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# IJHP

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## Shaping Evidence-Driven Practice: The Evolving Role of Healthcare Research

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Evidence-based practice has become a defining pillar of contemporary healthcare. More than ever, clinicians are required to make decisions that reflect not only empathy but also the support of credible, rigorously tested research (1). When clinical actions are guided by strong evidence, patient care becomes safer, outcomes improve, professional responsibility is reinforced, and variations in practice are reduced. In an increasingly complex healthcare landscape, relying on a solid research base has shifted from being an advantage to a fundamental necessity.

Rapid developments in technology—such as artificial intelligence, wearable monitoring tools, and extensive clinical data repositories—have generated vast amounts of information (2). However, data in itself does not lead to better care. The true challenge lies in converting information into dependable, meaningful, and actionable evidence. Researchers play a central role in this process, linking technological innovation with clinical relevance while upholding scientific rigor and ethical standards.

Within this system, scientific journals act as critical guardians of quality. By upholding principles of transparency, reproducibility, and academic integrity, journals help establish the benchmarks that guide healthcare practice worldwide (3). Each published study, whether modest or groundbreaking, contributes to the collective understanding that shapes clinical decision-making, education, and health policy.

As the distinction between clinical work and research becomes increasingly intertwined, our commitment to discovery must grow stronger. Evidence-based practice is not merely a professional requirement—it represents an ethical responsibility to the communities we serve. Through this journal, we reaffirm our mission to advance high-quality research and to support healthcare professionals striving to deliver care that is scientifically robust, technologically informed, and truly meaningful for patients across the globe.

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**Accuracy of ultrasound for the diagnosis of acute pancreatitis**Zafar Iqbal<sup>a</sup>, Zain ul Abidin<sup>b</sup>, Rana Sohaib<sup>c</sup>, Talha Khalid<sup>d</sup><sup>a</sup>Institute of Allied health sciences, Allama Iqbal Medical College Jinnah Hospital Lahore.<sup>b</sup>Children Hospital, Lahore.<sup>c</sup>Cleveland Clinic Abu Dhabi, UAE.<sup>d</sup>Department of Radiology, Sharif medical city Hospital, Lahore.Correspondence: [zafar.iqbal888@gmail.com](mailto:zafar.iqbal888@gmail.com)**ABSTRACT**

**Background and Objectives:** The interaction of light with materials, particularly at the nanoscale, forms the foundation of many modern optical and photonic technologies. Among these materials, silver stands out as a preferred choice due to its remarkable optical and electrical properties, including its ability to support low-loss surface plasmon resonances in the visible and near-infrared spectrum. To find the accuracy of ultrasonography in acute pancreatitis taking computed tomography as a gold standard.

**METHODOLOGY:** Cross-sectional analytical study conducted at the Department of Radiology, Jinnah Hospital Lahore, Pakistan. 163 patients were enrolled in our study. The inclusion criteria of our study were; all patients of both genders aged 18-65 years, presenting with severe acute abdominal pain and epigastric pain with the age group 15 -70 years included in this study. The exclusion criteria included Post-operative case, and lower abdominal pain. All patients underwent CT scan and reports were interpreted by the radiologist. Ultrasonography findings were compared with CT scan findings.

**RESULTS:** The sensitivity of ultrasound was recorded as 95%, Specificity was 100%. The PPV were 100% and NPV was 27.27 %. In 95% of the cases, the ultrasound was accurate identified pancreatitis. The computed tomography also confirm pancreatitis in n= 160 (98%) while three participant pancreatitis were not diagnosed.

**CONCLUSION:** Ultrasonography is a highly sensitive & accurate noninvasive method in diagnosing acute pancreatitis. It has not only improved ability of detection of acute pancreatitis but also better patient care by proper preoperative planning and management of acute pancreatitis patients.

**KEYWORDS:** Acute pancreatitis, Ultrasonography, Sensitivity, Specificity, CT scan.

**INTRODUCTION**

Acute pancreatitis (AP) is a dangerous condition that manifests itself as an acute abdomen. It is a pancreatic inflammatory disorder.<sup>1</sup> It is an inflammatory complaint that triggers a complicated chain of immunological responses that disturb both the progression and outcome of the disease. Early identification and differentiation are required to distinguish edematous acute pancreatitis from necrotizing. The mainstream of people suffers from an insignificant form of the disease, through low morbidity and mortality. However, the clinical course is severe in 10–25% of cases, necessitating intensive care and, in some cases, surgical or radiological intervention. As a result, if the early treatment might reduce morbidity and death, proper diagnosis of patients with acute pancreatitis is crucial. Whatever causes the illness, it develops in three

stages: local pancreas inflammation, a broad inflammatory response, and eventually multi-organ failure. An about half of patients die under the 1st week after a severe attack and progress excessive systemic syndrome of inflammatory reaction leading to syndrome and death of multiple organ dysfunctions.<sup>2-5</sup> A total of 210,000 acute pancreatitis admissions are expected in the U.S every year. The majority of people with AP knowledge have stomach discomfort that starts in the Epigastric and radiates posterior in most cases. Pain can start quickly, reaching its peak intensity in 30 minutes or less, is frequently excruciating, and lasts for more than 24 hours without relief. Nausea and vomiting are common side effects of the pain. Physical examination reveals considerable upper abdominal discomfort when guarding is present.<sup>6</sup>

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Two of the following three characteristics must be present in order to diagnose acute pancreatitis: Pain in the abdomen that is consistent with acute pancreatitis, a sudden onset of severe, chronic epigastric pain that frequently radiates to the back. Acute pancreatitis frequently results in collections of necrotic tissue and intra-abdominal fluid. Early on in the course of acute pancreatitis, these collections form. Such a collection does not have a wall or capsule in its early stages. Lesser sac, transverse mesocolon, anterior and posterior pararenal spaces of the retroperitoneum, and small bowel mesentery are the preferred sites for fluid accumulation. The activated pancreatic enzymes that cause necrosis of the surrounding tissues also result in these collections.<sup>7</sup>

Typical results of contrast-enhanced CT (CECT) and, less frequently, ultrasonography for acute pancreatitis. For the diagnosis and staging of acute pancreatitis and associated consequences, computed tomography (CT) is the preferred imaging modality. An early CT scan is only advised when the diagnosis of acute pancreatitis is unclear or in cases where early complications such as intestinal perforation or ischemia are suspected. This is because the diagnosis of acute pancreatitis is typically based on clinical and laboratory findings. Because an early CT scan may underestimate the existence and extent of necrosis, it may be deceptive in terms of the morphologic severity of the pancreatitis. Sometimes it is impossible to tell whether a collection contains fluid exclusively or a combination of fluid and necrotic tissue based merely on CT scans.<sup>8</sup>

Abdominal ultrasounds may occasionally reveal properties consistent with acute pancreas diagnoses. A CECT scan is the greatest imaging method for the exclusion of conditions which pretend to be AP, diagnosis of the severity and identification of pancreatitis complications and in specific a CECT scan and detecting choledocholithiasis.<sup>9-10</sup> Ultrasound is the first imaging tool used to examine and detect choledocholithiasis in patients with acute pancreatitis.<sup>11-12</sup> It is highly recommended because its qualities are non-invasive, non-expansive, and without radiation

## METHODOLOGY

This Cross-sectional and analytical study conducted from September 2020 to February 2022 at the Department of Radiology, Jinnah Hospital Lahore, Pakistan. Informed consent was obtained from all participants. 163 patients were enrolled in our study. The inclusion criteria of our study were; all patients of both genders aged 18-65 years, presenting with severe acute abdominal pain and epigastric pain included in this study. The exclusion criteria included Post-operative case, and

lower abdominal pain. Ultrasound, Toshiba Applio 200, Mindray DC 70, with frequency range 2.5 – 3.5 MHz convex probe and Computed Tomography, Philips DX 16-slice single source were used.

