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Assessment of Nurses knowledge regarding the care of patients undergoing angioplasty at Azadi Teaching Hospital

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Abstract
Background: A minimally invasive medical procedure angioplasty is used to restore blood flow in narrowed or obstructed arteries, mainly those that supply the heart. It is commonly used to treat cardiovascular diseases, especially coronary artery disease (CAD), which is still one of the leading causes of morbidity and mortality globally. The procedure entails inserting a catheter into a blood vessel, usually the femoral or radial artery, and then guiding the catheter to the site of the blockage. A tiny balloon is then inflated at the catheter's tip to widen the artery, and in many cases, a stent is implanted to keep the vessel open, ensuring improved blood circulation.
Objective: The aim of this study is to assess the knowledge of nurses in the care of patients undergoing angioplasty.
Methodology: quantitative, descriptive cross-sectional study. The study Conducted at Azadi Teaching Hospital's Cardiology Department in Kirkuk, the setting was chosen for its role as a key referral center for percutaneous coronary interventions (PCI) 24th November 2024 to 1st June 2025. A convenient sampling method was used to select (60) nurses working in the Cardiology Department
Results: The study assessed nurses' knowledge of angioplasty using a 21-item self-scored questionnaire on a 3-Likert scale. Statistical measures included observed frequencies, percentages, mean scores, standard deviation, and relative adequacy. Responses were categorized into low, medium, and high levels, with 57.14% of items assigned to medium knowledge and 42.86% to high knowledge. Weak relationships were observed between knowledge scores and demographic factors such as gender, age, qualifications, experience, and workplace. Findings suggest that nurses' knowledge distribution is relatively uniform, reinforcing the generalizability of the questionnaire across the studied population, despite demographic differences having no statistically significant impact.
Conclusions: the findings highlight the nuanced understanding nurses have regarding angioplasty, with strong knowledge in general aspects but noticeable gaps in specific post-procedural concerns. While demographic factors such as gender, experience, and qualifications do not appear to significantly influence knowledge levels, the need for targeted educational interventions remains evident.

Keywords: Cardiology, nurses, knowledge, angioplasty

Introduction
A minimally invasive medical treatment called angioplasty is used to open blocked or constricted arteries, especially those that supply the heart, and restore blood flow. It is frequently used to treat cardiovascular conditions, especially coronary artery disease (CAD), which continues to be one of the world's major causes of morbidity and death (Smith *et al.*, 2020) [12]. During the operation, a catheter is inserted into a blood vessel, usually the radial or femoral artery, and directed to the blockage location. In order to ensure better blood circulation, a stent is frequently inserted to maintain the conduit open after a tiny balloon is inflated at the catheter's tip to enlarge the artery (Jones *et al.*, 2020) [6].
.Advancements in interventional cardiology have refined angioplasty techniques, making the procedure safer and more effective. Drug-eluting stents, for example, help prevent restenosis by releasing medication that inhibits abnormal tissue growth within the artery (Green & Taylor, 2020) [4]. Compared to traditional open-heart surgery, angioplasty offers shorter recovery times, reduced hospital stays, and lower procedural risks, making it a preferred intervention for many patients with cardiovascular disease. However, despite its benefits, angioplasty is not without complications. Potential risks include arterial dissection, blood clots, restenosis, and adverse reactions to contrast dye used during the procedure Thus,

ongoing patient monitoring, lifestyle modifications, and adherence to prescribed medications are crucial for maintaining long-term cardiovascular health (Harrison & Lee, 2019) (Baeez & Younis, 2019) [16].

Nurses play a pivotal role in the comprehensive care of patients undergoing angioplasty, spanning pre-procedural preparation, intra-procedural support, and post-procedural recovery (Miller & Anderson, 2017) [9].

Their responsibilities include educating patients about the procedure, obtaining informed consent, and ensuring the administration of necessary medications such as anticoagulants and sedatives. (Sania *et al.*, 2022) [15].

Additionally, nurses assess patient history for potential contraindications, including kidney disease, which may be exacerbated by contrast agents used in angioplasty. (Al-Jumaily & Khudur, 2019) [14].

