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Perception and satisfaction level of patients undergoing cardiac catheterization

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Abstract
Background: Understanding patients' perceptions and satisfaction level regarding cardiac catheterization is crucial for identifying knowledge gaps and enhancing the overall quality of care provided in this clinical setting. **Aim:** To assess perception and satisfaction level of patients undergoing cardiac catheterization. **Design:** A descriptive research design was used. **Sample and setting:** the study was conducted in cardiac catheterization units at Assiut general hospital. **Sample:** A convenient sample of 100 adult patients (male and female) undergoing cardiac catheterization were included in the study. **Tools:** three main tools were used to collect data include **Tool (I):** Patient assessment tool (demographic, clinical data and diagnostic tests and Laboratory Investigations). **Tool (II)** Patient perception assessment tool. **Tool (III):** Short Assessment Patient Satisfaction (SAPS) tool. **Results:** The mean age of the studied patients was 55.10 ± 11.12 years, majority of them were males (63%), married (96%), from rural areas (59%). While majority (83%) felt they received complete information about the procedure, A majority (80%) had "unacceptable" perceptions of their care, but overall, most patients reported being satisfied, with no statistically significant difference in satisfaction based on socio demographic factors. Additionally, a significant relationship was found between patient perceptions and education and employment. **Conclusion:** There was a positive correlation between the patients' perceptions and their satisfaction levels regarding cardiac catheterization. **Recommendation:** A comprehensive educational program is recommended to address knowledge gaps, enhance communication with healthcare providers, and provide continuous support throughout the patient care.

Keywords: Cardiac catheterization, Perception & Satisfaction

Introduction:
Cardiac catheterization is a widely utilized procedure in diagnosing and treating various heart conditions, including coronary artery disease, congenital heart defects, and valvular heart disorders. It involves inserting a catheter into a large blood vessel and guiding it to the heart to examine the coronary arteries, heart chambers, and valves. While this procedure is often lifesaving and minimally invasive, patients' experiences and perceptions of cardiac catheterization can vary significantly based on multiple factors, including the quality of care provided, the communication of healthcare professionals, and the patient's overall comfort and emotional well-being. Understanding these factors is crucial to enhancing patient outcomes and satisfaction **(Alghrairi, et al., 2020).**

Patient satisfaction has become a key indicator of healthcare quality, as it is linked to improved adherence to treatment plans, better clinical outcomes, and reduced healthcare costs for cardiac catheterization patients. In this context, the role of the critical care nurse is indispensable, as they are often the primary point of contact for patients before, during, and after the procedure **(Shao, et al., 2020).**

Critical care nurses play a crucial role in ensuring that patients undergoing cardiac catheterization feel informed, comfortable, and supported throughout their journey. These nurses are responsible for providing pre-procedural education, addressing patients' concerns, managing anxiety, and ensuring that they fully understand the procedure, potential outcomes, and post-care instructions **(Faried, et al., 2023).**

During the cardiac catheterization procedure, critical care nurses are actively involved in monitoring the patient's physiological status, ensuring their safety, and managing any complications that may arise. They serve as patient advocates, providing reassurance and emotional support. This hands-on role not only contributes to the patient's physical well-being but also enhances their overall satisfaction with the care they receive **(Hojjatoleslami, et al., 2024).**

Post-procedure, critical care nurses continue to play an integral role in patient recovery and education. They are responsible for monitoring vital signs, managing pain, and providing detailed instructions for aftercare. Patients often rate their satisfaction based on the quality of post-procedural care **(Naidu, et al., 2021).**

In conclusion, the perception and satisfaction levels of patients undergoing cardiac catheterization are influenced by a combination of procedural factors and the quality of care provided by the healthcare team and critical care nurses playing a central role Through effective communication, vigilant monitoring, and compassionate care, critical care nurses not only contribute to the physical recovery of patients but also enhance their emotional well-being, ultimately improving overall patient satisfaction and perceptions of the cardiac catheterization process **(Mohammed, et al., 2021).**

Significance of the study:

Understanding patient's perception can enhance their satisfaction level, patient satisfaction has become an important outcome in the treatment of several disease including cardiovascular disease (**Zaid, et al., 2020**). Moreover, it was observed by the researcher for a long time that there was a significant increase in the number of cardiac catheterization patients. For this reason, the researcher thought to study this phenomenon of patient satisfaction and perception at Assiut general Hospital to understand patients' perception. Furthermore, little is known about whether patients feel adequately educated or prepared for post procedural self-care following a same-day CCL procedure, and how these factors contribute to patient perceptions and satisfaction of care quality.