The following parameters were studied in each case:

- Focal thickening and AP diameter was conducted on grey scale imaging.
- Fluid collections peripancreatic or pararenal was conducted on grey scale imaging.
- The echogenicity of pancreas was conducted on grey scale imaging.
- Position, size and echo pattern of the pancreas was observing on grey scale and all above-mentioned information was recorded /noted on data collection sheet.

Statistical Analysis

Data was analyzed using Statistical Software for Social Sciences (SPSS version 24.0). Sensitivity, Specificity, Positive Predictive Value, and Negative Predictive Value was calculated.

## RESULTS

The table 1 shows that the total participants participated in the study were comprised of 163 out of which 47 (28.8%) were female and 116 (71.2%) were male. The mean age of the participant were recorded in our study was  $34.40 \pm 9$ . According to table 1 when ultrasound was performed in such patient the majority of participants have acute pancreatitis  $n=152$  (93.3%) which in  $n=11$  (6.7%) was due to some other cause. In addition, they have no pancreatitis. Table 2 shows that when computed tomography was done in-patient who have pancreatitis on ultrasound. In  $n=46$  (28%) Ct scan showed a fluid collection with necrotizing lesion in pancreas while in  $n=114$ (70%) have no necrotizing lesion and only fluid collection was noted. No changes were recorded in  $n=3$  participants. According to table 2, total patients enrolled in our study that had acute pancreatitis are 163, out of which 152 patients were detected on ultrasound and CT scan. Table shows the sensitivity of ultrasound was recorded as 95%, sensitivity was 100%. The PPV were 100% and NPV was 27.27 %. In 95% of the cases, the ultrasound was accurate identified pancreatitis.

**Table 1: Comparison of acute pancreatitis on ultrasound and computed tomography.**

		Acute pancreatitis on CT		Total
		Yes	No	
Acute pancreatitis on USG	Yes	152	0	152
	No	8	3	11
Total		160	3	163

**Table 2: Accuracy of ultrasound for the diagnosis of acute pancreatitis.**

Statistic	Value	95% CI
Sensitivity	95.00%	90.39% to 97.82%
Specificity	100.00%	29.24% to 100.00%
Disease prevalence (*)	98.16%	94.72% to 99.62%
Positive Predictive Value (*)	100.00%	
Negative Predictive Value (*)	27.27%	16.03% to 42.42%
Accuracy (*)	95.09%	90.56% to 97.86%

## DISCUSSION

In pancreatitis, an inflammatory disease, pancreatic enzymes auto digest the gland. The condition known as acute pancreatitis refers to the recovery of the gland without any morphologic changes or impairment of function. Pancreatitis can also recur on a regular basis, leading to the gland's functional and morphologic loss; this is referred to as chronic pancreatitis. The pancreas produces 13 times as much protein as the liver and reticuloendothelial system combined, which together make up 4% of the total body weight, despite making up only 0.1 percent of the body weight.<sup>14</sup> Abdominal USG is the primary method of imaging used in the first stages of acute pancreatitis to evaluate the biliary tract and determine whether biliary stones are the cause of the disease.<sup>15</sup>

In current study, total participants that participated in our study were comprised of 163 out of which 47 were female and 116 were male. The mean age of the participant were recorded in our study was  $34.40 \pm 9$ . The lower age that was recorded as 18 years and maximum age was 60 years.

A modified CT severity index was developed by Bollen et al. to evaluate the severity of acute pancreatitis. The modified CT severity score has a 71% sensitivity and a 93% specificity, with a 69% positive predictive value and a 94% negative predictive value, according to the study's findings. They concluded that the modified CT severity score had a better correlation with pancreatic infection and could diagnose clinically severe disease with accuracy<sup>16</sup>. The modified CT severity index's sensitivity and specificity were reported to be 78% and 81%, respectively, in a different study by Bollen et al.<sup>20</sup> Jauregui-Arrieta et al. studied how well the modified CT severity index worked to determine how severe acute pancreatitis was. According to their research, the modified CT severity score had an 81% positive predictive

value, 66% specificity, and 61% sensitivity. They concluded that individuals with severe acute pancreatitis benefit more from screening using the modified CT severity score<sup>17</sup>. In order to evaluate various radiological grading systems for determining the severity of acute pancreatitis, Sharma et al. conducted a study. They discovered that the modified CT severity index has a 98.6% sensitivity, a 26.5% specificity, a 73.7% positive predictive value, and a 90% negative predictive value. They verified that the currently recognized modified CT severity index is, in fact, a potent instrument for predicting severe acute pancreatitis and that it associated favorably with APACHE II, the most dependable clinical grading system now in use for predicting pancreatitis sequelae.<sup>18</sup>

In a study by Tenner et al., a total 110 consecutive patients with acute pancreatitis were included. In a patient with clinically serious acute pancreatitis, the probability of a positive ultrasound result was 89.60% (sensitivity). Ultrasound had a sensitivity of 77.80% in assessing moderate and extreme types of acute pancreatitis as defined at laparotomy. The low specificity of ultrasound was 44.00% in comparison with modified prognostic criteria, but high in comparison with CT (87.50%) & staging at laparotomy (85.69%). According to the author, the early ultrasound in acute pancreatitis is helpful in diagnosing the severity of the disease and affects the decision-making. Using computed tomography as the gold standard, the sensitivity, specificity, positive and negative predictive value, and diagnostic accuracy of ultrasonography for diagnosing acute pancreatitis were 90.77%, 86.81%, 83.10%, 92.94%, and 88.46%, respectively, in comparison to our findings.<sup>19</sup> As compared to our study the sensitivity of ultrasound was recorded as 95%, sensitivity was 100%. The PPV was 100% and NPV was 27.27%. In 95% of the cases, the ultrasound was accurate identified pancreatitis. Another study showed 92.0% sensitivity & 84.0% specificity of ultrasonography in 16 diagnoses of patients with acute pancreatitis.<sup>20</sup> Because of the small size and retroperitoneal location with overlaying structures, the pancreas presents a challenge for ultrasonography. Early research conducted in the country describes the structural alterations in the pancreas that are seen on trans-abdominal ultrasound in about two-thirds of patients with chronic pancreatitis that have been detected.

