

Patients Sociodemographic Characteristics And Pain Of Sheath Removal After Percutaneous Coronary Intervention

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Abstract

Objective: to assess the pain of arterial femoral sheath removal after percutaneous coronary intervention and correlation of sociodemographic data with pain.

Place and Duration of Study: The study had been done at the Ibn al-Nafis Teaching Hospital in Baghdad, the Karbala Center for Cardiac Surgeries and Catheterization, and the Al-Imam Alhassan Al Mujtaba Teaching Hospital during the period from 1 September 2024 to 1 February 2025.

Methods: A descriptive study used to assess correlations and differences of demographic data among pain intensity. With simple random sampling to allocate sample size

Results: The study results indicate that the mean age was 56, BMI was 26, and pain was 61. There are no significant differences between pain and smoking.

The study of pain related to removing the femoral artery sheath after percutaneous coronary intervention (PCI) shows how important both procedural and demographic factors are in determining patient discomfort. Our findings indicate age, gender, and body mass index can significantly influence pain levels. and pre-existing health conditions. Additionally, the technique of sheath removal—whether manual or facilitated by closure devices—also plays a crucial role in pain perception.

Keywords: pain, percutaneous coronary intervention.

Introduction:

Cardiovascular diseases (CVDs) are a group of conditions that affect the heart and circulatory system. These conditions include coronary artery disease, congenital cardiovascular disease, and rheumatic heart disease (1,2). About 90% of cardiovascular disease-related fatalities take place in middle- or low-income nations (3,4). Ischemic heart disease (IHD), another name for coronary artery disease (CAD), is thought to be the most common type of CVD (5,6). In many nations, CAD is a leading cause of morbidity and death and remains one of the most significant categories of heart disease (7,8). According to recent research, the prevalence of IHD is steadily rising worldwide, making it one of the biggest hazards to public health (9). Angiography is the gold standard for diagnosing CAD and is commonly used for CAD evaluation (5). For example, percutaneous coronary intervention, artificial implantation, valve replacement, heart transplantation, and coronary artery bypass graft (CABG) must be used to treat IHD (10). One common method used to treat IHD is percutaneous coronary intervention (11,12).

PCI is an invasive, non-surgical way to improve blood flow to the heart by opening up a blocked or narrowed coronary artery (12). Transfemoral access (TFA) has historically been the method of choice for doing PCI because the bigger artery makes it easier to cannulate the artery, manipulate catheters, implant mechanical support devices simultaneously, and provide quicker door-to-balloon timeframes (13). During cardiac catheterization, an X-ray is used to guide a tiny tube catheter into the vein or artery system and then to the coronary blood vessels or another organ in the system (14). Following PCI, patients frequently experience pain from a variety of sources, including headache, back, and puncture site discomfort (15). Removing the artery sheath and applying pressure at the catheter insertion site can cause discomfort in PCI patients (16).

One of the primary duties of healthcare providers, particularly nurses, is to prevent and reduce postoperative pain (17). As a result,

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it is the ethical and professional duty of nurses to provide their patients with efficient pain management (18). Understanding the variation in pain sensations among PCI patients requires knowledge of demographic information. Analgesic response and pain perception might be impacted by age-related physiological changes. For example, younger people may react differently psychologically to pain, while older persons may have changed pharmacokinetics that affect therapeutic effectiveness. Further complicating the measurement of discomfort during sheath removal are cultural and socioeconomic variables that might influence how patients express and manage their pain (19).

When arterial sheaths are taken off, not managing and controlling pain properly can lead to a number of serious problems, including high blood pressure, a fast heart rate, and a need for more oxygen, all of which can lead to myocardial ischemia, myocardial infarction, and left ventricular dysfunction. (20,21). With these factors in mind, the goal of this study is to find out if there is a link between various demographic factors and the pain experienced during the removal of the femoral artery sheath following PCI. We aim to find trends that can guide clinical treatment by examining patient data, such as age and comorbidities. The results might help create evidence-based protocols for treating sheath removal discomfort, which would improve patient outcomes and satisfaction in interventional cardiology settings. In order to provide highquality treatment and enhance the entire experience of patients undergoing PCI procedures, it is still critical to consider patient comfort as the profession develops.

METHODS

Study design

A descriptive study examined the correlations and differences between demographic data and pain intensity.

Setting and period

In order to receive logical and universal data, the study had been done at Ibn al-Nafis Teaching Hospital in Baghdad, Karbala Center for cardiac surgeries and catheterization and at al-Imam

Alhassan Al Mujtaba teaching hospital during the period from 1 September, 2024, to 1 February 2025.

