

# LEVELS OF PAIN IN PATIENTS UNDERGOING CORONARY INVASIVE PROCEDURES IN TRANS-RADIAL VERSUS TRANS-FEMORAL APPROACHES: A CROSS-SECTIONAL STUDY

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## ABSTRACT

Trends for invasion site for coronary interventions are shifting from femoral to radial approach because of the advantageous effects. Assessment of pain associated with puncture site in both approaches (radial/femoral) is important. Purpose of this study is to find the difference in post procedural access site pain in patients undergoing coronary invasive procedures in trans-radial versus trans-femoral approach and its association with age, gender and BMI. A cross-sectional study was conducted with 75 randomly selected patients who underwent coronary invasive procedures. A structured questionnaire used for demographic and biophysical data, procedural data and Numerical Pain Rating Scale to assess the pain. Out of 75 patients 42 patients received trans-femoral access and 33 received trans-radial access. Post procedural access site pain in trans-femoral site felt at mild and moderate level 64.2% vs. 23.8 % respectively. While on same rating scale in radial group felt at mild and moderate level 42.4% vs. 33.3 % with  $p$ -value 0.611 ( $>0.05$ ). The mean difference in gender with males 69.3 % versus females 30.6 % showed from analysis that both sexes felt pain at mild level on pain rating scale resulting  $p$ -value 0.046 ( $<0.05$ ). Statistically significant level of pain was associated with obese patients resulting  $p$ -value 0.299 ( $>0.05$ ).

Patient undergoing coronary intervention through femoral site invasion experience more post procedural access site pain than radial site invasion. Pain level is increased in obese and aged population.

**Keywords:** Pain Measurement, Body Mass Index, Percutaneous Coronary Intervention, Early Ambulation and Quality of Life

## INTRODUCTION

Coronary artery disease (CAD) is not only the problem of the West, 80 % of deaths are caused due to CAD and 86% of the global burden of CAD is in the developing countries Abbas, Kitchlew & Abbas, (2009). Worldwide, Asian population is very vulnerable to CAD, and it is considered to be an important cause of death among the people of Asian continent Jafar, Qadri & Chaturvedi, (2007). Modern technology and improvement in cardiologists' skills have provided multiple treatment options for patients with CAD. These effective coronary interventions (angiography/angioplasty) provide direct visualization of anatomical

structure of coronary artery which is helpful in measuring the different heart functions Armendaris *et al.*, (2008). Coronary invasive procedures (CIP) are techniques used to detect vascular blockage via coronary angiography (CA) or to treat the blockage with angioplasty and implant stents to keep the lumen open using small inflatable balloon catheters. According to National Cardiovascular Data Registry (NCDR) radial and femoral arteries are the common access sites for puncture to carry out the CIP, (Siqueira, Brito Jr & Abizaid, 2014). Since the introduction of angiographic techniques, femoral artery is the preferred vascular route to carry out the procedure but a recent shift has been more towards radial approach. It is because of the

advantageous effects of access site comfort, short bed rest and free ambulation to use the bath room facility. Pain assessment associated with puncture site in both approaches (radial/femoral) is not much considered by health care providers as it may have effect on patients' behaviour and compliance to treatment plan.

Pain intensity is generally under-estimated in both diagnostic and surgical procedures. It remains a problem for many patients for inadequate pain management in hospital. Pain assessment and its measurement guide the health care providers to manage pain. It is systematic process to assess patient's pain experiences in physiological, emotional, cognitive and social dimensions. Various pain scales are important to measure the pain intensity. Comparing the benefits and harms of vascular access either radial or femoral complicates the procedures. A systematic incorporation of patient behaviour about pain at puncture site along with nurses' professional expertise may provide better directions for managing pain and to address the issues of safety and efficacy. Extensive literature has been found on safety issues, feasibility and efficacy of vascular access routes. Post procedural pain at puncture site in two approaches (radial vs. femoral) and their clinical outcomes are hardly ever investigated by cardiologists as they think that procedures are minimal in nature. Pain itself puts a burden on heart and vascular resistance increases which may cause angina pain McGrath *et al.*, (2004). Moreover, it may increase the work of nurses which delay to carry out routine activities.