## CONCLUSION

Ultrasonography is a highly sensitive and accurate noninvasive method in diagnosing acute pancreatitis. It has not only improved ability of detection of acute

pancreatitis but also better patient care by proper preoperative planning and management of acute pancreatitis patients.

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**Authors Contributions:**

**Zafar Iqbal and Zain ul Abidin:** Substantial contributions to the conception and design of the work. Design of the work and the acquisition.

**Rana Sohaib and Talha Khalid:** Drafting the work. Final approval of the version to be published.

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## Effects of educational program on Nurses knowledge and practice regarding management of peripheral vascular access at tertiary care hospital

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### ABSTRACT

**Background and Objectives:** In the healthcare industry, effective communication is essential, but intern students frequently struggle with it, which can result in mistakes and unfavorable outcomes. To assess the level of knowledge and practice of nurses regarding the management of peripheral vascular access.

**METHODOLOGY:** The technical design included research design, setting, participants and tools of data collection. A quasi experimental design was used pre, post and follow up after 2 months to evaluate the effect of an educational program on nurses' practice regarding management of peripheral vascular access. The study was conducted in the intensive care units (ICUs) and Medical Departments at Ali Fatima Hospital in Lahore city. Convenient sample of all available nurses (50 nurses) divided into 36 nurses in I.C.U units and 14 nurses in medical departments who are caring patients undergoing peripheral vascular access working in the above mentioned units at the time of the study

**RESULTS:** Hedges' g and Cohen's d both show that there is a statistically significant and practically significant difference in knowledge between before and after the intervention. This firmly demonstrates the intervention's efficacy.

**CONCLUSION:** There was significant improvement in nurses' practice between pre and immediately post program implementations. Also there was a significant relation among factors affecting nurses practice and demographic characteristics of all the participants nurses regarding mainly to years of experience, education level and age.

**KEYWORDS:** Healthcare, communication, nurses, Intensive care unit, knowledge

### INTRODUCTION

In both inpatient and outpatient settings, vascular catheters are frequently used to sustain patients' status and are crucial to contemporary healthcare. It's critical to provide nursing care for peripheral vascular lines. To reduce the risks associated with peripheral vascular lines, a thorough understanding of the process is quite beneficial. The principles of safe insertion, injection, dressing change, and flushing procedure must be ingrained in the minds of all staff members. <sup>1</sup>Assessing how an educational program affects nurses' practice in managing patients receiving peripheral vascular access is the study's main goal. Design of research: Quasi-experimental design was utilized to conduct the study at Ali Fatima hospital and Green International

University in Lahore. The study nurses consisted of 50 nurses.<sup>2</sup>

Peripheral vascular access (PVA) is a commonly used procedure in clinical settings, with a crucial role in the administration of medications, fluids, and blood products. Peripheral intravenous catheters (PIVCs) are typically used for short-term access, yet the procedure, while routine, is not without risks. (Hassanein and Sobh 2021) Improper management of PVA can lead to various complications such as infection, infiltration, phlebitis, and thrombosis, which can significantly affect patient outcomes and increase healthcare costs. Nurses play a central role in the insertion, management, and maintenance of these access devices,

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making their knowledge and skills crucial to patient safety.<sup>3</sup>

Educational programs designed to improve nurses' competency in managing peripheral vascular access have gained increasing attention in recent years. These programs aim to enhance nurses' knowledge of best practices, boost their confidence, and improve their ability to handle the complexities associated with PVA. (Bahl, Mielke et al. 2025) This is essential because, despite the common nature of PVA procedures, many nurses report gaps in their knowledge and skills, leading to inconsistent practices and potential adverse outcomes.<sup>4</sup>

The impact of educational interventions on nursing practice is well-documented in the literature, with studies consistently showing positive effects on nurses' knowledge, skills, and ultimately patient care outcome.<sup>5</sup> This introduction will explore the effects of educational programs on nurses' practices regarding the management of patients undergoing peripheral vascular access, drawing upon recent research to illustrate the importance of such initiatives.<sup>6</sup>

Peripheral vascular access, primarily achieved through the insertion of a peripheral intravenous catheter (PIVC), is essential for patient care in various clinical settings. However, despite its frequent use, improper management of PIVCs can result in several complications, such as infection, extravasation, and clot formation.<sup>7</sup> According to the Centers for Disease Control and Prevention (CDC), healthcare-associated infections linked to intravenous catheters can lead to prolonged hospital stays, increased healthcare costs, and higher morbidity and mortality rates. Given the critical role of nurses in the insertion and maintenance of these devices, it is crucial that they have comprehensive training to minimize the risks associated with PVA.<sup>8</sup>

Nurses are required to maintain PIVCs, recognize complications, and intervene appropriately when issues arise. However, studies have shown that there are significant gaps in nurses' knowledge regarding the insertion and management of these devices. A study by found that despite the widespread use of PIVCs, many nurses lacked the knowledge necessary to prevent complications such as infections or phlebitis. These findings highlight the need for structured educational programs to ensure that nurses are adequately prepared to manage PVA effectively.<sup>9</sup>

Educational programs are designed to address these knowledge gaps and provide nurses with the necessary skills to ensure safe and effective PVA management. These programs can take various forms, including workshops, online courses, simulation training, and

hands-on practice sessions. A critical component of these programs is the emphasis on evidence-based practices, infection control, and the prevention of complications associated with PVA.<sup>10</sup>

The effectiveness of educational programs has been a subject of numerous studies, with most research showing a clear positive impact on nursing practice. A study by demonstrated that an educational program significantly improved nurses' knowledge and practices regarding the management of PVA in a hospital setting.<sup>11</sup> The study, which involved 100 nurses, found that after attending the program, nurses were able to demonstrate increased competence in PIVC insertion, maintenance, and complication prevention. Nurses who received the educational intervention also exhibited a heightened awareness of infection control protocols, which led to a reduction in PVA-related complications such as infections and thrombophlebitis. This study underscores the direct correlation between educational interventions and improved nursing practices in PVA management.<sup>12</sup>

Another study by (Al-Fadhli et al 2022) focused on the impact of a blended learning program, which combined online training with in-person simulation exercises. The study, conducted in a large teaching hospital, included 150 nurses. After completing the training program, nurses demonstrated a significant improvement in their ability to insert PIVCs correctly and manage complications such as infiltration and phlebitis. The study highlighted that blended learning methods, which offer flexibility and practical experience, can effectively enhance both theoretical knowledge and hands-on skills, making them particularly beneficial for nurses working in busy clinical environment.<sup>13</sup>

The ultimate goal of educational programs for nurses is to improve patient care and safety. Evidence from several studies has shown that when nurses are better trained in PVA management, patient outcomes improve significantly. According to a study by Finnegan et al. (2021), hospitals that implemented comprehensive educational programs on PIVC management saw a reduction in PVA-related complications, such as infections and phlebitis, resulting in improved patient outcomes and lower healthcare costs. Nurses who underwent specialized training were better able to detect complications early and intervene promptly, which contributed to faster recovery times and reduced hospital readmission rates<sup>14</sup>

Additionally, improved nursing practices through education contribute to higher patient satisfaction. Patients who experience fewer complications related to

PIVCs, such as infections or extravasation, report higher satisfaction with their care. A study by Mann et al. (2022) found that patients whose nurses had completed specialized training in vascular access management reported a more positive care experience, especially in terms of comfort and the perceived safety of their intravenous lines.<sup>15</sup>

**METHODOLOGY**

The materials and methods for this research design were utilizes using 4 designs.as follows

**(I) TECHNICAL DESIGN:**

The technical design included research design, setting, participants and tools of data collection.