Thus, the current study assessed the cardiac catheterization patient's perception and their satisfaction in a selected hospital.

Aim of the study:

The aim of the study was to assess perception and satisfaction level of patients undergoing cardiac catheterization.

Research questions:

To fulfill the aim of this study the following research questions were formulated:

What is the level of the patients' perceptions regarding cardiac catheterization?

What is the level of the patients' satisfaction regarding cardiac catheterization?

Patients and Methods

Research design:

A descriptive research design was used to conduct this study.

Setting:

The study was carried out in cardiac catheterization unit at Assiut general hospital. This unit providing diagnostic and interventional coronary procedures for patients. the unit perform in excess of 1200 cardiac catheterization for patients per year.

Sample

A convenient sample of 100 adult patients (male and female) undergoing cardiac catheterization in cardiac catheterization units at Assiut general hospital were included in the study over 6 months period from January 2024 until June 2024.

Sample size:

The sample size was calculated according to Epi Info 2000. It was selected using a special formula based on prevalence of disease at a confidence interval of 95% and precision of (2%). The sample increased by 10% to overcome problems related to non-responses and missing data. The power of study was 80%.

Inclusion criteria:

- Both sex: male and female
- Patient age: above 18 years
- All patients undergoing cardiac catheterization for first time.

Exclusion criteria:

- Children.
- Pregnant women.
- Unconscious patients.

Tools: Three tools were used in this study and used as a baseline data of the studied patients.

Tool (1): Patient assessment tool:

This tool was developed by the researcher after reviewing of the related literatures (**Aboziad, et al. 2021 & Hames et al., 2023**). This tool comprised three main parts:

Part (1): demographic data: It included the assessment of patient profile as: Patient' code, age, gender, marital status, and level of education, occupation, and residence).

Part (2): Clinical Data

This section covered the following:

Past Medical History: Included prior occurrences of myocardial infarction, coronary stent placement, and congestive heart failure. **Current medical History**: Focused on the patient's medical diagnosis, the purpose of the catheterization, habits, and the presence of chronic conditions such as diabetes, hyperlipidemia, hypertension, pulmonary issues, or other diseases, and **family history:** Assessed the presence of hereditary conditions such as coronary heart disease, cerebrovascular disease, hypertension, or peripheral vascular disease.

Part (3): Diagnostic tests and Laboratory Investigations: which include Complete blood count Liver and renal function test, viral hepatitis, Chest X ray, Echocardiography, and ECG).

Tool II: Patient Perception Assessment Tool

This tool was developed by the researcher based on a review of relevant literature (Albugami et al., 2020; Zaid et al., 2020; Tseng et al., 2023; Hames et al., 2023). It is designed to evaluate patients' perceptions of their experiences with cardiac catheterization. The

tool measures the level of patient understanding and perception regarding cardiac catheterization.
It consists of 11 questions addressing topics such as: the definition of cardiac catheterization, types of cardiac catheterization, causes and indications of the procedure, contraindications, potential complications and their prevention post-procedure precautions.

Scoring system:

Each complete answer got score of (2) and incomplete answer got score of (1) but unknown answer got score of (0). The total degrees are ranged from 0 to 22 degrees.

- Patients who scored (60%) or more were considered as having "good" perception (Acceptable level).
- Those scored (60%) or less were considered as having "poor" perception (Un acceptable level).

Tool III: Short Assessment Patient Satisfaction (SAPS) tool:

This tool, originally developed by **Hawthorne, et al. (2006)** and later utilized by **Young, et al. (2022**), is the Short Assessment of Patient Satisfaction (SAPS). It is designed to evaluate patient satisfaction levels and their perspectives on the effectiveness of treatment. Additionally, it helps identify areas for improving practices and addressing patient concerns. The tool also provides valuable insights to demonstrate the effectiveness of healthcare services.
Hawthorne et al.'s SAPS tool is widely acknowledged for its practicality in clinical environments, offering a balance between thoroughness and simplicity in assessing patient satisfaction. The SAPS consists of 7 items, making it both concise and easy to use. Most patients can complete it in under a minute.

Scoring system:

SAPS generally uses a **Likert scale** for scoring responses (e.g., from 0-5), where patients rate their level of satisfaction across different area as: Completely Satisfied= 4 score, Satisfied =3 score , Neutral =2 score , Unsatisfied = 1 score , Completely Unsatisfied =0 score The sum all scores is 28. The score range is from 0 (extremely dissatisfied) to 28 (extremely satisfied).

