, and outcomes considering communication challenges, then came the 90.0% (27) that provided emotional support, reduced isolation, and advocated for patient needs in the care plan, 86.7% (26) educated patients on CKD management, dialysis procedures, diet, and fluid control using visual aids or simplified materials, 83.3% (25) monitored vital signs, dialysis parameters, and patient symptoms with consideration for hearing limitations, having the same trend with those that agreed that they ensured that the environment is safe and conducive (minimizes noise, provides visual alarms or alerts), while 80.0% (24) encouraged and supported patient adherence to medication, dialysis schedules, and self-care practices.

Considering Chi-Square Goodness-Of-Fit test with cutpoint for effectiveness set at 80%, 91.3% was above 80% though not significantly ($\chi 2=2.842$; $P=0.0918$), thus practice was effective as to foster good management of CKD patients with hearing impairment in the haemodialysis unit.

Table 7: Description of nurses' practices of the management of CKD patients with hearing impairment in the haemodialysis unit based on observation

Activity		Very poor	Poor	Good	Very good	Very poor & poor	Good & Very good	Mean	SD
1	Uses alternative communication methods (written instructions, gestures, visual aids, or sign language) effectively.	6.7% (1)	20.0% (3)	53.3% (8)	20.0% (3)	26.7% (4)	73.3% (11)	2.9	0.8

2	Provides clear, understandable written instructions for medications and ensures comprehension.	20.0% (3)	20.0% (3)	40.0% (6)	20.0% (3)	40.0% (6)	60.0% (9)	2.6	1.1
3	Educates patients on CKD management, dialysis procedures, diet, and fluid control using visual aids or simplified materials.	6.7% (1)	26.7% (4)	53.3% (8)	13.3% (2)	33.3% (5)	66.7% (10)	2.7	0.8
4	Monitors vital signs, dialysis parameters, and patient symptoms with consideration for hearing limitations.	6.7% (1)	0.0% (0)	60.0% (8)	33.3% (5)	6.7% (1)	93.3% (14)	3.2	0.8
5	Ensures the environment is safe and conducive (minimizes noise, provides visual alarms or alerts).	6.7% (1)	6.7% (1)	53.3% (8)	33.3% (5)	13.3% (2)	86.7% (13)	3.1	0.8
6	Encourages and supports patient adherence to medication, dialysis schedules, and self-care practices.	0.0% (0)	13.3% (2)	40.0% (6)	46.7% (7)	13.3% (2)	86.7% (13)	3.3	0.7
7	Provides emotional support, reduces isolation, and advocates for patient needs in the care plan.	0.0% (0)	26.7% (4)	40.0% (6)	33.3% (5)	26.7% (4)	73.3% (11)	3.1	0.8
8	Collaborates with audiologists, dietitians, social workers, or other professionals for holistic care.	6.7% (1)	20.0% (3)	66.7% (10)	6.7% (1)	26.7% (4)	73.3% (11)	2.7	0.7
9	Demonstrates patience, clear verbal and non-verbal cues, and confirms patient understanding consistently.	6.7% (1)	20.0% (3)	53.3% (8)	20.0% (3)	26.7% (4)	73.3% (11)	2.9	0.8
10	Keeps accurate records of patient progress, interventions, and outcomes considering communication challenges.	0.0% (0)	0.0% (0)	53.3% (8)	46.7% (7)	0.0% (0)	100% (15)	3.5	0.5
MRS		6.0% (9)	15.3% (23)	51.3% (77)	27.3% (41)	21.3% (32)	78.7%% (118)	3.0	0.8

In aggregate and based on observations, nurses' practices of the management of CKD patients with hearing impairment in the hemodialysis unit was generally perceived as satisfactory at a very strong proportion weight of 78.7%.

Keeping accurate records of patient progress, interventions, and outcomes considering communication challenges was the most adequate as perceived satisfactory in 100% of the instances, followed by monitoring vital signs, dialysis parameters, and patient symptoms with consideration for hearing limitations 93.3% (14), ensuring that the environment is safe and conducive (minimizes noise, provides visual alarms or alerts) 73.3% (11), having the same proportion with collaboration with audiologists, dietitians, social workers, or other professionals for holistic care and using alternative communication methods (written instructions, gestures, visual aids, or sign language) effectively. Then followed educating

patients on CKD management, dialysis procedures, diet, and fluid control using visual aids or simplified materials 66.7% (10), and providing clear, understandable written instructions for medications and ensures comprehension 60.0% (9).