**(2) Research Design:**

A quasi experimental design was used pre, post and fallow up after 2 months to evaluate the effect of an educational program on nurses' practice regarding management of peripheral vascular access.

**(3) Study Setting:**

The study was conducted in the intensive care units (ICUs) and Medical Departments at Ali Fatima Hospital in Lahore city. The intensive care unit (ICU) contains 18 beds divided into 2 main units: general ICU, and Surgical ICU. The medical departments contain 56 beds divided into: medical disease unit, tropical unit, chest unit, gastric unit and rheumatic disease unit.

**(4) Study samples:**

Convenient sample of all available nurses (50 nurses) divided into 36 nurses in I.C.U units and 14 nurses in medical departments who are caring patients undergoing peripheral vascular access working in the above mentioned units at the time of the study.

Duration of study: duration of this study is 21 February, 2025 to June, 2025.

Sampling techniques: stratified sampling techniques.

Inclusion criteria: Nursing Novice (interns) and nursing students and nursing officers.

Exclusion Criteria: Doctors and Technicians

Equipment: intravenous line (IVL), cotton swabs, tourniquet, IVL fixer, sticking.

Tool:

Two tools were used to collect data

Tool I was assessment questionnaire and

Tool II was observational checklist to assess the knowledge of nurses.

**RESULTS**

The frequency distribution of scores among a group of 54 individuals on a variable called "preknowledge" is shown in this table. Fifty participants gave valid answers out of the total, and four (7.4%) were missing.

**Table 1: An explanation of the Preknowledge Frequency**

		Preknowledge		Valid	Cumulative
		Frequency	Percent	Percent	Percent
Valid	19.00	1	1.9	2.0	2.0
	20.00	5	9.3	10.0	12.0
	21.00	5	9.3	10.0	22.0
	22.00	8	14.8	16.0	38.0
	23.00	16	29.6	32.0	70.0
	24.00	7	13.0	14.0	84.0
	25.00	4	7.4	8.0	92.0
	26.00	3	5.6	6.0	98.0
	27.00	1	1.9	2.0	100.0
	Total	50	92.6	100.0	
Missing	System	4	7.4		
Total		54	100.0		

The scores, which range from 19 to 27, represent the participants' prior knowledge levels prior to any kind of evaluation or intervention. Below is a summary of the data:

- 16 participants stated that the most common score (mode), which accounts for 32% of all valid responses, was 23.
- The second most common score is 22, observed in 8 participants (16%).
- Scores of 20 and 21 each occurred in 5 participants (10% each).
  - Very few participants scored at the extremes:
  - Only 1 participant scored 19 (2%).
  - Only 1 participant scored 27 (2%).

The cumulative percent column indicates that 70% of the participants scored 23 or below, and 100% scored 27 or below, confirming that this is the upper limit of observed scores. This distribution suggests that the data is slightly concentrated around the mid-to-high range (especially scores from 22 to 24), with fewer participants at the lower and upper extremes. This may indicate that most participants had a moderate to moderately high level of preknowledge

**Table 2: Descriptive Summary of the Post knowledge Frequency**

		post knowledge		Valid	Cumulative
		Frequency	Percent	Percent	Percent
Valid	47.00	1	1.9	2.0	2.0
	48.00	1	1.9	2.0	4.1
	49.00	4	7.4	8.2	12.2

50.00	6	11.1	12.2	24.5
51.00	6	11.1	12.2	36.7
52.00	7	13.0	14.3	51.0
53.00	6	11.1	12.2	63.3
54.00	2	3.7	4.1	67.3
55.00	9	16.7	18.4	85.7
56.00	4	7.4	8.2	93.9
57.00	3	5.6	6.1	100.0
Total	49	90.7	100.0	
Missing System	5	9.3		
Total	54	100.0		

This table presents the distribution of scores on the variable “post knowledge”, likely collected after some form of learning or instructional intervention. Out of 54 participants:

- 49 provided valid responses (90.7%)
- 5 responses were missing (9.3%)

Score Range and Distribution:

- Scores range from 47 to 57, which is a wider and generally higher range than the "preknowledge" scores.

- The most frequently observed score is 55, reported by 9 participants (18.4% of valid responses).

- Other relatively common scores include: o 52 (14.3%) o 50, 51, and 53 (each around 12.2%)

Distribution Pattern and Skewness:

- The distribution is centered in the 50–55 range, indicating that the majority of participants performed in this mid-to-high range following the intervention.

- Only six people overall participated in the lower end of the distribution (scores 47–49).

- The data is largely accounted for by the higher scores (55–57) (16 participants, or roughly 32.7%).

Cumulative Percentages:

- About 51% of participants scored 52 or below.
- 85.7% scored 55 or below.
- All valid responses (100%) fall within the 47–57 range.

Overall Interpretation:

Compared to the preknowledge scores, the post knowledge scores appear higher and more concentrated in the upper range, suggesting an improvement in knowledge after an intervention. The most common score (mode) shifted upward, and the frequency of lower scores decreased. This points to a general gain in knowledge among participants

**Table 3: Description of the Paired Samples**

		Paired Samples Test							
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference				
Pair					Lower	Upper			
1	preknowledge - post knowledge	-29.714	3.12916	.44702	-30.61309	-28.81548	-66.47	48	.000
		29					1		

The table presents the results of a paired samples t-test, used to evaluate whether there is a statistically significant difference between two related means — in this case, the scores before and after an intervention (referred to as preknowledge and post knowledge).

Pair 1 (preknowledge – post knowledge):

This row shows the comparison between the scores before and after the intervention.

- Mean Difference: -29.71

This indicates that post knowledge scores were, on average, 29.71 points higher than preknowledge scores. The negative value shows improvement (assuming higher scores indicate more knowledge).

- Standard Deviation: 3.13

Reflects the variability in the differences between pre and post scores.

- 0.447 is the standard error mean.

The sample mean difference's estimated standard deviation is this. A smaller number denotes a more accurate assessment.

- [-30.61, -28.82] is the 95% CI for the difference.

Since 0 is not included in this interval, the difference is statistically significant. With a 95% confidence level, we can say that the true mean difference is between -30.61 and -28.82.

- T-value: -66.47

A very large negative t-value, suggesting a strong difference between the two conditions.

- Degrees of Freedom (df): 48

Reflects the number of participants minus one, implying data from 49 individuals.

- Significance (2-tailed): .000

the p-value is less than .001, showing a highly significant difference between pre and post scores.