Methods

- The study was approved by the Dean of the Faculty of Nursing at Assuit University and received authorization from the Director of Hospitals to proceed. After obtaining official permission from the director of hospitals.
- The tool one and two used in this study were developed by the researcher based on reviewing the relevant literature.
- Each patient was interviewed by the researcher by using pre-constructed tools .

Validity: The tools were assessed for content validity by a panel of five experts in critical care nursing and critical care medicine from Assiut University Hospital. Necessary modifications were made based on their feedback.

Reliability:

The reliability of the tools was evaluated using Cronbach's alpha. Tool I achieved a reliability coefficient of 0.892, and Tool II scored 0.789, both of which are considered acceptable.

Pilot study:

Pilot study was carried out on (10%) ten patient who met the predetermined selection criteria in order to assess the clarity and applicability of the tools. Some minor modifications based on the result of the pilot study were made to have more applicable tools for data collection. Some statements were omitted, added or rephrased, and then the final forms were developed, so the 10% of the subjects selected for the pilot study.

Ethical considerations:

The study was conducted meticulously, adhering to ethical guidelines for clinical research and ensuring the protection of participants' rights. The research proposal was approved by the Ethical Committee of the Faculty of Nursing, Assiut University, on 27/11/2023. Written informed consent was obtained from all participants prior to their inclusion in the study.
The study followed standard ethical principles in clinical research. Participants were informed of their rights to decline, withdraw, or participate voluntarily. Confidentiality and anonymity of the respondents were assured, and they were explicitly informed that all collected data would be used solely for research purposes.
Official and non- official permission to carry out the study were granted by the researcher was taken from the responsible authorities of cardiac catheterization units at Assiut university heart hospital and Assiut general hospital after explanations the aim of study.

Data collection:

- Once permission granted to proceed with the proposed study, researcher started the data collection.
- The researcher defines criteria for selecting patients (e.g., those who have undergone cardiac catheterization, are 18 years or older, and are able to give consent).
- Identify eligible patients through hospital records or directly in the cardiac catheterization unit.
- At initial interview the researcher introduce herself to initiate line of communication then the aims of the study were explained to the patients and responsible persons.
- Obtain informed consent, ensuring patients understand their participation is voluntary and anonymous.

- The researcher performed the data collection in the bed side location to decrease any effort may cause effect on the patients individually.
- Administer the questionnaire in a comfortable setting to ensure they are relaxed and focused.
- The questionnaire can be administered via face-to-face interviews.
- The data was collected after two hours of catheterization performance as the patient was hemodynamically stable.
- Data collection was conducted across all three shifts (morning, evening, and night).
- The researcher began assessing the patients on their first day of admission, recording demographic details, clinical data, diagnostic tests, and laboratory results. This information was retrieved from the patient's records using Tool I, which required approximately 15–20 minutes.
- Patient perceptions were evaluated using Tool II, categorizing perceptions as unacceptable (<60%) or acceptable (≥60%). This process took about 20–25 minutes.
- Patient satisfaction was measured using Tool III, with scores ranging from 0 (extremely dissatisfied) to 28 (extremely satisfied). This assessment took about 10–15 minutes.

Statistical analysis:

The data were tested for normality using the Anderson-Darling test and for homogeneity variances prior to further statistical analysis. Categorical variables were described by number and percent (N, %), where continuous variables described by mean and standard deviation (Mean, SD). Chi-square test and fisher exact test used to compare between categorical variables. person Correlation Used to Appear the Association between Patient perception assessment tool and Short Assessment Patient Satisfaction (SAPS). A two-tailed $p < 0.05$ was considered statistically significant All analyses were performed with the IBM SPSS 26.0 Software

Results

Table(1):Distribution of Socio demographic data among studied Patients (n=100)

	No	%
Age group		
Less 0than 40 years	8	8.0
From 40-50 years	28	28.0
From 50-60 years	33	33.0
More than 60 years	31	31.0
Mean ±SD(range)	**55.10±11.12(23-86)**	
Gender		
Male	63	63.0
Female	37	37.0
Marital Status		
Single	1	1.0
Married	96	96.0
Widow	3	3.0
Education Level		
Illiterate	29	29.0
Basic Reading and Writing	19	19.0
Intermediate Education	36	36.0
Higher Education	16	16.0
Occupation		
Employee	38	38.0
Laborer	16	16.0
Unemployed	21	21.0
Homemaker	25	25.0
Residence		
Rural	59	59.0
Urban	41	41.0