Considering Chi-Square Goodness-Of-Fit test with cutpoint for effectiveness set at 80%, 78.7% was significantly different from 80% ($\chi 2$= 0.025; P=0.874), thus based on observations as well, practice was effective as to foster good management of CKD patients with hearing impairment in the haemodialysis unit.

Comparing observation and nurses 'perspective

Though nurses praised their practical performance more than expert observation with proportion weight of 91.3% as compared to 78.7% for the observations, from both observations and nurses' perspectives, considering Chi-Square Goodness-Of-Fit test with cutpoint for effectiveness set at 80%, both proportion weights fit within the effectiveness range. Thus, based on observations and nurses' perspectives, practice was effective as to foster good management of CKD patients with hearing impairment in the haemodialysis unit.

Test of Research Hypotheses

Research Hypothesis One: Nurses' Knowledge does not Significantly Influence the Effective Management of CKD Patients with Hearing Impairment

Table 8: Correlation between knowledge and practice

	Spearman's rho	Practice
Knowledge	Correlation Coefficient (R)	0.199
	Sig. (2-tailed) / P-value	0.292
	N	30

There was a weak positive and non-significant correlation (R=0.199; P=0.292) between knowledge and practice, thus implying that though knowledge positively impacted practices, this effect was not statistically significant, thus accepting the hypothesis here stated .

Research Hypothesis Two: Nurses' Attitudes do not Significantly Affect the Effective Management of CKD Patients with Hearing Impairment.

Table 9: Correlation between attitude and practice

	Spearman's rho	Practice
Attitude	Correlation Coefficient (R)	0.611
	Sig. (2-tailed) / P-value	0.000
	N	30

There was a positive and very significant correlation (R=0.199; P=0.292) between attitude and practice, thus implying that attitude impacted practices and this effect was statistically significant, thus rejecting the hypothesis here stated.

Discussion of the Findings

Nurses' knowledge on the management of CKD patients with hearing impairment in the hemodialysis unit

Nurses' knowledge of the management of CKD patients with hearing impairment in the hemodialysis unit was moderate, thus the specific weak impact on the outcome of management. Recent studies consistently show that nurses have moderate knowledge of CKD management in hemodialysis, with scores averaging 45-63% thus corroborating this study context. Experience and nephrology training significantly predict higher scores (Alrasheeday *et al*., 2024; Sumari *et al*., 2023; Meng *et al*., 2025)**.** This therefore implies nurses' inadequate knowledge in the management of CKD patients with hearing impairment is a contemporary issue that is not confined to the study context. It was earlier highlighted that nursing care based on expert knowledge is critical for the effective management of CKD patients, as inadequate knowledge among non-specialized nurses has been associated with substandard care, increased risk of complications, and prolonged hospitalization (Sumari *et al*., 2023).

Though most of nurses in the study context were aware of hearing impairment as a complication of chronic kidney disease, and were aware of the common types of hearing loss, quite few of them could identify the common types of hearing loss. Nurses were however knowledgeable of the effective ways to communicate with hearing-impaired CKD patients. They highlighted among others using written instructions, using gestures and speaking louder than normal. Nurses were also knowledgeable of the interventions that are important for safety during hemodialysis for hearing-impaired patients and of the reasons why it is essential to provide written or visual materials to hearing-impaired CKD patients. They mentioned in this respect close monitoring by nurses, using visual alarms or notifications and documenting communication strategies. However, few of them failed by letting patients act independently without guidance. As for the reasons why it is essential to provide written or visual materials to hearing-impaired CKD patients, though some nurses had wrong approach to this context as they perceived that it will confuse patients or they simply strived to meet hospital policy only, most of them were aware of the importance as it improves patient understanding and adherence and helps replace verbal communication.