## LITERATURE REVIEW

Several publications for post procedural coronary invasive complications exist between the two approaches i.e. radial and femoral. Most of previous studies have been carried out to observe the procedures, complications, care and usefulness of trans-radial artery access to CA and PCI compared to trans-femoral ones. However, literature on the study topic in clinical trials lacks at large scale in nursing at international level and even not a single study conducted in Pakistan is available that typically answers the research question.

Pain is a physiologic response and a very disgusting experience for an individual who can relate to actual or potential tissue injury (International Association for the Study of Pain, 2010). The procedural pain is even more complicated as it is procedure specific and patients' behave differently. Any diagnostic, therapeutic or

interventional procedures can cause pain. Now it is an ethical responsibility of all health care providers (nurses and interventionist) to be aware of the procedures and consider them while attending the patients and providing care (Ylinen, 2010). Pain assessment and management both are known to be complicated issues with physiological, psychological and social dimensions. Scientific pain scales are supportive in terms of pain measurement which directs to pain management (Brown, 2008).

A study was conducted in Turkey to compare pain levels of trans-radial versus and trans-femoral coronary catheterization. The study design was randomized in which 428 patients underwent CAG and/or PCI via trans-femoral approach (TFA) and 408 patients underwent coronary angiography (CAG) and/or percutaneous coronary intervention (PCI) via trans-radial approach (TRA). The levels of pain in patients were assessed with Visual Analog Scale (VAS) after catheterization and then at 30 days of intervention. It was found that radial approach for Coronary interventions in patients with small wrist circumference and low BMI may cause more access site pain as compared to femoral approach Aktürk *et al.*, (2014).

Another study conducted in United States compared the quality of life after radial versus femoral artery access for catheterization in women. This study was aimed to assess whether radial or femoral access impacts formal measures of quality-of-life (QOL) among women undergoing c-Faradic catheterization. No differences in QOL or functional status according to access site were found in women undergoing cardiac catheterization. However, patients' preference for the radial approach was significantly higher (Hess *et al.*, 2015). A study from Germany assessed 1024 patients with cardiac catheterization accessed through trans-radial or trans-femoral to evaluate the safety and feasibility. It was found that trans-radial coronary angiography and angioplasty are safe, feasible, and effective with similar results to those of the trans-femoral approach. But, duration of the procedure and radiation exposure is higher in the trans-radial access. As compared to the trans-femoral route, the vascular complication rate was negligible using the trans-radial approach (Brueck *et al.*, 2014).

The review of literature analysis was carried out to support the study i.e. comparison of post procedural

pain at puncture site in femoral vs. arterial methods. The vast amount of research was already conducted by doctors and nurses repeatedly showed that trans-radial approach is equally safe and as effective as the trans-femoral approach. The researchers also revealed that although total procedure time in the trans-radial approach may be longer but overall the hospital stay was short with trans-radial access. However, research focusing on patients' perspective about these two access site is still lacking with very limited literature address about the issue. Appropriate interventions may be taken by nurses to prevent from such adverse changes. Results of the study may serve as a basis of information for future similar researches to be conducted and empower the nurses at professional level.

### Study Aim

To find the difference in post procedural access site pain in patients undergoing coronary invasive procedures in trans-radial versus trans-femoral approach and it's the association with age, gender and BMI.

## RESEARCH METHODOLOGY

**Design:** A cross-sectional analytical design was used in this study to compare the post-procedural puncture site pain in patients undergoing coronary angiography, with or without angioplasty, via trans-radial versus a trans-femoral approach.

**Sample and Settings:** The study was conducted at a tertiary care hospital and a cardiac hospital, Lahore. The research population comprises of all the patients undergoing angiography/possible and elective angioplasty procedures due to coronary artery disease and angina symptoms in femoral vs. radial approach as per inclusion and exclusion criteria.