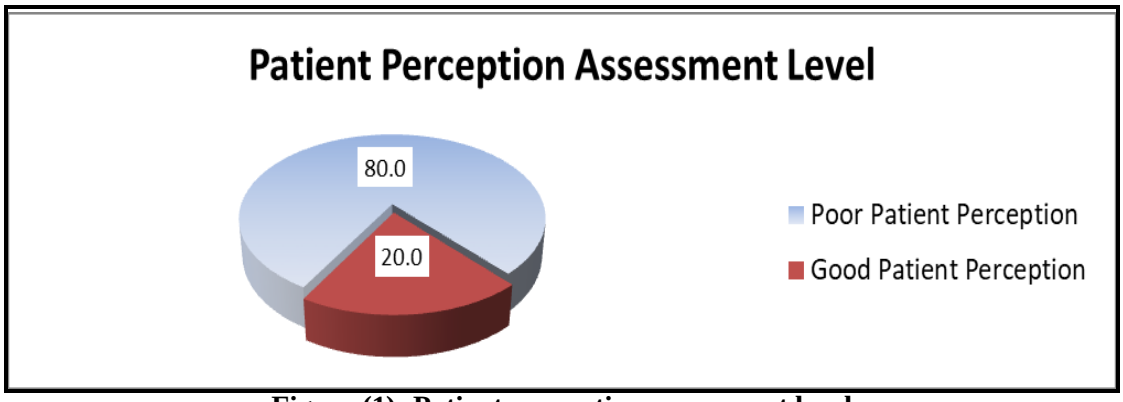

Figure (1): Patient perception assessment level

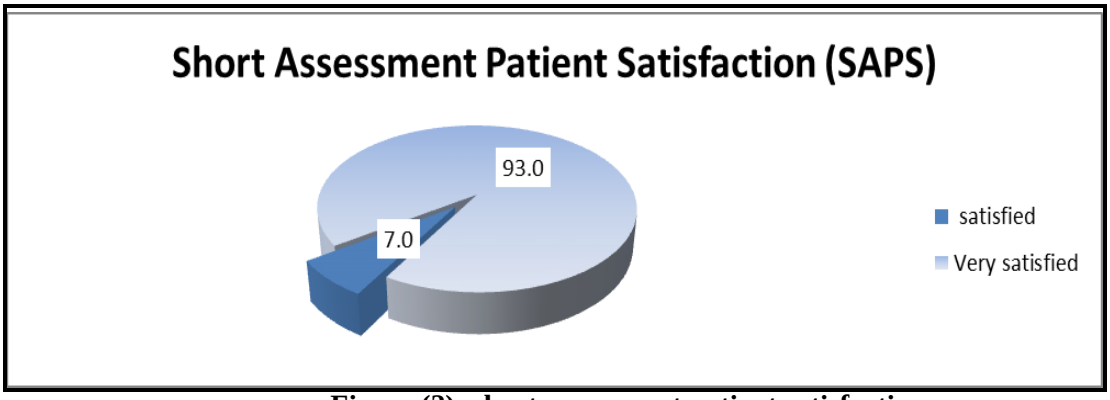

Figure (2): short assessment patient satisfaction

Table (2): Relationship Between Patients Perception with Their Socio Demographic data (n=100)

	Patient perception assessment tool				X2	P. value
	Unacceptable (n=80)		Acceptable (n=20)			
	No	%	No	%		
Age group						
Less 0than 40 years	6	7.5	2	10.0	6.29	0.098
From 40-50 years	19	23.8	9	45.0		
From 50-60 years	26	32.5	7	35.0		
More than 60 years	29	36.3	2	10.0		
Gender						
Male	53	66.3	10	50.0	1.81	0.178
Female	27	33.8	10	50.0		
Marital Status						
Single	1	1.3	0	0.0	1.04	0.594
Married	76	95.0	20	100.0		
Widow	3	3.8	0	0.0		
Education Level						
Illiterate	27	33.8	2	10.0	76.56	0.000**
Basic Reading and Writing	19	23.8	0	0.0		
Intermediate Education	34	42.5	2	10.0		
Higher Education	0	0.0	16	80.0		
Occupation						
Employee	22	27.5	16	80.0	19.65	0.000**
Laborer	16	20.0	0	0.0		
Unemployed	20	25.0	1	5.0		
Homemaker	22	27.5	3	15.0		
Residence						
Rural	49	61.3	10	50.0	0.84	0.360
Urban	31	38.8	10	50.0		

Table (3): Relationship Between Patient Satisfaction (SAPS)With Their Socio Demographic data (n=100)