During the procedure, nurses collaborate with the interventional cardiology team to maintain a sterile environment, monitor patient vital signs, and promptly respond to complications such as arrhythmias, hypotension, or allergic reactions (Clark *et al.*, 2020) [3]. Their presence provides emotional reassurance to patients, helping to alleviate anxiety and promote a sense of security (Patel & Kumar, 2021) [7]. Post-procedural nursing care is equally critical, involving the assessment of bleeding or hematoma at the catheter insertion site, monitoring for signs of restenosis, and ensuring effective pain management. Furthermore, nurses play a key role in patient education, advising on medication adherence, lifestyle changes, and the importance of follow-up care to optimize recovery and prevent future cardiovascular events (Thomas *et al.*, 2020) (Mahmood *et al.*, 2018) [14, 17].

Subject (Material and Methods)

A quantitative, descriptive cross-sectional study Conducted at Azadi Teaching Hospital's Cardiology Department in Kirkuk, 24th November 2024 to 1st June 2025, Data were collected using a self-administered questionnaire distributed to nurses working in the Cardiology Unit. To ensure accuracy in responses and minimize response bias, tools were used: a demographic checklist, a knowledge-based questionnaire. Researchers were present during the data collection process to offer clarification on any questionnaire items as needed.. On average, each nurse required about [20-40] minutes to complete the full set of questionnaires. The setting was chosen for its role as a key referral center for percutaneous coronary interventions (PCI). The design enabled assessment of nursing competencies and identification of gaps in procedural angioplasty care. A convenient sampling method was used to select (60) nurses working in the Cardiology Department, the study instruments and program's content validity; the tools' dependability was assessed using a test-retest methodology and data from the evaluation of (10) nurses, for assesses the degree to which items in a questionnaire or scale are interrelated and measure the same construct, the reliability coefficient was 0.7.The Statistical Package (SPSS) ver. 26.0 was used to analyses and evaluate the study's findings using statistical data analysis methods: Frequencies, percentages, the mean of the score (MS), Percentile Grand/Global Mean of Score (PGMS), the standard deviation (SD), are used in descriptive analysis of data. Inferential data analysis is used to draw conclusions.

Statistical Analysis

Utilizing the statistical software (SPSS) ver. (26.0), the following statistical data analysis techniques were employed to analyses and evaluate the study's findings.

Results

Table 1: Summary statistics of nurse's responses toward "Knowledge Regarding Angioplasty" main domain's items

Nurses' Knowledge Regarding Angioplasty	Response	No.	%	MS	SD	RS% Ass.
1. Types of angioplasties like (Coronary Angioplasty, Balloon Angioplasty, Stent Placement, Stent Angioplasty	Don't know	1	1.7	1.85	0.40	92.5 H
	Uncertain	7	11.7			
	I know	52	86.7			
2. Causes of angioplasties like (Coronary artery disease(CAD) Heart attack (myocardial infarction) High blood pressure (Hypertension) Diabetes	Don't know	3	5	1.47	0.60	73.5 H
	Uncertain	26	43.3			
	I know	31	51.7			
3. Contraindications of angioplasty procedures like Severe Allergies to Contrast Dye, Uncontrolled Bleeding Disorders, Acute or Severe Stroke, Pregnancy.	Don't know	7	11.7	1.38	0.69	69.0 H
	Uncertain	23	38.3			
	I know	30	50			
4. Risks and complications associated with angioplasty like(Bleeding or Hematoma, blood Vessel Damage, Stroke, Pulmonary Embolism)	Don't know	5	8.3	1.62	0.64	81.0 H
	Uncertain	13	21.7			
	I know	42	70			
5. Factors to prevent complications post-angioplasty like(Medications, Blood Pressure Control, Stress Management Avoiding Heavy Lifting or Straining	Don't know	7	11.7	1.50	0.70	75.0 H
	Uncertain	16	26.7			
	I know	37	61.7			
6. Common local complications during and after angioplasty like (Hematoma, Arterial Puncture Site Bleeding Thrombosis at the Angioplasty Site, Nerve Injury	Don't know	3	5	1.55	0.59	77.5 H
	Uncertain	21	35			
	I know	36	60			
7. Can you describe the role of nurses in preparing patients for angiography?	Don't know	14	23.3	1.25	0.82	62.5 M
	Uncertain	17	28.3			
	I know	29	48.3			
8. Indicators of aneurysm expansion post-angioplasty	Don't know	18	30	0.82	0.62	41.0 M
	Uncertain	35	58.3			
	I know	7	11.7			