Study Participant:

The study population of patients in The sample was from the coronary care unit. One group of 31 patients is going to sheath removal after percutaneous coronary intervention.

Inclusion and exclusion criteria:

a patient who is going to remove the femoral sheath after therapeutic PCI, able to speak and understand Arabic, over 18 years of age, not consuming analgesics for at least four hours. The exclusion criteria: Patients who declined to participate in the study met the exclusion criteria. Any patient with a psychiatric disorder was excluded from the study. The patient underwent successful percutaneous coronary intervention without any complications that required cardiopulmonary resuscitation, such as a pulse rate less than 60, a hearing defect, a visual problem, or a decreased level of consciousness.

Sampling and sample size

A simple random sampling method involves selecting representative elements of a population, specifically patients who are going to remove their sheath after therapeutic PCI. The sampling procedure involves distributing a sealed envelope containing two colours, white and red, to each client, who is then asked to select one colour. White colour to involve in the study and red colour for exclude from the study. Anticipated effect size (Cohen's d) 0.8 which consider large effect size, desired statistical power level (0.8) and probability level 0.05.

Study instruments and data collection:

The study questionnaire contains two sections; the first one is for demographic characteristics, which contain age, smoking, smoking years, number of cigarettes, BMI, pain, occupation, and chronic disease, the second part of the study contains a visual analogue scale This scale will be used to evaluate the intensity of pain experienced by individuals during the sheath removal. The first used by Hayes and Patterson in 1921. The wide use of VAS in the literature indicates how this tool is crucial to assessing the intensity of pain,

and its validity and reliability have been confirmed and used by many studies to evaluate the pain(22,23)

The reliability of the VAS was 0.97. The VAS evaluates pain on a scale of 1–100, classifying it as "none" (0–4 mm), "mild" (5–44 mm), "moderate" (45–74 mm), or "severe" (75–100 mm). We use a ruler to measure the distance between the anchor (0 mm) and the client's mark on the VAS.

Ethical considerations

At first the proposal will be administered to the scientific committee in the adult nursing department after that will obtain the agreement from the council of the College of Nursing, University of Baghdad. The Institutional Review Board (IRB) in the College of Nursing at the University of Baghdad will receive the study protocol. After that, The study will be administered to the Center for Training and Developing Staff. of the Health Ministry in Iraq. Furthermore, the study protocol and detailed description will be given to the Ministry of Planning/Central Statistical Analysis. Also, approvals will be obtained from cardiac surgery centres in Karbala at Al-Imam Al-Hassan Al-Mujtaba Teaching Hospital and Ibn Al-Nafees Teaching Hospital, and to get approval from participants, the researcher will take oral or written agreement from the participant to vote—entering in this study. Also, explain the experiment, procedures, time of procedures, and the fact that there's no benefit to participating in this study, and any risks of injuries, and the subject has the right to discontinue participation at any time without penalty. Finally, all information will be kept anonymous, like name, job, and living. And this information will be used only for research and kept confidential. We will administer informed consent to all patients before they participate in the study.

Statistical analysis

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Descriptive and inferential statistical procedures were conducted. SPSS Statistics (version 26).

Results:

According to the result of this study, the result revealed the mean age for study participants was 56.10 ± 7.9 , with a minimum of 39 years and a maximum of 70 years. On the other hand, based on occupation subtypes, 12 participants, or 38.7%, were earners, while 11 participants, or 35.5%, were employed. Additionally, retired and unemployed participants, or 12.9% of each subtype, accounted for four patients. Out of the study sample, 48.4% had hypertension, 22.6% had diabetes mellitus, 16.1% had no chronic disease, and only 12.9 had both diabetes and hypertension. According to smoking, the results show that 9.7% are non-smokers, 32.3% are cigarette smokers, 16.1% are hookah smokers, 22.6% are cigarette and hookah smokers, and finally, 19.4% are previous smokers. According to previous PCI 27 patients, 31 samples have done previous PCI, and 4 patients have only done PCI previously. The mean pain score was 61.1 with a standard deviation of 12.06, indicating moderate pain, while the lowest pain score was 28 and the highest was 81. Finally, the result revealed that the mean BMI was 26.12 with 2.9 SD, which is considered pre-obesity. According to table 2 of study result of data distribution was non normal according to Shapiro walk with 0.06 sig level. The results of Table 2's Pearson correlation between age, BMI, and pain indicate that there is no significant correlation between these factors. The SIG level was 0.3 for both age and BMI. With a significance level of 0.02, Table 4 showed that there is a significant difference between smoking and pain. Other demographic data, such as differences in occupation, were 0.7, which is not significant. Also, the previous PCI for occupation and chronic disease showed that there are no significant differences.