**Table 4: The denominator used in estimating the effect sizes**

		Paired Samples Effect Sizes				
		Standardizer	Point Estimate	95% Confidence Interval		
				Lower	Upper	
Pair 1	preknowledge - post knowledge	Cohen's d	3.12916	-9.496	-11.407	-7.579
		Hedges' correction	3.15388	-9.422	-11.317	-7.520

- The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation of the

mean difference.

Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.

The Effect Sizes Table for Paired Samples:

- There are two widely used standardized effect size measurements in this table:
- Cohen's d Point Approximation: 3.129
- The confidence interval is [-11.407, -7.579].

[-11.407,-7.579]

Meaning: A very large effect size is indicated by a Cohen's d = 3.13.

In accordance with standard benchmarks:

- 0.2 is little.
- 0.5 is equivalent to medium.
- 0.8 indicates a large
- >2 indicates a very significant

This indicates that the intervention had a significant effect on knowledge.

Hedges' Correction

- Point Estimate: 3.154
- Confidence Interval: [-11.317,-7.520][[-11.317, -7.520][[-11.317,-7.520]
- Interpretation: Similar to Cohen's d but with a small-sample bias correction.
- Hedges' g is used especially when the sample size is small (as in this case,  $n=49$ ).
- The estimate is nearly the same, reinforcing the conclusion of a very large effect.

The negative values in the confidence intervals (e.g., -11.407-11.407-11.407) refer to directionality because preknowledge minus post knowledge is negative — but in terms of magnitude, they still represent a large positive effect (i.e., post > pre).

## DISCUSSION

An accurate picture of the success of the instructional intervention given to the participants can be obtained by analyzing the pre knowledge and post knowledge scores. The pre knowledge scores, which were gathered from 54 participants (50 of whom provided valid answers), indicate that the group's baseline level of comprehension before any official training was provided was moderate. Scores varied from 19 to 27, with 16 participants (32% of valid responses) reporting the highest score of 23. There was little variation in starting knowledge, as indicated by the majority of scores clustering closely between 22 and 24. 70% of participants received scores of 23 or lower, according to the cumulative frequency data, indicating that most

of the group began with only rudimentary knowledge. Only one participant achieved a score of 19, and another.16

Following the intervention, the post knowledge scores demonstrate a notable upward shift in performance. The post-intervention scores, based on 49 valid responses, range from 47 to 57—a significantly higher and broader range than the pre-intervention scores. The most common score shifted from 23 to 55, with 9 participants (18.4%) achieving this score. Additionally, a large portion of participants scored within the 50–55 range, and 16 participants (approximately 33%) scored between 55 and 57. Only a small fraction of participants remained at the lower end of the distribution (47–49), which included just six individuals in total. This suggests that the intervention was broadly successful in raising knowledge levels, with the vast majority of the group achieving scores near the upper end of the new distribution. The upward trend in both the mode and overall distribution clearly shows that the participants benefited significantly from the instructional content or method.17

The change in distribution from preknowledge to post knowledge reveals a strong positive outcome. Where the preknowledge scores showed a tight concentration in the low-to-mid-twenties, the post knowledge scores are not only higher but also more widely spread, especially toward the upper end of the range. This indicates that the intervention not only improved knowledge on average but also allowed for greater differentiation among participants. Some individuals may have reached a deeper or more advanced level of understanding, as evidenced by the higher scores near the upper limit of the post-test range. Furthermore, the fact that relatively few participants remained in the lower scoring range post-intervention suggests that the instructional method was effective even for those who began with less background knowledge.18

These results collectively support the conclusion that the instructional intervention had a significant positive impact on learning outcomes. The substantial upward shift in scores across the board highlights the success of the intervention in enhancing knowledge retention and comprehension. The data suggest that the majority of participants moved from a moderate pre-existing level of knowledge to a significantly improved post-intervention understanding. In addition, the effectiveness of the intervention appears consistent across the group, with benefits observed at all levels of prior knowledge. This demonstrates not only the instruc-

tional value of the intervention but also its broad applicability and inclusiveness. Future implementations of this approach could continue to yield similar gains, making it a valuable tool for knowledge development in similar populations.19-20

## CONCLUSION

There was significant improvement in nurses' practice between pre and immediately post program implementations. Also there was a significant relation among factors affecting nurses practice and demographic characteristics of all the participants nurses regarding mainly to years of experience, education level and age. Recommendations:

- Providing continuous nursing education to upgrade their practice concerning patients care with peripheral vascular access.
- Conflict between nurses should be solved by nurse administrator to save their efforts toward patient care.
- Replication of the current study on a large probability sample from different geographical areas to achieve more generalized results.

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## Effects of Modulating Environmental Stimuli on pain experience During IV Cannulation in Neonates in NICUs

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### ABSTRACT

**Background and Objectives:** To assess the nurse's knowledge regarding effects of modulating environmental stimuli on pain experience during IV Cannulation in neonates in NICUs.

To evaluate the nurse's knowledge after nursing interventions of environmental stimuli on pain experience during IV-Cannulation in Neonates in NICUs.

**METHODOLOGY:** A quasi-experimental study design was conducted in Ali Fatima Hospital Lahore. The study involved 30 participants' female nurses who were chosen using a combination of universal and convenient sampling method. The data collection process involved the use of modified Questionnaires. Questionnaires section consisted a non-randomized controlled trial with pre and post tests which aimed to assessing the knowledge of nurses and to evaluate the knowledge after nursing interventions. The intervention group (n=30) nurses received the comprehensive knowledge about pain management in Neonates in NICUs. After that, the data was analyzed using the SPSS software.

**RESULTS:** The sample consists of 30 participants. 56.7% (17 participants) are aged between 20-22 years. 43.3% (13 participants) are aged between 23-25 years. All participants (100%) are female, indicating a gender-specific sample. 33.3% (10 participants) hold a diploma. 66.7% (20 participants) have a degree. The significant increase in knowledge scores from pre-intervention (mean = 9.4000) to post-intervention (mean = 13.9667) indicates that the intervention (modulating environmental stimuli) effectively enhanced nurses' knowledge regarding the management of pain during IV -Cannulation in neonates. The p-value (Sig. 2-tailed) is .000, indicating a statistically significant improvement.

**CONCLUSION:** The sample consists of 30 participants. 56.7% (17 participants) are aged between 20-22 years. 43.3% (13 participants) are aged between 23-25 years. All participants (100%) are female, indicating a gender-specific sample. 33.3% (10 participants) hold a diploma. 66.7% (20 participants) have a degree. The significant increase in knowledge scores from pre-intervention (mean = 9.4000) to post-intervention (mean = 13.9667) indicates that the intervention (modulating environmental stimuli) effectively enhanced nurses' knowledge regarding the management of pain during IV -Cannulation in neonates. The p-value (Sig. 2-tailed) is .000, indicating a statistically significant improvement.