**Ethical Considerations:** The ethical approval were obtained from The University of Health Sciences institutional review board (approval no. UHS-ION-2076). The Ethical Review Committee for Medical and Biomedical Research. In addition, all scales in this study were used with permission from their respective developer. Participation in this study was voluntary and respondents were informed about their rights to refuse or withdraw from the study at any time. Participation was also anonymous and only the questionnaire

number was obtained.

**Instruments:** A structured questionnaire was divided into following three parts. Section "A" enabled the researchers to know the patient demographics and bio variables including height and weight, presenting disease symptoms, cardiac risk factors and history of anti-coagulation therapy. The biographical information can give advantage to researchers in interpreting the results. Section "B" procedural data facilitates that what access route (radial or femoral), the procedure performed (angiogram, PCI or angioplasty), sheath size, the number of catheters used per case, and if any anti platelet (heparin infusion) therapy was used in procedure etc.

Section "C" Numeric Rating Pain Scale consists of 10-point to assess the intensity of pain. NRPS is a screening scale for clinic staff to rate the intensity of patients'. Zero score on scale means: absence of pain, 10 means: most intense pain. If pain is marked at 1-3 it represents Mild: which means just pain or discomfort, when pain mark at 4-6, it shows Moderate (tolerable pain but no analgesia required) and if scale rating is 7-10 that indicates Severe (pain and analgesia is required).

**Data Collection and Procedure:** A Systematic Random Sample of 75 patients was registered from Angiography Department of selected Institutions. Accessible patients were entered in the sample until it reached to 75. Demographic information, disease history and procedural data were noted by means of patients' hospital file analysis. Additional information was also obtained from patient by interview. The inclusion criteria for participants in study is both male & female, age > 30 and < 65 years, patients with coronary artery disease, patients with or without history of diabetes mellitus, Positive Allen's Test (for radial access). No history of previous angiography/ angioplasty or CABG and Single vessel disease (for PCI).

**Data Analysis:** All the collected information through data collection tool was transferred to SPSS version 17. The Chi-square test was applied to analyse the data as it is used to measure two types of comparison, which was the focus of this study i.e. comparing the difference in post-procedure access site pain in the trans-radial vs. trans-femoral approaches. The researchers identified that categorical variables were expressed in the form of frequencies, percentages and graphs. And continuous variables (age, gender and BMI) were to be presented in

mean ± standard deviation. When testing hypothesis, researchers used inferential statistics to confirm a correlation/association of access site pressure pain with age, gender and BMI in radial vs. femoral approach if it exists in the target population.

**RESULTS**

In a short time frame for study purpose, data was collected on small sample size which comprised 75 participants. Even though the sample size is relatively small but findings from study could become a pilot study within a bigger study in nursing practice. The statistical findings from the report are discussed in detail.

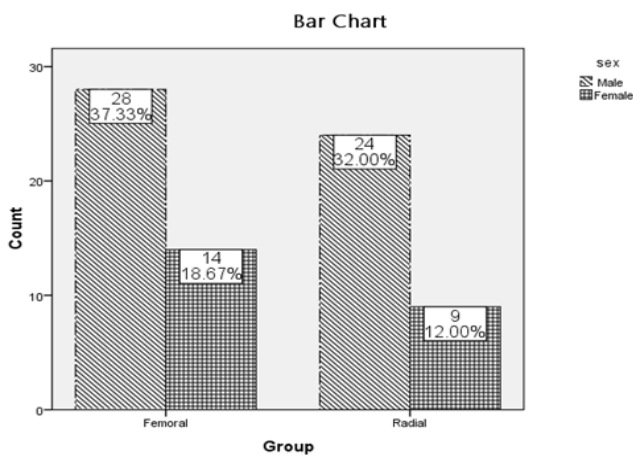
A total of 75 patients of undergoing coronary invasive procedures were enrolled in the study, 52 (69.3%) were males and 23 (30.7%) were females shown in bar chart of figure 1. The mean age was 51.39±8.54 years. All the patients' entering into study were observed for BMI and categorized into three groups' i.e. normal, overweight and obese. The number of patients under normal BMI was 24 (32 %), over weighted 33 (44%) and obese were 18 (24 %). Gender distribution of participants as 28 (66.6%) were male and 14 (33.3%) were female in trans-femoral approach whereas 24 (72.7%) were male and 9 (27.2%) were females in trans-radial procedure.

access site pressure pain scores and the trans-radial and trans-femoral groups. Results of patients' age association with pain in patients who underwent coronary invasive intervention showed that out of 75 patients, 41 (55%) patients between age group 40 - 49 and 50 - 59 felt mild to moderate level pain at puncture site with  $p$ -value>0.05 that shows significant difference in reported pain level with age.