	Short Assessment Patient Satisfaction (SAPS):				X2	P. value
	Satisfied (n=7)		Very Satisfied (n=93)			
	No	%	No	%		
Age group						
Less 0than 40 years	0	0.0	8	8.6	1.67	0.643
From 40-50 years	1	14.3	27	29.0		
From 50-60 years	3	42.9	30	32.3		
More than 60 years	3	42.9	28	30.1		
Gender						
Male	5	71.4	58	62.4	0.23	0.632
Female	2	28.6	35	37.6		
Marital Status						
Single	0	0.0	1	1.1	0.31	0.855
Married	7	100.0	89	95.7		
Widow	0	0.0	3	3.2		
Education Level						
Illiterate	2	28.6	27	29.0	1.67	0.645
Basic Reading and Writing	2	28.6	17	18.3		
Intermediate Education	3	42.9	33	35.5		
Higher Education	0	0.0	16	17.2		
Occupation						
Employee	3	42.9	35	37.6	1.30	0.730
Laborer	2	28.6	14	15.1		
Unemployed	1	14.3	20	21.5		
Homemaker	1	14.3	24	25.8		
Residence						
Rural	3	42.9	56	60.2	0.81	0.368
Urban	4	57.1	37	39.8		

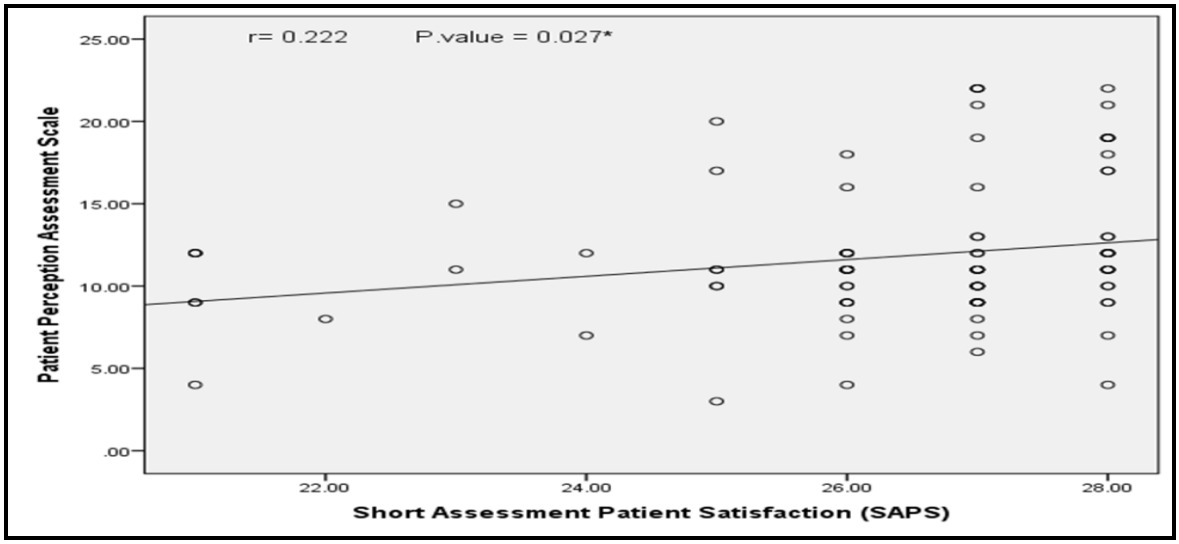

Figure (3): Correlation between patients' perception and satisfaction

Table (1): The data shows that the mean age of the studied population is 55.10 ± 11.12 years. The majority of patients (61%) fall within the age range of 50–60 years and older. There is a male predominance, with 63% of the patients being male and 37% female. A significant majority of the patients (96%) are married. Education levels vary, with 36% having an intermediate level of education. Approximately 38% of the patients are employed. Additionally, more patients reside in rural areas (59%) compared to urban areas (41%).

Figure (1): Revealed that a significant majority of patients, comprising 80%, had poor perception level while only 20% of patients ,had good level of perception .

Figure (2): Showed that 93% of studied patients were very satisfied according to Short Assessment Patient Satisfaction (SAPS) Level, while only 7% of patients were satisfied.

Table (2): The relationship between patients' perception (measured by the Patient Perception Assessment Tool) and socio-demographic factors reveals the following:

- **Education**: A highly significant relationship exists (p = 0.000), with 80% of patients with "Acceptable" perceptions having higher education.
- **Occupation**: A significant relationship is noted (p = 0.000), as 80% of the "Acceptable" group are employed.
- **Regarding age**: No statistically significant relationship (p = 0.098).
- **As regard to gender**: No significant difference (p = 0.178), though 66.3% of males reported "Unacceptable" perceptions.
- **Marital status**: No significant relationship (p = 0.594), with 95% of the "Unacceptable" group being married.