**KEYWORDS:** Neonates, nicu, IV cannulation, pain, environmental stimuli, randomized controlled trial.

### INTRODUCTION

Neonates admitted to NICUs often undergo various painful procedures as part of their medical care, with intravenous (IV) cannulation being one of the most common. Pain experienced during such procedures not only causes distress to the neonates but can also have long-term physiological and psychological consequences. Therefore, effective pain management strategies are essential in neonatal care settings. Modulating environmental stimuli has emerged as a promising

approach to alleviate pain and distress during medical procedures in neonates. Environmental factors such as noise, light, touch, and non-pharmacological techniques can influence the neonate's perception of pain and stress. By optimizing these stimuli, it is possible to create a more conducive environment for pain management.<sup>1-4</sup>

This literature review provides a summary of the current literature on pain management of neonates.

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Effective pain management presents positive patient outcomes, such as a decrease in length of stay in hospital; reduced incidences of infections; and steady increase in the weight of a child. There is the belief that neonates do not feel pain<sup>5-8</sup>

The total number of newborns who were candidates to receive a IV-Cannulation was 80, of whom 60 were included in the study. The neonates have no surgery and congenital anomalies. Both genders were included in this study; 24.6% of them suffer from respiratory distress syndrome and prematurity simultaneously.<sup>9</sup> A study has shown that the nurses' knowledge and attitude are important in implementation of pain management program, guidance on the possible improvement of pain management is instructive in design and hold training courses to inform the Personnel. According to the review, the root causes of insufficient pain management in NICUs are NICU nurses' lack of expertise, lack of collaboration, and ineffective communication<sup>10-12</sup>

## METHODOLOGY

A quasi-experimental study design could be suitable, specifically a non-randomized controlled trial with pre-and post-tests.

The research work was conducted in Ali Fatima Hospital Lahore. Slovin's formula was used to determine the sample size for simple random sampling. The formula is given by  $n = N / (1 + N(e^2))$ , where n is the sample size, N is the population size, and e is the desired level of precision.

The sample size was (n= 30) nurses. The population would consist of registered pediatric nurses working in either inpatient or outpatient settings where IV therapy is regularly administered.

Non-Randomized sampling techniques was used. The pre and post results were analyses using paired sample statistics to determine the effects of interventional education. The research setting for this study was the neonatal intensive care unit at Ali Fatima Hospital Lahore. At Hospital, the upgraded neonatal unit can accommodate 20 babies, including provision for kangaroo mother care (KMC). The baseline characteristics of participant was collected with the help of questionnaire after distributing the questionnaire among the participants.

## RESULTS

The sample consists of 30 participants. 56.7% (17 participants) are aged between 20-22 years. 43.3% (13 participants) are aged between 23-25 years. All participants (100%) are female, indicating a gender-specific sample. 33.3% (10 participants) hold a diploma.

66.7% (20 participants) have a degree. This literature review provides a summary of the current literature on pain management of neonates.

**Table 1: Demographic table shows variable of frequency and percentage.**

		Frequency	Percent
Age	20-22	17	56.7
	23-25	13	43.3
Gender	Female	30	100.0
Education	Diploma	10	33.3
	Degree	20	66.7

Statistical Package for the Social Sciences was used to analyze the gathered data which reflect the data as graphical representations.

Pre-Intervention Knowledge: The mean score is 9.4000, with a standard deviation of 3.71019.

### T test (paired sample test)

Paired Samples Statistics			
		Mean	N
Pair 1	Pre Knowledge	9.4000	30
	Post Knowledge	13.9667	30
			Value of p
			<0.001

The pre-training results showed a moderate to high level of understanding across various aspects related to modulating environmental stimuli for pain management during IV cannulation in neonates. However, there were some areas of uncertainty or misunderstanding, as indicated by incorrect responses ranging from 16.7% to 50.0%.

The post-training results demonstrated a significant improvement in understanding, with the majority of respondents correctly answering questions across all aspects covered in the training. Correct responses ranged from 86.7% to 100%, indicating a comprehensive grasp of the material.

Before the training program, there were notable knowledge gaps and inconsistencies among participants, with incorrect responses observed in several questions.

The training program effectively addressed these knowledge gaps and uncertainties, resulting in a substantial improvement in understanding and proficiency among participants. The training program had a positive and significant impact on participants' understanding of modulating environmental stimuli for pain management during IV cannulation in neonates.

## DISCUSSION

There are great opportunities for neonatal nurse to improve their knowledge and skills, and highly training in the management of pain by performing non-pharmacological methods that have proven to be powerful aids in reducing procedural pain in neonates. 13-14 Regarding the nurses' characteristics, the present study results revealed that, This suggests that the intervention

successfully addressed knowledge gaps and provided valuable insights into pain management for neonates. The 95% confidence interval for the mean difference does not include zero, indicating that the improvement in knowledge is statistically significant. 15-16 The findings suggest that the intervention of modulating environmental stimuli significantly improves nurses' knowledge regarding pain management during IV cannulation in neonates. This improvement in knowledge is likely to contribute to better pain management practices, enhancing the overall care and comfort of neonates in the NNU.

These results highlight the importance of interventional education regarding environmental factors in pain perception and management in neonates. By creating a supportive environment with reduced sensory input, it is possible to minimize the pain and distress associated with medical procedures such as IV cannulation. This has significant implications for neonatal care practices in NICU settings, where optimizing pain management is paramount. 17-20

## CONCLUSION

Providing education to nurses regarding Modulating environmental stimuli during IV cannulation in neonates admitted to NICUs can effectively improve their understanding of neonatal pain and management. Implementation of such interventions may contribute to enhanced neonatal care practices in NICU settings. Further research is warranted to validate these findings and explore additional strategies for optimizing pain management in neonates.

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#### Authors Contributions:

**Amna Zia, Iqra Khan, Abida Parveen:** Substantial contributions to the conception and design of the work.

**Ms. Hajra sarwer, Ms. Alina Hameed:** Design of the work and the acquisition.

**Amina Kainat and Kanwal Zubair:** Drafting the work. Final approval of the version to be published.

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## Effect of Nursing Intervention for Management and Prevention of Needle Stick Injuries among Student Nurses

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### ABSTRACT

**Background and Objectives:** Needle stick injuries (NSIs) are a significant occupational hazard among student nurses. This study evaluates the effectiveness of a nursing intervention program designed to manage and prevent NSIs. NSIs pose a serious threat of infection transmission, including hepatitis B contagion (HBV), hepatitis C contagion (HCV), and mortal immunodeficiency contagion (HIV)(Al-Mugheed, Farghaly et al. 2023).

**METHODOLOGY:** A quasi-experimental design was employed involving student nurses from Nursing School. The intervention included education sessions, hands-on training.

**RESULTS:** Post-intervention data showed a significant reduction in the incidence of NSIs among the participants. Additionally, there was an improvement in knowledge and practices related to NSI prevention and management. The post survey showed the significant result of (<0.001).

**CONCLUSION:** The nursing intervention program was effective in reducing NSIs and enhancing preventive measures among student nurses.