9. Appropriate timing and methods to monitor Creatinine levels post-procedure	Don't know	17	28.3	1.02	0.77	51.0 M
	Uncertain	25	41.7			
	I know	18	30			
10. Risks of delayed dressing removal after angioplasty	Don't know	7	11.7	1.42	0.70	71.0 M
	Uncertain	21	35			
	I know	32	53.3			
11. Symptoms and management of blood collection post-procedure	Don't know	9	15	1.28	0.72	64.0 M
	Uncertain	25	41.7			
	I know	26	43.3			
12. Identification of pseudoaneurysm at the catheter insertion site	Don't know	19	31.7	1.03	0.82	51.5 M
	Uncertain	20	33.3			
	I know	21	35			
13. Complications arising from delayed sheath removal	Don't know	8	13.3	1.42	0.72	71.0 M
	Uncertain	19	31.7			
	I know	33	55			

Nurses' Knowledge Regarding Angioplasty	Response	No.	%	MS	SD	RS% Ass.
14. Risks and prevention of contrast-induced nephropathy	Don't know	20	33.3	1.07	0.86	53.5 M
	Uncertain	16	26.7			
	I know	24	40			
15. Risk factors for renal failure post-angioplasty	Don't know	21	35	1.00	0.84	50.0 M
	Uncertain	18	30			
	I know	21	35			
16. Signs and symptoms of thrombus formation post-procedure	Don't know	11	18.3	1.38	0.78	69.0 H
	Uncertain	15	25			
	I know	34	56.7			
17. Techniques for immobilizing the affected extremity post-angioplasty	Don't know	14	23.3	1.05	0.72	52.5 M
	Uncertain	29	48.3			
	I know	17	28.3			
18. Risk factors for pulmonary edema post-angioplasty	Don't know	8	13.3	1.42	0.72	71.0 H
	Uncertain	19	31.7			
	I know	33	55			
19. Recognition and management of hematoma at the puncture site	Don't know	7	11.7	1.53	0.70	76.5 H
	Uncertain	14	23.3			
	I know	39	65			
20. Nutritional guidelines for recovery after angioplasty	Don't know	19	31.7	1.03	0.82	51.5 M
	Uncertain	20	33.3			
	I know	21	35			
21. Early signs of infection or sepsis post-angioplasty	Don't know	11	18.3	1.22	0.74	61.0 M
	Uncertain	25	41.7			
	I know	24	40			

RS%: Relative Sufficiency Assessing by: (L: Low; M: Moderate; H: High)

The study consisted of 21 self-scored items using a 3-Likert scale, by estimating several statistics, such as observed frequencies, percentages due to scoring scales, mean scores, standard deviation, and relative adequacy, in addition to different levels to evaluate the observed response by converting the scoring scales into three different category levels, such as (low, medium, and high) in light of relative adequacy: intervals [(0.00 - 33.33), (33.34 - 66.66), (66.67 - 100)] respectively. Table (1) the nurses' knowledge items were assigned to the medium to high level limits that were evaluated, where 12 (57.14%) of the items were assigned to the medium level, while the remaining 9 (42.86%) of the items were assigned to the high level. It can be concluded that the studied sample with regard to the main domain items of "nurses' knowledge on the subject of arterial catheterization" were allocated to some extent at the specific level that achieves the aim of this study, where the medium level was considered as the border of the high level.

Table 2: Relationships amongst assess of "Nurses' Knowledge Regarding Angioplasty" through redistribution of PGMS and Nurse's (SDCv. & Rv.)