And place of residence: No significant difference (p = 0.360), with the majority residing in rural areas (61.3% in the "Unacceptable" group).

Table (3): Showed that there was no statistically significant difference between patient satisfaction **(SAPS)**with their socio demographic data.

Figure (3): Showed the Scatterplot illustrating a Statistically Significant Positive correlation between Patient perception assessment tool and Short Assessment Patient Satisfaction (SAPS) (r=0.222 P= 0.027*)

Discussion:

Patients' perceptions and satisfaction levels regarding cardiac catheterization are influenced by several factors, including the adequacy of information provided, communication with healthcare providers, and management of pain and discomfort. Patients who feel well-informed about the procedure, experience clear and empathetic communication, and receive effective post-procedure care tend to report higher satisfaction. Trust in healthcare professionals, emotional support from staff and family, and perceived health improvements also play key roles in shaping positive perceptions. Overall, patient education and emotional support are essential to enhancing satisfaction before and after cardiac catheterization **(Eşkut, et al., 2021).** So, this study aimed to assess the patients' perceptions and satisfaction levels regarding cardiac catheterization.

Regarding to age the present study showed that the largest proportion of patients are between the ages of 50-60, followed closely by those over 60 years. The researcher opinion that this age distribution is consistent with the fact that cardiovascular diseases are more prevalent in older adults due to age-related risk factors such as hypertension, diabetes, and hyperlipidemia.

This is consistent with **Laurent & Boutouyrie, (2020) & Peila, et al., (2023)** which emphasizes the increased risk of cardiovascular diseases in aging populations due to factors like arterial stiffness, hypertension, and atherosclerosis.

The gender distribution in this study showed a male predominance, the researcher point of view that this aligns with established research indicating that men are at a higher risk for heart disease, particularly at younger ages compared to women. The gender difference in cardiac catheterization may also reflect men's higher exposure to traditional risk factors like smoking and a sedentary lifestyle.

In this line, **Jovanovic, et al., (2024)** highlighted that men are more likely to develop coronary artery disease earlier than women, primarily due to hormonal differences and lifestyle-related risks such as smoking and high cholesterol. However, **Freisling, et al. (2020) & Roeters, et al. (2023)** noted that while men are more frequently diagnosed at younger ages, this gender gap diminishes significantly in older populations. This discrepancy may suggest that women in this study could be underrepresented due to social, cultural, or healthcare access barriers, or potential selection bias.

This is supported by **Ng, et al. (2020)** reported that men are more prone to developing heart disease at an earlier age due to risk factors such as smoking, elevated blood pressure, and unhealthy lifestyle habits. The findings confirm that men are typically diagnosed with coronary artery disease (CAD) at younger ages compared to women, particularly before the protective effects of estrogen wane in women after menopause.

In the other hand, **Hart, (2022)** found that women, particularly post-menopausal women, experience heart disease at rates closer to men as they age, due to the loss of estrogen's protective cardiovascular effects. Thus, the study's male predominance might overlook the growing recognition of heart disease as a significant risk for women, particularly in older populations.

Regarding to residence, in the present study, a higher proportion of patients live in rural areas. the researcher's opinion, Rural residents may face more significant barriers of low sociodemographic level. This could delay diagnosis and treatment, potentially leading to more advanced disease states by the time they undergo procedures like cardiac catheterization.

The higher representation of rural patients aligns with findings by **Zhong, et al. (2021),** who reported that

rural populations often experience worse cardiovascular outcomes due to delayed access to specialized care and limited preventive healthcare, despite having a similar or higher prevalence of risk factors compared to urban populations. Similarly, **McGrath, et al. (2022)** highlighted that individuals in rural areas face significant health challenges due to restricted access to specialized healthcare services, such as cardiologists. As a result, rural patients are frequently diagnosed at more advanced stages of heart disease, leading to an increased need for interventional procedures like cardiac catheterization.

Additionally, **Sharma, et al. (2023)** noted that certain rural regions with intense agricultural or industrial activities might have higher exposure to pollutants, such as pesticides or emissions from agricultural waste, which can adversely affect cardiovascular health.

The present study revealed that a significant majority of patients, comprising, had "poor" perception level category. The researcher opinion that the high percentage of poor perceptions and the low mean score indicate a need for improved communication strategies and education about the procedure. This may be due to limited access to support resources, such as rehabilitation services or educational materials, can hinder the patient's recovery experience.