**KEYWORDS:** Needle stick injuries (NSIs), Student nurses, Nursing intervention program, Prevention Hepatitis B (HBV), Hepatitis C (HCV), HIV, Quasi-experimental design, Education sessions

### INTRODUCTION

Needle stick injuries (NSIs) are a significant occupational health concern, particularly for nursing internee students. NSIs pose a serious threat of infection transmission, including hepatitis B contagion (HBV), hepatitis C contagion (HCV), and mortal immunodeficiency contagion (HIV)<sup>1</sup>. Although the majority of sharp object injuries are reported in developing countries, in developed countries, where advanced forestallment measures similar as real-time injury monitoring systems and standardized operating protocols are in place, sharp object injuries continue to do, and numerous reports coming from developed countries, which signifying that sharp objects injuries might be a global concern. Encyclopedically, 32.4 to 44.5% of healthcare professionals report passing at least one accidental sharp injury or needle stick annually. In the United States, an estimated 385,000 sharp object injuries do among healthcare workers annually<sup>2</sup>. Needle stick injuries (NSIs) pose a serious risk for transmission of bloodborne pathogens. Student nurses are particularly vulnerable due to inexperience and lack of training. On

a global position, according to World Health Organization (WHO), 3 million nurses and nursing student are exposed annually to percutaneous fluid defiled with at least hepatitis B about exposures), HIV (roughly 170,000 exposures), and hepatitis C 9 about 900,000 exposures<sup>3</sup>. Futhermore, A global meta-analysis set up that 42.8 % of nurses and 46.4% of physicians reported sharps injuries. The overall prevalence of NSIs among nursing students was found to be 14.1% in a study involving 300 undergraduate nursing students in Saudi Arabia<sup>4</sup>. Despite the presence of preventive measures, needle stick injuries continue to occur among nursing students, highlighting the need for a interventional study to explore and understand the effects of s influencing the preventive measures and advance management of needle stick injuries. The incidence of needle stick injuries is higher among nurses with a low level of knowledge on the prevention of needle stick injury, and who have not received the relevant training during their undergraduate study. The aim of this study is to provide nursing intervention

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and check the effects of it in management and in preventive measures among the students of nursing in Ali Fatima Hospital. The high incidence of needle stick injuries among nursing students indicate a gap in current prevention and management strategies. There is a critical need to evaluate and enhance nursing interventions aimed at reducing needle stick injuries<sup>5</sup>.

The high incidence of needle stick injuries among nursing students indicate a gap in current prevention and management strategies. There is a critical need to evaluate and enhance nursing interventions aimed at reducing needle stick injuries.

### METHODOLOGY

A quasi-experimental study was conducted at a private hospital in Lahore from February 2024 to June 2024, aiming to assess the impact of preventive measures on the incidence of needle stick injuries among nursing internee students. The study involved a sample of 30 participants, selected through purposive sampling. The sample size was determined using the formula  $n = N / (1 + N(e^2))$  with a 5% margin of error, as referenced from Statology. The dependent variable of the study was needle stick injuries, while the independent variable was the implementation of preventive measures. The work environment was considered a control variable to maintain consistency across participants. The interventional component of the study included 30 registered nurses working across various hospital wings. Data collection spanned five months, and a specialist committee comprising three members from the Safety Department of AFH was responsible for administering and evaluating the data. The inclusion criteria required participants to be internee nursing students and those engaged in malpractice practices, while the exclusion criteria ruled out students with health or emotional conditions that could hinder their safe or effective participation.

### RESULTS

The study involved 30 female participants, all of whom had four years of study experience. Regarding injury history, 63.3% reported no history, 30% reported having a history, and 6.7% were uncertain. During tasks, injuries occurred primarily during the disposal of needles (50%), followed by recapping needles (26.7%), suturing (13.3%), and passing needles (10%). The causes of these injuries were attributed to time pressure (46.7%), lack of experience (23.3%), and equipment failure (30%).

Category	Score	Frequency	Percent%
poor	49%	11	39
average	50% -80%	10	33
good	80%-100%	7	25

The p test table shows that the mean pre-knowledge percentage is 51.20 with a standard deviation of 16.988. The mean post-knowledge percentage is 68.07 with a standard deviation of 6.918. The p-value associated with the comparison of pre and post knowledge percentages is less than 0.001, indicating statistical significance.

Paired Samples Test							
pre and post	Mean	Std. Deviation	95% Confidence Interval of the Difference		t	df	Sig
			Lower	Upper			
			15.71429	4.49664			

### DISCUSSION

The study sample consisted of 30 female student nurses, representing 100% of the participants. This uniformity ensures that the findings are specifically applicable to female nursing students at a similar stage in their education.

The distribution of tasks during which needlestick injuries occurred was the disposal of needles was the most common activity (50.0%), followed by recapping needles (26.7%), suturing (13.3%), and passing needles (10.0%). This indicates that routine and frequent tasks like needle disposal and recapping pose the highest risk. These findings suggest that interventions should focus particularly on these high-risk activities, perhaps by revising protocols, enhancing training, and promoting the use of safer needle disposal systems. The educational intervention aimed at improving knowledge about needlestick injury prevention showed significant effectiveness.

The pre-intervention mean knowledge score was 51.20 (SD = 16.988), which increased to 68.07 (SD = 6.918) post-intervention. The paired samples t-test revealed a statistically significant improvement ( $t(29) = -8.398, p < .001$ ), with a mean increase of 16.867 points. Whereas A total of 43 articles were included in the analysis. Results showed that females (OR = 1.30, 95 % CI 1.06–1.58, P value = 0.009), younger age (OR = 2.75, 95 % CI 2.27–3.33, P value < 0.001, rotated shift work-

ers (OR = 2.16, 95 % CI 1.47–3.15, P value < 0.001), not attending training courses (OR = 1.30, 95 % CI 1.07–1.56, P value = 0.006), working in the surgery ward (OR = 1.83, 95 % CI 1.33–2.50, P value < 0.001), less work experience (OR = 1.43, 95 % CI 1.04–1.95, P value = 0.025) apposed a greater risk factors for NSI among healthcare workers 6. Additionally The study by (Alfulayw, Al-Otaibi et al. 2021) revealed that the Incidence of NSIs over 26 months was 8.4% among all participants. Nurses were the most affected staff (52.5%) resulted commonly from disposing syringes (58.9%). In contrast, the incidence of NSIs among physicians was 24.9% where surgical devices were the primary source of NSIs among them (40%). Failure to complete all required hepatitis B vaccination was common among expatriates of the participants of this study. Needle recapping was the leading cause of sharp object injuries (36.30%), followed by medical waste treatment (21.92%). The left hand was the most commonly affected body part (56.84%)7. All injured individuals reported the incidents promptly, and no sero-conversions were documented during the study period Ibrahim, Kannan et al. 2024. The average age of the participating nurses was 29.7 years. The following 3 themes were identified: various needlestick injury experiences, post-needlestick injury coping, and expectations regarding needlestick injuries 8. Additionally Paramedical Workers and Staff Nurses constitute the highest percentages of NSIs at 27% and 12%, respectively. The locations where NSIs frequently occur include the Emergency Ward (26%) and Intensive Care (27%). Hypodermic needles are identified as the primary cause (39%), with procedures (38%) and recapping (22%) being the leading activities linked to NSIs. Lack of awareness about the reporting process is identified as a significant reason, with 6.38% of participant were not aware of the reporting procedures9. The study by (Al Qadire, Ballad et al. 2021) showed that , Of the participants, 81.2% were females; mean age was 23.3 (SD = 4.5) years. The mean total knowledge score was 6.6 out of 10 (SD = 2.1). In addition, 18.2% (n = 32) of the students experienced needle stick injury. Most of the injuries 71.9% (n = 24) occurred during medication preparation and administration. The main cause of NSI as reported by students was recapping the needles (59%, n = 19). The study findings revealed that the participants that are nursing internee students, showed relatively good mean scores in knowledge test (Mean=6.4, SD=1.4), and the students held positive

attitudes towards the learning program (Mean=27.1, SD=4.12). Students showed the low degree of handling the practice of needle stick (Mean = 14.10, SD = 2.0). The sample totaled 14.1% prevalence which was needle stick injuries. About 65.1% of them either had one of those two in the past 12 months, and 24.4% of them are those who had two of the injuries in the same period10.