As for the professional resource that can assist nurses in caring for hearing-impaired CKD patients, knowledge was inadequate to some nurses as they considered dietician in this context, which is wrong. Previous study revealed similar problems as Meng *et al*. (2025) stressed that despite the high level of engagement, gaps in knowledge and clinical practice were identified among nurses caring for CKD patients, particularly regarding referral to access specialists for abnormalities. However, most of them acknowledged audiologists, nephrologists, and interpreters or colleagues trained in sign language. Setbacks were also recorded when checking knowledge on strategies that help ensure medication adherence in hearing-impaired CKD patients, among which wrong options such as relying entirely on family to manage medications and giving verbal instructions only came up.

However good practices such as providing written medication schedules and demonstrating how to take medications were dominant. In assessing how nurses involve hearing-impaired CKD patients in self-care effectively, number of nurses portrayed inadequacy in practice as they suggested offering opportunities to practice care under supervision, which is not ok. However, they dominantly used step-by-step visual demonstrations, provided written instructions for procedures and assumed the patient cannot participate due to hearing loss, which are recommended practices. Other studies equally revealed that the level of knowledge among nurses was moderate, with approximately 63.06% of participants providing correct responses to knowledge-related items (Alrasheeday *et al*., 2024). This further suggests that while nurses possess a foundational understanding of CKD, significant gaps remain that could affect the quality of patient care in hemodialysis units (Sumari *et al*., 2023), thus supporting the findings of this study context.

Nurses' attitude towards caring for CKD patients with hearing impairment in the hemodialysis unit

Nurses had positive or good attitude toward the management of CKD patients with hearing impairment in the hemodialysis unit, thus justifying its good influence on practice and so far outcome of management. Previous study acknowledged that nurses' attitudes toward patient care play a critical role in determining the quality of care delivered, influencing both clinical practice and patient outcomes (Alrasheeday *et al*., 2024). Their study revealed that the majority of nurses (84.52%) demonstrated positive attitudes toward caring for CKD patients, indicating a supportive and empathetic approach in their clinical interactions (Alrasheeday *et al*., 2024).

Nurses expressed their good attitude in various ways. They were of the opinion that managing hearing-impaired CKD patients requires extra effort, and they were willing to provide it. They equally agreed that effective communication with hearing-impaired CKD patients is essential for providing quality care thus supporting Meng et al. (2025). Feeling confident in one's ability to communicate effectively with hearing-impaired CKD patients and been motivated to improve skills in caring for hearing-impaired CKD patients were additional impetus to proper outcome of care and this was earlier emphasized by Mancin *et al*. (2024). Collaborative spirit was part of the good attitude expressed by nurses as they felt comfortable asking colleagues or interpreters for assistance when caring for hearing-impaired CKD patients thus being in line with the recommendations of Meng *et al*. (2025). Moreover, nurses were of the opinion that caring for hearing-impaired CKD patients contributes positively to their professional development, and were confident that hearing-impaired CKD patients can achieve the same treatment outcomes as patients without hearing impairment.

Nurses' management of CKD patients with hearing impairment in the hemodialysis unit

Nurses' practices of the management of CKD patients with hearing impairment in the hemodialysis unit was very satisfactory. All of them provided clear, understandable written instructions for medications and ensured comprehension, collaborated with audiologists, social workers, and other professionals for holistic care. The use of alternative communication methods (written instructions, gestures, visual aids, or sign language) was effectively, they demonstrated patience, clear verbal and non-verbal cues, and confirmed patient understanding consistently. Effective management of CKD patients with hearing impairments requires nurses to possess not only technical knowledge of hemodialysis care but also specialized communication and relational skills (Tannenbaum-Baruchi, 2024[a]).

The use of professional interpreters and other communication tools increased, demonstrating that structured, hands-on training directly improves nurses' practical skills in engaging with hearing-impaired patients, which is critical in the hemodialysis setting where complex procedures require clear communication (Tannenbaum-Baruchi, 2024[b]), thus supporting the findings of this study as nurses acknowledged the use of interpreters and visual support aids. Similarly, Britto and Samperiz (2010) examined communication difficulties faced by nursing staff caring for hearing-impaired patients. The study revealed that 66% of nurses struggled to explain care processes, while 32% experienced difficulty understanding patients' communication methods. To address these challenges, nurses utilized mimicry (100%), lip reading (94%), written communication (42%), and assistance from companions (65%). .