Variable	Groups	Control		Сс	Sig
Age	Mean	n 56.10		.969	.386
	SD	7.922			
	Min	39			
	Max	70			
Occupation	Subtypes	F	%	.817	.501
	Employed	11	35.5		
	Earner	12	38.7		
	Retired	4	12.9		
	Unemployed	4	12.9		
	Total	31	100.0		
Chronic	No	5	16.1	.824	.383
disease	HTN	15	48.4		
	DM	7	22.6		
	Both	4	12.9		
	Total	31	100.0		
Smoking	No smoking	3	9.7	.859	.384
	Cigarette	10	32.3		
	Hoka	5	16.1		
	Both	7	22.6		
	Previously	6	19.4		
	smoker				
	Total	31	100.0		
Previous PCI	Yes	27	87.1	.632	.482
	No	4	12.9		
	Total	31	100.0		
BMI	Mean	26.	12401	.632	.482
			26104		
	Min		21.201		
	Max	32.112			
Pain1	Mean	61.13		.976	.221
SD		12.069			
	Min	28			

Table	1.	Max	81			distribution
of		•	•	•	•	

demographic data for each group of study.

Min=minimum. Max=maximum. SD= stander deviation. F=frequency. %=percentage. Cc= contingency coefficient. Sig= significant

Table 2. test of normality for data distribution.

Statistic	Statistics	Df	Sig
pain1	.937	31	.069

Df= degree of freedom, sig= significant

Table 3. Pearson correlations between age, BMI s with pain 1, pain2

Age	Pain1
Correlation	177
Sig	.341
BMI	Pain1
Correlation	166
Sig	.372
N	31

N= number of participants, sig= significant

Table 4. differences between pain1, pain2 and chronic disease, occupation and smoking.

Occupation	Pain1
One-way anova	70.325
Df	3
Asymp. Sig.	.931
Chronic	Pain1
Disease	
One-way anova	213.420
Df	3
Asymp. Sig.	0.7
Smoking	Pain1
One-way anova	1526.855

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Df	4
Asymp. Sig.	0.02
Previous PCI	Pain1
One-way anova	5.854
Df	1
Asymp. Sig.	.845

Sig= significant, df=degree of freedom

Discussion:

In this study, the age was 56, which is an important factor that affects the prevalence of ischemic heart disease and pain intensity, which is consistent with a study done in Iraq to examine the effect of aromatherapy on the pain of sheath removal (6). The link between age and pain was not significant. This is because the average age was over 56 years, which lowers the pain threshold and makes it less consistent. This outcome mirrors the findings from(24) . The results indicate that 38% of respondents are freelancers. The study sample is freelancers, which is the same finding found in study (14), which was done to find the effect of ice gel on pain. Following the removal of the femoral artery sheath, there were no differences in pain levels based on occupation, a finding that aligns with the previous study. On the other hand, the smoking result shows that most of the people in the study sample smoked. This was also found in the study, which looked at how a cold sand pack affected vascular complications after the sheath was removed. The study also found significant differences in pain intensity due to smoking. Research has demonstrated that individuals who smoke cigarettes experience more intense pain following surgery. This is clear because they feel pain later, have higher pain VAS scores, and have lower levels of beta-endorphin and higher levels of substance P in their cerebrospinal fluid (CSF)(25). Previous PCI revealed that most of the sample size have not done PCI. Previously, another study supported this result (6,26), and there was no difference in pain intensity. This aligns with the findings of other studies (26). Following the chronic disease, the study found that 48% of the sample had high blood pressure, which is similar to other studies

(26). High blood pressure is considered a major risk factor for IHD (27). The BMI result indicated that the study sample was pre-obese, in line with existing literature. Increased body weight can increase the risk of IHD (28). Ultimately, the average pain during sheath removal exceeded 60, a finding consistent with previous research (29).

conclusion:

The study of pain after femoral artery sheath extraction during percutaneous coronary intervention (PCI) shows how important procedure and patient demographic factors are in determining pain. Our research demonstrates that pain levels can fluctuate significantly according to age, gender, body mass index, and pre-existing health issues. The method of sheath removal, whether performed manually or aided by closure devices, significantly influences pain perception.

Recommendation:

Comprehending these characteristics is crucial for optimizing post-procedural care and improving patient comfort. Customizing pain treatment tactics to unique patient profiles may enhance results and satisfaction. Future research should concentrate on standardized techniques for sheath extraction and the application of multimodal analgesia strategies to effectively alleviate pain. By addressing these factors, healthcare practitioners can improve the entire experience for patients having PCI, hence facilitating enhanced recovery and quality of life following the surgery.