Level of pain in both gender were compared and it was concluded that both sexes felt pain at mild level on pain rating scale resulting  $p$ -value 0.046<0.05 suggesting that there is no association of pain with gender. When BMI compared with the pain levels it was found that there were 11 patients out of 75 who fall into obese category and felt moderate pain at pressure site. Statistically significant level of pain was associated with obese patients resulting  $p$ -value 0.299 > 0.05.

The mean procedural duration among both groups has shown in the Table1. All patients had pressure compression at access site with difference in time interval 10 minutes or more than 10 minutes before the pressure bandage, showed statistically insignificant difference compression time with both groups as ( $p$ -value >0.05 ).

**Table 1: Procedural data with respect to radial versus femoral approach**



**Figure 1: Graphical Presentation with Respect to Gender**

Post procedural pain was assessed and recorded with two hours' time interval for up-to six hours. The average post-procedural trans-radial and trans-femoral access site pain rating scores differed by a  $p$ -value of 0.611 > 0.05. Therefore, the result indicated that there is a difference in patients' perceived post-procedural

Variables		Femoral	Radial	$p$ -value
Procedure duration		19.29±10.39	20.39±11.17	0.231
Difficulty of catheter insertion	Routine	24(57.1%)	19(57.5%)	0.448
	Moderate	16(38.0%)	11(33.37%)	
	Difficult	2(4.7%)	3(9.09%)	
Initial compression time	10 min	22 (52.3%)	24 (72.7%)	0.199
	Longer	18 (42.8%)	8 (24.2%)	
	>10 min	2 (4.7%)	1(3.03%)	
Anti-Coagulants	Heparin	1(2.3%)	17(51.51%)	0.001
	Other	0	2(6.06%)	
	None	41(97.6%)	14(42.47%)	

Post procedural pain was assessed and recorded with two hours interval up-to six hours. The average post-procedural trans-radial and trans-femoral access site pain rating scores differed by a  $p$ -value 0.611 > 0.05.

Therefore, the result indicated that there is a difference in patients' perceived post-procedural access site pressure pain scores between the trans-radial and trans-femoral group.

“Difficulty and discomfort” after procedure were considered important on different parameters i.e. restlessness, resistant to movement / ambulation and if any disturbance in sleeping occur as reported by patients. The percentages of femoral vs. radial (56.0 % vs. 27.06 %) group on these parameters suggested that patient who underwent through trans-femoral approach was more susceptible for experiencing discomfort due to restlessness and resistant to movement of leg as presented in Table 2.

**Table 2: Post-procedural findings with respect to trans-radial versus trans-femoral approach**

Variables		Femoral	Radial	P-value
Experienced groin / Wrist pain	0-2 hours	26 (61.9%)	15 (45.0%)	0.611
	2-4 hours	12 (28.5%)	10 (30.0%)	
	4-6 hours	4 (9.09%)	8 (24.0%)	
Difficulty/	Calling out	0	2 (6.06%)	
Discomfort	Restless	5 (6.7%)	7 (21.0%)	
	Resistant to movement / mobilization	42 (100%)	0	0.543
	Not sleeping	0	2 (6.06%)	
Pressure loosened		5 (11.9 %)	6 (18.2%)	

The research question “Is there a difference in post-procedural access site pressure pain level in patients undergoing coronary invasive procedures between trans-radial versus trans-femoral approach”? Pressure pain was assessed using a 0-10 point NRPS as 0 representing no/absence of pain, 10 means most intense pain, while mild has just pain or discomfort as compared to tolerable pain with moderate level. Post procedural access site pain in trans-femoral group felt at mild and moderate level 64.2% vs. 23.8 % respectively. While on same rating scale in radial group felt at mild and moderate level 42.4% vs. 33.3 % with *p*-value >0.05 as shown in the Table 3.