This supported by **Harden, et al., (2022)** study who interpret that their lack of familiarity with the procedure can result in heightened anxiety, poor understanding, and misconceptions. In addition, **Hu, e al., (2024)** reinforced that first-time patients often experience high levels of anxiety and fear due to uncertainty about the procedure and its outcomes. This anxiety can negatively influence their perception of the procedure and reduce their ability to retain critical information provided by healthcare professionals that match with **AHA, (2021)** by **Bangalore, et al.,** who emphasized on providing detailed explanations of the procedure, expected sensations, and post-procedure recovery can mitigate fear and improve patient satisfaction.

In this context, **Afrassa, et al., (2022)** found that the patients do not receive comprehensive and clear information about cardiac catheterization, they may not fully understand its purpose, benefits, and risks. Educational resources may be lacking or overly complex, making it hard for patients to grasp essential details about the procedure.

So, **Malliarou, et al., (2022)** suggested that ongoing emotional and psychological interventions are essential in improving patients' perceptions of invasive procedures like cardiac catheterization. **de Carvalho, et al., (2022)** supporting that the multidisciplinary emotional support contributes to more positive patient perceptions and greater satisfaction with invasive cardiac procedures.

In this regard, **Amin, et al., (2020)** reported that the patients with lower levels of health literacy often struggle to understand medical information, leading to misconceptions or anxiety about procedures like cardiac catheterization adding that health literacy influences how patients process and apply information regarding medical procedures. But, **Smith & Lee, (2023)** disagreed with them and indicates that factors like cultural beliefs, emotional readiness, and trust in the healthcare system may influence patient perceptions and understanding more significantly than health literacy alone.

Jones & Davis, (2023) also points out that patients' prior experiences with the healthcare system and previous medical procedures can shape their understanding and attitudes more than health literacy alone. For instance, patients who have had positive healthcare experiences may feel more confident and less anxious about new procedures, even if their health literacy is limited.

Brown & Taylor, (2023) added that access to educational resources, such as easy-to-understand videos or community health workshops, can improve patient understanding independently of health literacy.

This contrasts with the findings of **Shao, et al. (2020),** who emphasized that key factors contributing to patients' positive perceptions included effective communication from healthcare providers and comprehensive pre-procedure education. Similarly, **Amer, et al. (2021)** noted that patients often experienced reassurance and trust in their healthcare providers, significantly enhancing their perception of the care provided during cardiac catheterization.

The researcher concluded that patients generally held a favorable view of the care they received, as indicated by high SAPS scores. These findings can help healthcare providers identify and maintain their strengths while addressing areas for improvement to further enhance patient satisfaction.

The present study revealed that the majority of studied patients reported higher level of satisfaction .the researcher opinion that satisfaction was closely related to the quality of care during and after the procedure, emotional support and clear communication from the medical team also the small number of patients attending the cardiac catheterization unit , which enable health care provider to provide satisfactory health services for patients .The most important factor that drives patient satisfaction is the good hospital policy , cleanliness and technical competencies of the staff.

In this line, **Bangalore, et al., (2021)**assessed patient's satisfaction levels following cardiac

catheterization procedures. The authors found that a significant percentage of patients expressed high satisfaction with their care, particularly when they received thorough explanations before the procedure.

In this context, **Boyer, et al., (2020) & Chen, et al., (2021)** indicated that satisfaction was related to the quality of care, including the professionalism of the staff and the effectiveness of pain management during and after the procedure. Also, the importance of emotional support and effective communication in enhancing patient satisfaction and found that patients who received emotional support and clear communication from the medical team reported significantly higher satisfaction scores.

In the other hand, **Naidu, et al., (2021) & Kaplan, et al., (2023)** highlighted that many patients felt inadequately prepared for the procedure and experienced significant anxiety, leading to lower satisfaction levels. also, they found minority patients, including those undergoing cardiac procedures, often reported lower satisfaction levels due to communication barriers, cultural differences, and perceived discrimination within the healthcare system.

Moreover, **Hassan, et al., (2021) & de la Blanca, et al., (2023)** found a significant portion of patients reported dissatisfaction due to pain management issues during and after the procedure. Patients indicated that their pain levels were not adequately addressed, which detracted from their overall satisfaction. Also, pre-procedural anxiety negatively impacted patient satisfaction, regardless of the quality of care received.

Regarding perception level with socio demographic factor the present study found that there was a statistically significant correlation between the perception level with education level and occupation of the studied patients. Education level and occupation are significantly associated with patients' perception of care. Patients with higher education and those who are employed tend to have more "Acceptable" perceptions of care.

This match with**, Schooley, et al., (2020)** who found that although education is often associated with better health literacy, higher-educated patients can sometimes be more critical of the care they receive and have more "Acceptable" perceptions of care.