In this study context as well, some nurses highlighted communication challenges and deplored inadequate simulation tools or visual-support materials. Nurses employed informal strategies such as gestures and written notes to convey information (Silva de Assis *et al*., 2019), which aligns with the practices portrayed by nurses in this study context. This study underscores the skill-related gap in standard communication methods, showing that while nurses attempt to ensure care continuity, enhancing these skills through structured programs is essential for safe and effective management in hemodialysis units. Santos *et al*. (2020) in assessing challenges faced by nurses assisting patients with hearing disabilities equally highlighted lacks in sufficient training notably in communication with hearing-impaired individuals, limiting nurses' professional skills in delivering inclusive care.

Keeping accurate records of patient progress was equally adequate. Interventions and outcomes considering communication challenges, providing emotional support, reducing isolation, and advocating for patient needs in the care plan, educating patients on CKD management, dialysis procedures, diet, and fluid control using visual aids or simplified materials, monitoring vital signs, dialysis parameters, and patient symptoms with consideration for hearing limitations, ensuring that the environment is safe and conducive (minimizes noise, provides visual alarms or alerts), while encouraging and supporting patient adherence to medication, dialysis schedules, and self-care practices were additional good practices. In other settings, practices were fair (47-53%), including monitoring hypotension and perfusion, but gaps persisted in specialized care (Meng *et al*., 2025). In the same vein, the study by Mancin *et al*. (2024) identified key competencies, including active listening, empathy, therapeutic communication, and building nurse-patient alliances. In hemodialysis, these skills are essential for helping patients adapt to therapy, manage symptoms, and participate in self-care and they were generally considered in this study context.

Conclusion and Recommendations

Inadequate knowledge in managing CKD patient with hearing impairment surfaced as a critical loophole to reckon with. Reflecting on practical skills was somehow obvious in this study context and was effective to some extent, thus the necessity for such specific skills to be imbedded in school or in-service training in order to equip nurses and improving the outcome of care. This further stressed the need for formal training to standardize care delivery for patients with hearing impairments. Continuous skill development to support the formal training is therefore deemed important during university studies, seminar or workshops and should be

recommended as they are vital for enabling nurses to manage CKD patients effectively, ensuring both procedural accuracy and patient engagement during hemodialysis.

Attitude however was a major impetus as nurses expressed high level of motivation, felt confident in their ability to communicate effectively with hearing-impaired CKD patients, were committed to devote extra effort, had trust that their hearing-impaired patients could achieve the same outcome of treatment like their normal pairs, demonstrated patience, and were enthusiastic in initiating and sustaining collaboration with other specialists to achieved consequential treatment outcome. Sustaining such good attitude by enhancing skill development to foster self-confident, intrinsic and extrinsic motivation as well as good working environment and conditions could foster the sustainability and constant improvement of care for hearing-impaired patients.

Practice was very good, nurses among others were committed to provide emotional support, reduces isolation, and advocated for patient needs in the care plan, thus aligning with the Peplau's Interpersonal Relations Theory (1952). However, nurses still highlighted hearing impaired patients discomfort due to the fact they felt isolated as a problem to reckon with. Inadequate company-keeping for hearing impaired patients by nurses could be stemmed from work overload stressed in this study context. By prioritizing the seeking for patient needs or specificities, nurses thus considered the Madeleine Leininger's Culture Care Theory (1990s) that argued that culturally congruent care is essential for achieving meaningful, effective, and holistic patient outcomes. Communication was a major hindrance to proper care as they had challenge using formal sign language and other facilities such as visual or simulation support tools were not adequate. However, nurses develop adaptive strategies to compensate for communication barriers, such as written note, demonstrates patience, clear verbal and non-verbal cues, and confirms patient understanding consistently, thus conforming the Howard Giles Communication Accommodation Theory (1975). Keeping accurate records of patient progress, interventions, and outcomes considering communication challenges were additional impetus to quality services and outcome of care.

To enhance the effective management of CKD patients with hearing impairment in the hemodialysis unit, the following recommendations were made: Nurses must apply adaptive communication strategies, demonstrate adequate knowledge, and maintain positive attitudes to provide effective patient centred care. Findings will inform targeted interventions including training programs to improve nursing practice and enhance quality of care for this vulnerable population and policy adjustment.

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