**Table 3: Comparison of access site pressure pain in trans-radial versus trans-femoral approach**

		Access sites		Total	P=value
Pain Rating		Femoral	Radial		
	None	1(2.3%)	0 (0 %)	1(2.3)	0.416
	Mild	27(64.2%)	14 (42.4%)	41(54.1%)	
	Moderate	10(23.8 %)	11(33.3 %)	21(28.0 %)	
	Severe	4(9.5 %)	8(24.2 %)	12(16.0 %)	
Total		42	33	75	

Results of patients' age association with pain in patients who underwent coronary invasive interventions are presented in Table 4. Statistical analysis of data demonstrated that out of 75 patients, 41 (55%) patients between age group 40-49 and 50-59 felt mild to moderate level pain at puncture site with pressure bandage with *p*-value>0.05 that shows significant difference in reported pain level with age. Because of small and unequal data size in both the groups femoral vs. radial (42 vs. 33), it cannot help to see the true association with age and reported pain.

**Table 4: Association of access site pressure pain with Age in trans-radial versus trans-femoral access**

		Age				p-value
Pain Rating		30-39	40-49	50-59	60-69	
	None	0	1	0	0	0.421
		0.00%	4.80%	0.00%	0.00%	
	Mild	2	13	12	10	
		33.30%	61.90%	37.50%	62.50%	
Moderate	3	5	11	2		
	50.00%	23.80%	34.40%	12.50%		
Severe	1	2	9	4		
	16.70%	9.50%	28.10%	25.00%		
Total		6	21	32	16	

Gender association with pain reporting were analyzed and it is concluded that both sexes felt pain at mild level on pain rating scale resulting *p*-value 0.046 < 0.05 suggestive of no association of pain with gender.

The data in Table 5 shows that patients were divided into BMI group in three categories i-e normal, overweight and obese. The variable BMI and access

site pressure pain at puncture site are not independent. Each patient's BMI was calculated by given formula and patients were put in BMI categorized group. 11 patients out of total 75 were fall into obese category who felt moderate pain at pressure site. Percentages of obese were calculated and association measured using Pearson Chi-square test. Statistically significant level of pain was associated with obese patients resulting  $p$ -value  $0.299 > 0.05$ .

**Table 5: Association of access site pressure pain with BMI in trans-radial versus trans-femoral access**

Pain Rating	BMI			p-value
	Normal	Over weight	Obese	
None	4 (16.6%)	9 (27.7 %)	0 (.0%)	0.299
Mild	8 (33.3 %)	11 (33.3 %)	4 (22.0 %)	
Moderate	8 (33.3 %)	12 (36.3 %)	11 (61.1 %)	
Severe	4 (16.6 %)	1(3.0 %)	3 (16.6 %)	
<b>Total</b>	24	33	18	

Relationship of the results with the theoretical framework is also assessed. Deliberative Nursing Process Theory (Orlando, 1961) is used as a guide to assess the patients' experiences of access site pressure pain with coronary angiography/angioplasty as these are potentially stressful procedures. All components of nursing process theory (physical, psychosocial and developmental) are important factors in relation to patient pain. The severity of the heart disease and or the presence of co-morbidities may have a further threat to patient and patient perception of pain can vary greatly. When pain was evaluated on theoretical framework, significant difference was reported in physical and psychological level. Trans-femoral access site approach showed high level of discomfort due to immobilization for long hours and tight groin dressing when compared to trans-radial one. Statistically significant difference of pain level that was moderate in nature was reported in the age group between 30-39 years.

## DISCUSSION

This cross sectional analytical study was utilized to explore the experiences of pain at puncture site (femoral/radial) after coronary invasive procedures and findings are compared and contrasted in relation to current literature. Many studies have been conducted on complication of coronary angiography or angioplasty in both the trans-radial approach versus the trans-femoral approach. However, limited literature was available on safety and efficacy of the trans-radial approach vs. trans-femoral approach but only one study that typically focuses on patient perceived pain differences in both two approaches was available internationally.