Reference:

- 1. Ike S, Onyema C. Cardiovascular diseases in Nigeria: What has happened in the past 20 years? Nigerian Journal of Cardiology. 2020;17(1):21. doi: 10.4103/njc.njc_33_19
- 2. Ahmad E. Cardiovascular Diseases (CVDs) Detection using Machine Learning Algorithms. Int J Res Appl Sci Eng Technol. 2020 Jun 30;8(6):2341–6. doi: 10.22214/ijraset.2020.6376
- 3. Gaziano TA, Prabhakaran D, Gaziano JM. 2 Global Burden of Cardiovascular Disease Additional content is available online at Elsevier eBooks for Practicing Clinicians. Available from: http://apps.who.int/gho/data/view.main.POP2040?lang=en.
- 4. Ndejjo R, Hassen HY, Wanyenze RK, Musoke D, Nuwaha F, Abrams S, et al. Community-Based Interventions for Cardiovascular Disease Prevention in Low-and Middle-Income Countries: A Systematic Review. Vol. 42, Public Health Reviews. Frontiers Media S.A.; 2021. doi: 10.3389/phrs.2021.1604018
- 5. Valikhani M, Mahdizadeh SM, Eshraghi A, Mazlum SR, Dehghani J. The Effect of Simultaneous Sand-Ice Bag Application on Hemorrhage and Hematoma after Percutaneous Coronary Intervention: A Randomized Clinical Trial. J Caring Sci. 2020 Dec 1;9(4):188–94. doi: 10.34172/jcs.2020.029
- 6. Al-Mussawi Gh, Al-Jubouri MB. Effect of Aromatherapy on Pain Intensity for Patients Undergoing Arterial Sheath Removal after Percutaneous Coronary Intervention: A Randomized Controlled Trial. Pakistan Journal of Life and Social Sciences. 2024; 22(1). 1427-36. https://doi.org/10.57239/PJLSS-2024-22.1.0096
- 7. Vaduganathan M, Mensah GA, Turco JV, Fuster V, Roth GA. The Global Burden of Cardiovascular Diseases and Risk: A Compass for Future Health. Vol. 80, Journal of the American College of Cardiology. Elsevier Inc.; 2022. p. 2361–71. doi: 10.1016/j.jacc.2022.11.005
- 8. Amini M, Zayeri F, Salehi M. Trend analysis of cardiovascular disease mortality, incidence, and mortality-to-incidence ratio: results from global burden of disease study 2017. BMC Public Health. 2021 Dec 1;21(1). doi: 10.1186/s12889-021-10429-0
- 9. Shu T, Tang M, He B, Liu X, Han Y, Liu C, et al. Assessing Global, Regional, and National Time Trends and Associated Risk Factors of the Mortality in Ischemic Heart Disease Through

- Global Burden of Disease 2019 Study: Population-Based Study. JMIR Public Health Surveill. 2024;10. doi: 10.2196/46821
- 10. World health orgnization. Cardiovascular diseases (CVDs), Internet. Geneva: WHO; 2023 [cited 2025 Jan 14]. Available from: https://www.who.int/chp
- 11. Demssis Y, Demissie Z, Alemayheu B, Fekadu C. Prevalence of Periprocedural Complications and Associated Factors of Percutaneous Coronary Intervention in Patients with Ischemic Heart Disease at Coronary Care Units of Tikur Anbessa Specialized Hospital and Gesund Cardiac and Medical Center, Addis Ababa, Ethiopia: A Retrospective Cohort Study. Research Reports in Clinical Cardiology. 2023 Sep;Volume 14:55–68. doi: 10.2147/rrcc.s419385
- 12. Abubakar M, Javed I, Rasool HF, Raza S, Basavaraju D, Abdullah RM, et al. Advancements in Percutaneous Coronary Intervention Techniques: A Comprehensive Literature Review of Mixed Studies and Practice Guidelines. Cureus. 2023 Jul 3; doi: 10.7759/cureus.41311
- 13. Changal K, Syed MA, Atari E, Nazir S, Saleem S, Gul S, et al. Transradial versus transfemoral access for cardiac catheterization: a nationwide pilot study of training preferences and expertise in The United States. BMC Cardiovasc Disord. 2021 Dec 1;21(1). doi: 10.1186/s12872-021-02068-5
- 14. Prasetya A, Handian FI. The effect of ice gel pack on pain reduction of sheath removal in post-cardiac catheterization patients. The Journal of Palembang Nursing Studies. 2023 Jan 29;2(1):67–74. doi: 10.55048/jpns.v2i1.79
- 15. Paganin AC, Beghetto MG, Feijó MK, Matte R, Sauer JM, Rabelo da Silva ER. Vascular complications in patients who underwent endovascular cardiac procedures: Multicenter cohort study. Rev Lat Am Enfermagem. 2018;26. doi: 10.1590/1518-8345.2672.3060
- 16. Nair M, Singal G, Yaduvanshi A, Kataria V. First in man: percutaneous coronary angioplasty using non-fluoroscopic electro-anatomic mapping. Int J Cardiovasc Imaging. 2020;36:1189–90.
- 17. Small C, Laycock H. Acute postoperative pain management. British Journal of Surgery. 2020 Jan 1;107(2):e70–80. doi: 10.1002/bjs.11477