In the other hand, **Baljepally & Wilson, (2021)** highlighted that while socio-demographic factors like age, gender, marital status, and residence often influence patient perceptions, their direct effects are frequently confounded by other variables such as socio-economic status, health literacy, and access to healthcare.

The present study showed that there is no statistically significant difference between patient satisfaction (SAPS) and their socio-demographic data, it means that variables such as age, gender, marital status, education level, and possibly other demographic factors like income or occupation do not significantly influence how satisfied patients are with the cardiac catheterization procedure. The researcher point of view that this might suggest that satisfaction with the procedure is more likely tied to other factors, such as the quality of care received, communication with healthcare providers, or the success and safety of the procedure itself, rather than patient demographics.

This supported with, **Afify, et al., (2022)** found that patient satisfaction varied significantly across age groups and gender. Older patients tended to report higher satisfaction, while younger patients and females, in particular, were more critical of their healthcare experiences and suggests that certain demographic groups may experience and evaluate care differently.

Nguyen, et al., (2020) found that employed patients reported higher satisfaction with healthcare services compared to unemployed individuals. The research suggested that employed individuals may have more structured health benefits and access to timely medical care, contributing to better perceptions of care quality. education level strongly influences how patients perceive the quality of care they receive.

This match with **Amin, et al., (2020) & Schooley, et al., (2020)** highlighted that individuals with higher health literacy tend to be more satisfied with their care, as they are better able to communicate their needs and comprehend treatment plans.

However, **Pierce, et al., (2023) & Mohamed, (2024)** examined the differences in patient satisfaction between urban and rural populations and found that while rural residents reported certain challenges in accessing care, these challenges did not translate into significant differences in overall satisfaction levels when compared to urban residents. This suggests that other contextual factors, such as healthcare quality, may overshadow the impact of residence on patient satisfaction.

The present study showed that there was a statistically significant positive correlation between the Patient Perception Assessment Tool and the Short Assessment of Patient Satisfaction (SAPS) suggests that as patients' perceptions of their care improve, so does their satisfaction. The researcher highlights the importance of ensuring that patients have a positive perception of the care they receive, which can be influenced by clear communication, understanding of the procedure, and patient-centered interactions. Although the correlation is weak, it emphasizes that patient perception plays a meaningful role in shaping overall satisfaction and should be a focus for improving patient care experiences.

In this line, **Natha, et al., (2021)** found a significant link between patients' perceptions of care quality and their overall satisfaction. Patients who felt their healthcare providers communicated well and involved them in decision-making reported higher levels of satisfaction, reinforcing the idea that perception is a key driver of satisfaction.

Additionally, **Hames, et al., (2023)** found that patient satisfaction was closely associated with patients' perceptions of the quality of communication, care coordination and respect for their preferences, strongly predict patient satisfaction in various healthcare settings.

In contrast, **Beckerman, et al., (2019)** found that while communication and interpersonal care had some influence, clinical outcomes and tangible aspects like wait times and hospital infrastructure had a stronger impact on patient satisfaction than perceptions alone, suggesting that satisfaction may be driven more by objective factors than subjective perceptions.

While, **Lyons, et al., (2022)** argued that although patient perception influences satisfaction, the most significant determinant of satisfaction is the actual clinical outcome. Patients with positive health outcomes were more satisfied, even if their perceptions of communication or care delivery were less favorable.

Magdaa, et al., (2019) found that patient satisfaction was complex and multi-dimensional. While perceptions of care mattered, factors such as previous healthcare experiences, expectations, and personal values had a more profound influence on satisfaction levels, challenging the idea that perception alone drives satisfaction.

Conclusion:

Based on the research findings:

The present study revealed that a significant majority of patients were found to have a "poor" perception level. Most patients reported a high level of satisfaction. There was a statistically significant positive correlation between the Patient Perception Assessment Tool and the Short Assessment of Patient Satisfaction.

Recommendations:

based on the results of the present study, the following is recommended:

For Patients:

- Develop tailored, patient-centered educational programs to address key knowledge gaps, particularly regarding the meaning, types, purposes, and post-procedure care of cardiac catheterization.
- Provide comprehensive pre-procedure counseling to ensure patients fully understand the purpose and necessity of the procedure, as well as strategies to prevent complications afterward.

For nurses:

Conduct periodic assessments of nurses' knowledge to evaluate their expertise in cardiac catheterization units.

Encourage nurses to participate in specialized workshops and meetings to stay updated on the latest advanced skills and developments in cardiac catheterization.

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