The result of mild pressure pain felt by patient in trans-femoral group 64.2 % vs. 42.4 % in trans-radial and moderate pain felt in trans-femoral group 23.8 % as compared to 28.0 % in trans-radial ( $p$ -value  $> 0.05$ ). A previous study on both coronary angiography and interventions using single trans-radial guiding catheter confirmed the findings (Youssef, *et al.*, 2007). They found it feasible and highly successful in the use of single catheter with accurate procedure time, fluoroscopy time and mean contrast volume. It was also safe, patients' felt comfort and no procedural complication in all the cases. It indicates that trans-radial artery approach can be safely used in routine procedures as an alternative to conventional trans-femoral approach (Goyal, *et al.*, 2006). The findings from this study indicated the better health care outcomes with improved patients' satisfaction and comfort level when CA/PCI are performed via trans-radial approach. Further benefits that may help to improve patients' comfort are early ambulation and use of bath room facility that encourages a higher turnover of patients with appropriate education and discharge resources. The information for pain at puncture site (radial/femoral) was rated on NPRS and analysed statistically. No significant difference is found in access site pain levels in patients undergoing a trans-radial access as compared to trans-femoral. These results were consistent with another study conducted to assess patient perceived access site pain associated to the route of vascular access and found no statistically significant difference in both the trans-radial vs. trans-femoral approach (Wagner, 2007).

It was also observed in this study that overall highest number of patients i.e., 33 (44 %) were from the overweight group which measured the statistically

significant level of association with pain resulting  $p$ -value  $0.299 > 0.05$ . literature showed the statistically significant negative correlation between patient BMI and reported levels of access site pain as the patients with a lower BMI score reported higher levels of post-procedural access site pain compared to patients with higher BMI scores (Aktürk, 2014).

The trans-femoral group 24 (57.1%) patients had routine difficulty of catheter insertion and all 42 patients had pressure bandage, while in trans-radial group 19 (57.5%) patients had routine difficulty of catheter insertion and 33 patients had pressure bandage over radial artery at puncture site. Moderate and severe difficulty of catheter insertion were faced by operators in both the groups with statistical relationship of  $p$ -value  $< 0.05$ . These results were strongly supported by a previous study that was on trans-femoral approach versus trans-radial approach to PCI, with and without angioplasty (Ziakas *et al.*, 2004). Based on data collected and the results of procedural durations, procedure success rates, total length of stay and in-hospital major adverse cardiac events (MACE) were all similar in the two groups ( $p < 0.05$ ). Whereas vascular complications occurred only in the femoral group (5.7%) 15 (Ziakas *et al.*, 2004).

In order to find out the answer of question “Is there a difference in post-procedural access site pressure pain in patients undergoing coronary invasive procedures and between trans-radial versus trans-femoral approach?” present study was carried out. Although present study was limited by small sample size and lack of reliability testing, findings showed that the trans-radial access site to be an equally effective and safe approach to coronary angiography/ angioplasty as the trans-femoral approach. In this study, patients enrolled in both group were different in number but baseline characteristics were not significantly much different (Ziakas, *et al.*, 2004; Hildick-Smith, *et al.*, 2004; Louvard, *et al.*, 2004).

There was a different trend in comfort level of patients with femoral approach as all these patients felt more discomfort due to restricted ambulation for long hours on bed compare to trans-radial one. A previous study demonstrates an association between the trans-radial approach and reduced costs and post-procedural length of stay in hospital and greater nursing efficiency. It also indicates that trans-radial approach is safe and

may allow to be discharged on same day after uncomplicated elective procedures (Subherwal *et al.*, 2009).