- Mahama F, Ninnoni JPK. Assessment and Management of Postoperative Pain among Nurses at a Resource-Constraint Teaching Hospital in Ghana. Nurs Res Pract. 2019 Jul 18;2019:1–7. doi: 10.1155/2019/9091467
- 19. Zeleke S, Kassaw A, Eshetie Y. Non-pharmacological pain management practice and barriers among nurses working in Debre Tabor Comprehensive Specialized Hospital, Ethiopia. PLoS One. 2021 Jun 1;16(6 June). doi: 10.1371/journal.pone.0253086
- 20. Bayindir SK, Çürük GN, Oguzhan A. Effect of Ice Bag Application to Femoral Region on Pain in Patients Undergoing Percutaneous Coronary Intervention. Pain Res Manag. 2017;2017. doi: 10.1155/2017/6594782
- 21. Alhassani RY, Bagadood RM, Balubaid RN, Barno HI, Alahmadi MO, Ayoub NA. Drug Therapies Affecting Renal Function: An Overview. Cureus. 2021 Nov 26; doi: 10.7759/cureus.19924
- 22. Al-Jubouri MB, Jaafar SA, Abbas MK, Gazi IN, Shawwat MA, Karmoud KF, Al-Faham TM. Using cryotherapy, EMLA (eutectic lidocaine/prilocaine) cream, or lidocaine spray to reduce pain during arteriovenous fistula puncture: A randomized controlled trial. Hemodialysis International. 2024 Apr 11. 270-277. https://doi.org/10.1111/hdi.13152
- 23. Hussein AA, Al-Jubouri MB. Effect of Shotblocker on Venipuncture Pain among Blood Donors: A Randomized Controlled Trial. Bahrain Medical Bulletin. 2024 Mar 1;46(1). 1916 20
- 24. Mullins S, Hosseini F, Gibson W, Thake M. Physiological changes from ageing regarding pain perception and its impact on pain management for older adults. Clinical Medicine, Journal of the Royal College of Physicians of London. 2022 Jul 1;22(4):307–10. doi: 10.7861/clinmed.22.4.phys.
- 25. Wang F, Li H, Mu Q, Shan L, Kang Y, Yang S, et al. Association of Acute Postoperative Pain and Cigarette Smoking With Cerebrospinal Fluid Levels of Beta-Endorphin and Substance P. Front Mol Neurosci. 2022 Jan 10;14. doi: 10.3389/fnmol.2021.755799.
- 26. Sallal MH, Mousa AM. Reduction of pain intensity for patients undergoing arterial sheath removal after coronary artery

- angioplasty: An interventional program. Revista Latinoamericana de Hipertension. 2023;18(5):202–8. doi: 10.5281/zenodo.8364436
- 27. Masenga SK, Kirabo A. Hypertensive heart disease: risk factors, complications and mechanisms.Vol.10, Frontiers in Cardiovascular Medicine. Frontiers Media S.A.; 2023.doi:10.3389/fcvm.2023.1205475.
- 28. Held C, Hadziosmanovic N, Aylward PE, Hagström E, Hochman JS, Stewart RAH, et al. Body Mass Index and Association With Cardiovascular Outcomes in Patients With Stable Coronary Heart Disease A STABILITY Substudy. J Am Heart Assoc. 2022 Feb 1:11(3). doi: 10.1161/JAHA.121.023667
- 29. Sobh S, Ramadan M, Faried A, Ali A, Bassam E, El-Nady Y, et al. 397 Effect of Changing Angle of Bed on Pain Severity and Vascular Complications among Cardiac Catheterization Patients. Vol. 10, Mansoura Nursing Journal (MNJ.