SDCv. & Rv.	Responses	≤ Md		> Md		C.S.
	Groups	No.	%	No.	%	P-value
Gender	Male	7	23.3	11	36.7	C.C. = 0.144
	Female	23	76.7	19	63.3	P = 0.260 (NS)
Age Groups yrs.	22 _ 26	7	23.3	15	50.0	C.C. = 0.282
	27 _ 31	14	46.7	11	36.7	P = 0.075
	32 _ 36	9	30.0	4	13.3	NS
Professional Qualification	Diploma	1	3.30	0	0.00	C.C. = 0.151
	Bachelor's	27	90.0	29	96.7	P = 0.495
	Post Graduate	2	6.70	1	3.30	NS
Years of Experience as a Nurse in angiography	(1 _ 5) yrs.	20	66.7	25	83.3	C.C. = 0.227

	(6 _ 10) yrs.	8	26.7	5	16.7	P = 0.355 NS
	(11 _ 15) yrs.	1	3.30	0	0.00	
	> 15 yrs.	1	3.30	0	0.00	
Participation in Courses	No	16	53.3	14	46.7	C.C. = 0.067 P = 0.606 (NS)
	Yes	14	46.7	16	53.3	
Work place	Cardiac Ward Nurse	3	10.0	3	10.0	C.C. = 0.000 P = 1.000 (NS)
	CCU Nurse	27	90.0	27	90.0	

(*) HS: Sig. at $P<0.05$; NS: No Sig. at $P>0.05$; Statistical hypothesis are based on a Contingency's Coefficients test.

shows that weak relationships are accounted amongst redistribution of percentile grand mean of score (PGMS) of "Nurses' Knowledge Regarding Angioplasty" and studied nurse's (SDCv. & Rv.) at $P>0.05$, with respect to "Gender, Age Groups, Professional Qualification, Years of Experience as a Nurse in angiography, Participation in Courses, Work place". results, it could be concludes that studied questionnaire concerning of "Nurses' Knowledge Regarding Angioplasty" could be generalize on the studied sampling population even though that obtained for nurses properties' (SDCv. & Rv.).

Discussions

The findings indicate varying levels of knowledge among nurses regarding different aspects of angioplasty. High levels of knowledge were observed in general topics such as types of angioplasties (92.5%) and risks and complications (81.0%), whereas lower levels were seen in specific clinical concerns like indicators of aneurysm expansion post-angioplasty (41.0%) and appropriate timing for creatinine monitoring (51.0%).These results align with the study conducted by Rahman and Singh (2020) [11], which found that nurses generally have strong knowledge of common interventional procedures but may lack awareness of specific post-procedural indicators. However, the findings contradict the results of Brown *et al.* (2021) [2], who reported that nurses in specialized units exhibited consistently high knowledge levels across all aspects of angioplasty, which could be attributed to different training programs and protocols in different healthcare settings.The presence of moderate and low knowledge levels in key post-procedural aspects suggests the need for targeted educational interventions, particularly in areas such as identification of pseudoaneurysm (51.5%), risk factors for renal failure (50.0%), and nutritional guidelines post-angioplasty (51.5%). This aligns with the recommendations by Smith *et al.* (2022) [12], who emphasized the necessity of continuous professional development programs focusing on post-procedural care.These findings highlight the importance of structured and ongoing educational programs to bridge knowledge gaps, ensuring that nurses have the necessary expertise to provide optimal patient care. Future research should explore the impact of structured training interventions on improving nurses' knowledge and practice in angioplasty units. the relationship between the assessment of "Nurses' Knowledge Regarding Angioplasty" and various socio-demographic characteristics (SDCv.) and related variables (Rv.), including gender, age groups, professional qualification, years of experience, participation in courses, and workplace assignment. The findings indicate that there were no statistically significant relationships ($P>0.05$) between nurses' knowledge and any of the demographic or related variables studied. The results align with the study by Anderson and Lee (2021) [1], which found that while nurses' knowledge levels may vary, they are not necessarily dependent on demographic factors such as gender or years of experience. Conversely, the findings contrast with Patel *et al.* (2022) [10], who reported that professional qualification and experience significantly influenced knowledge levels in specialized nursing fields. The lack of significant relationships suggests that knowledge distribution among nurses in angioplasty care is relatively uniform, implying that training and education programs have a consistent impact across different demographic groups. This supports the generalizability of the questionnaire findings across the studied sample population.

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