Orlando's Nursing Process Discipline Theory (NPDT) is a physiological, socio-cultural, developmental and spiritual framework which was important for researchers to understand the patients' pain in stressful situation. The characteristics of Nursing Process are interrelated concepts, logical in nature, easy to understand and implement in clinical situation to the development of new nursing knowledge. All components of NPDT framework (physiological, psychosocial, developmental, spiritual) are important factors in relation to patient's pain. When patient experiences pain, he/she may face alteration in body's normal line of defence and resistance mechanism. Besides that, some individuals might have a preconceived fear of hospital environment and exposed to uncomfortable procedure put bias impact on levels of reported pain. Based on individual differences, it is the responsibility of nurses to be aware with the factors as an individual's degree of reaction to stressor, history of disease condition, and energy required to tolerate may influence a patient's level of reported pain at puncture site with pressure bandage following coronary invasive procedures (Masters, 2014).

Nurses having knowledge of potential factors would be helpful in maintaining the patient's level of wellness. Improvement in nursing services and better care to cardiac patient are dependent on the information obtained through evidenced based research studies. It is important that advanced practice nurses must take part in research to provide high quality care and promote the nursing profession.

The findings of this study support the fact that a single study cannot provide the evidence on which the clinical nursing practice can be based. Nurses are the key health care workers in the field of health, so they must take the responsibility for advancing the profession through research and education. Therefore, it is important that more evidence should be generated by doing this type of study to promote high quality care.

### Limitations of the Study

The major limitation of the study was the generalize ability of findings. The study was restricted to study settings with small number of patients. Therefore, it

was not considered a true representative of cardiac patient's population. It is also possible that patients from different hospital with different operators may respond differently to pain. Therefore generalizing the results of this study would be challenging. Another potential concern is response bias as the concept of pain is subjective in nature. Only elective coronary invasive procedures were included in the study. Emergent procedures were excluded, which may further have generalized problems.

## CONCLUSION

The complete and systemic review included in this study to provide adequate information regarding patient perceived access site pain following trans-radial versus trans-femoral percutaneous coronary procedure. Results complied by conducting the study is that trans-radial coronary catheterization is safe, feasible and effective. But use of trans-radial approach may be limited due to significantly higher rate of procedural failure. The length of procedure including fluoroscopy time, and radiation exposure are also higher in trans-radial access as compared to trans-femoral access. Both

vascular access techniques should not be considered opposite or mutually exclusive, but rather provide the intervention list with a wider spectrum of therapeutic options. It is also concluded from this research that patients who underwent through trans-femoral approach experienced more discomfort as compare to the trans-radial. The patients undergoing cardiac catheterization have improved quality of life with trans-radial access and it is strongly preferred by patients and it also reduces hospital costs. Nurses can provide detail information to patients and can also help them to decide the access site.

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## REFERENCES

- Abbas, S., Kitchlew, A.R. & Abbas, S. (2009). Disease burden of Ischemic Heart Disease in Pakistan and its risk factors. *Annals of Pakistan Institute of Medical Sciences*, 5(3), pp 145-150.
- Aktürk, E., Kurtoglu, E., Ermis, N., Açikgöz, N., Yagmur, J., Altuntas, M. S., Pekdemir, H. & Özdemir, R. (2014). Comparison of pain levels of transradial versus transfemoral coronary catheterization: a prospective and randomized study. *Anadolu Kardiyoloji Dergisi*, 14(2), pp 140- 146.
- Armendaris, M.K., Azzolin, K.D., Alves, F.J., Ritter, S.G. & Moraes, M. A. (2008). Incidence of vascular complications in patients submitted to percutaneous transluminal coronary angioplasty by Trans radial and Trans femoral arterial approach. *Acta Paulista de Enfermagem*, 21(1), pp 107-111.
- Brown, D.N. (2008). Pain assessment in the recovery room. *The Journal of Preoperative Practice*, 18(11), pp 480-489.
- Brueck, M., Bandorski, D., Kramer, W., Wieczorek, M., Höltgen, R., Tillmanns, H. (2009). A randomized comparison of Trans radial versus Trans femoral approach for coronary angiography and angioplasty. *JACC: Cardiovascular Interventions*, 2(11), pp 1047-1054.
- Goyal, A., Tricoci, P., Melloni, C., Mills, J. S., Thomas, K. L., Adams, G. L., Mitchell, R. G. & Turer, A. T. (2006). Highlights from the American Heart Association Scientific Sessions, November 13 to 16, 2005, Dallas, TX. *The American Heart Journal*, 151(2), pp 295- 307
- Hess, C. N., Krucoff, M.W., Sheng, S., Anstrom, K.J., Barham, W.B., Gilchrist, I.C., Harrington, R.A., Jacobs, A. K., Mehran, R., Messenger, J.C., Mark, D.B. & Rao, S.V. (2015). Comparison of quality-of-life measures after radial versus femoral artery access for cardiac catheterization in women: Results of the Study of Access Site for



- Enhancement of Percutaneous Coronary Intervention for Women quality-of-life sub study. *American Heart Journal*, 170(2), pp 371-379.
- Hildick-Smith, D. J., Walsh, J.T., Lowe, M.D., Shapiro, L.M & Petch, M.C.(2004). Transradial coronary angiography in patients with contraindications to the femoral approach: an analysis of 500 cases. *Catheterization and cardiovascular interventions*, 61(1), pp 60-66.
- International Association for the Study of Pain (2010). Global Year against Pain after Surgery International Association for the Study of Pain. Retrieved from: <http://www.iasp-pain.org/GlobalYear>
- Jafar, T. H, Qadri, Z. & Chaturvedi, N. (2007). Coronary artery disease epidemic in Pakistan-more electrocardiographic evidence of ischemia in women than in men. *Heart*, 94(4), pp 408-413
- Louvard, Y., Benamer, H., Garot, P., Hildick-Smith, D., Loubeyre, C., Rigattieri, S., Monchi, M., Lefèvre, T., Hamon, M. & OCTOPLUS Study Group. (2004). Comparison of Trans radial and Tran's femoral approaches for coronary angiography and angioplasty in octogenarians (the OCTOPLUS study). *The American journal of cardiology*, 94(9), pp 1177-1180.
- Masters, K. (2014). *Nursing theories: a framework for professional practice*. Jones & Bartlett Publishers, Burlington.
- McGrath, B., Elgendy, H., Chung, F., Kamming, D., Curti, B. & King, S. (2004). Thirty percent of patients have moderate to severe pain 24 hr after ambulatory surgery: a survey of 5,703 patients. *Canadian Journal of Anaesthesia*, 51(9), pp 886-891.
- Orlando, I.J. (1961). *The dynamic nurse-patient relationship: Function, process and principles*. Putman's sons, New York.
- Siqueira, D.A.D. A., Brito Jr, F.S. & Abizaid, A.A.C. (2014). Primary angioplasty in the ACCEPT registry: Why has it been difficult to accept and implement the radial artery access as preferential? *Arquivos brasileiros de cardiologia*, 103(4), pp 268-271.
- Subherwal, S., Bach, R.G., Chen, A. Y., Gage, B.F., Rao, S.V., Newby, L.K., Wang, T.Y., Gibler, W.B., Ohman, E.M., Roe, M.T. & Pollack, C.V. (2009). Baseline risk of major bleeding in non-ST-segment-elevation myocardial infarction. *Circulation*, 119 (14), pp 1873-1882.
- Wagner, N.A. (2007). *Comparison of Patient Perceived Post-procedure Access Site Pain in Patients Undergoing Transradial versus Transfemoral Coronary Angiography/angioplasty*. Florida State University. Tallahassee, Florida.
- Ylinen, E.R.(2010). Patients' Pain Assessment and Management during Medication-free Colonoscopy. Dissertations in health sciences. University of Eastern Finland, Kuopio: KopijyväOy. University of Eastern Finland, Finland.
- Youssef, A., Wu, C. J., Cheng, C. I. & Hsieh, Y. K. (2007). SHA.09. Both sides coronary angiography and intervention using a single trans radial guiding catheter. *Journal of the Saudi Heart Association*, 22(2), pages 87.
- Ziakas, A., Klinke, P., Mildenerger, R., Fretz, E., Williams, M.B., Siega, A.D., Kinloch, R.D. & Hilton, J.D. (2004). Comparison of the radial and femoral approaches in left main PCI: a retrospective study. *Journal of Invasive Cardiology*, 16(3), pp 129-132.