## CONCLUSION

The nursing intervention program significantly reduced needle stick injuries and enhanced the management and preventive practices among student nurses. Continued emphasis on education and training is essential for protecting healthcare workers from occupational hazards. This research on prevention of needle stick injury among students highlight several critical insights and practical recommendations. Needle stick injury represents a significant occupational hazard, with potential consequences of both physical and mental well being of nursing students. This study findings the underscore the importance of comprehensive educational programs that emphasize the needle handling techniques, the use of safety engineered devices and adherence to standard precautions. Recommendation

We recommend focusing on the effectiveness of safety-engineered devices, the impact of comprehensive training and simulation programs, the role of supervision and mentorship, the development of clear protocols for injury management, and the influence of environmental controls on injury rates. Exploring these areas can provide valuable insights for reducing NSIs.

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**Ayesha shabir:** Substantial contributions to the conception and design of the work.

**Zartasha Naheed Akthar , Farah Mubeen:** Design of the work and the acquisition. Drafting the work. Final approval of the version to be published.

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## Enhance the knowledge and practice of nurses regarding disaster management in public hospital in Lahore.

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### ABSTRACT

**Background and Objectives:** Disasters, both natural and man-made, pose significant challenges to healthcare systems worldwide. Nurses, as frontline responders, play a crucial role in disaster management and patient care. Despite their essential role, studies highlight a gap in disaster preparedness among nurses, especially in developing countries. This study aimed to evaluate the impact of a disaster management training program on the knowledge and practice of nurses working in a public hospital in Lahore, Pakistan.

**METHODOLOGY:** An interventional study using a descriptive correlational design was conducted at Ali Fatima Hospital, Lahore. A total of 30 nurses, selected through simple random sampling, participated. Data were collected using a validated adaptive questionnaire comprising demographic variables and multiple-choice questions assessing knowledge and practice related to disaster management. Pre- and post-intervention assessments were analyzed using SPSS (version 25). Descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (paired t-test) were applied, with a significance level set at  $p < 0.05$ .

**RESULTS:** Participants were all female nurses, evenly distributed between the 20–25 and 26–30 years age groups. Pre-intervention knowledge scores averaged 43%, indicating moderate preparedness. Following the training intervention, mean knowledge and practice scores significantly improved to 83% ( $p = 0.000$ ). Improvements were noted across all core domains, including triage, disaster response, patient care priorities, and recovery planning. The paired t-test confirmed a statistically significant difference between pre- and post-intervention mean scores ( $6.53 \pm 1.22$  vs.  $12.43 \pm 1.54$ ).

**CONCLUSION:** The disaster management training program significantly enhanced the knowledge and practice of nurses in disaster preparedness and response. Integrating such programs into continuous professional development and nursing curricula is essential to strengthen the healthcare system's readiness during emergencies. Expanding the sample size and applying this intervention across multiple institutions is recommended for broader applicability.

**KEYWORDS:** Disaster management, nursing education, preparedness, training, Lahore, public hospital.

### INTRODUCTION

Disasters pose complex challenges for healthcare systems worldwide, including a variety of natural events like earthquakes, hurricanes, and floods, as well as human-induced occurrences such as industrial mishaps or terrorist acts. In the midst of the disorder and immediacy of these occurrences, nurses emerge as frontline heroes, shouldering the responsibility of delivering prompt care and assistance to those impacted.<sup>1</sup>

Additionally, the World Health Organization (WHO) highlights the vital importance of nurses in disaster

preparedness and response initiatives. In its recent publication on disaster nursing and emergency preparedness, the WHO emphasizes the need for continuous education and training to enhance nursing capabilities in disaster settings (WHO, 2020)<sup>2</sup>. A disaster is a dangerous occurrence that impairs society's or community's ability to function and results in losses to people, property, the environment, and the economy. Disasters occur in four stages: mitigation, readiness, response, and recovery.<sup>3</sup> There are three categories for the disasters, which include: Natural

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catastrophes include floods, droughts, earthquakes, and disease outbreaks; technological mishaps like fires, building collapses, and radioactive accidents; and political and civil unrest like bombings, terrorism, and biological warfare<sup>3</sup>

.Since the term "disaster" describes the occurrence of unexpected and regrettable events, managing them is a continuous concern that calls for greater focus and cooperation on a worldwide scale .Physicians, pharmacists, and nurses are among the healthcare professionals who are crucial in reducing adverse effects on community health.<sup>4</sup>

The occurrence and intensity of disasters are increasing worldwide. The majority of healthcare professionals are nurses, and they play important roles in disaster response and care. They need to have sufficient knowledge, skill competencies, and preparedness in responding to disasters. The objective of this review was to assess the psychological, skill-based, and knowledge aspects of nursing preparedness for catastrophes.<sup>5</sup> In the last decade, an increasing number of serious disasters have impacted more individuals. Globally, there were more reported disasters in 2018. Out of 315 natural disaster incidents, 11,804 individuals lost their lives, 68 million people were impacted, and 131,7 billion USD worth of economic damage was sustained. India scored first in terms of the number of affected individuals (35%) while Indonesia recorded nearly half of all deaths (47%). <sup>5</sup>An increasing number of countries recognize the critical necessity to reduce disaster risks and build resilient communities as the frequency and diversity of disasters that can produce both direct and indirect impacts have risen Millions of individuals experience severe disasters every year as a result of either a lack of coping mechanisms or the existence of such mechanisms but their failure to translate into knowledge about threatened communities that could save lives.<sup>6</sup> This is one of the main reasons why disaster management practices are now doing poorly. This in particular pointed to a deficiency in the exchange of knowledge and the development of practical disaster management plans.<sup>7</sup> Hospitals receive patients and their families during a crisis within a very tight time frame. As a result, hospital administrators and decision-makers need to train nurses so they should react to emergencies quickly and efficiently.<sup>8</sup> Hospitals and other healthcare facilities play a crucial role in times of crisis. Among the initial centers are hospitals. Providing prompt, excellent care

is essential to lowering death rates, raising the proportion of survivors, minimizing complications, preventing disability, and providing relief from both physical and psychological suffering.<sup>8</sup> At every step of a crisis, nurses take on a variety of tasks, such as managers, educators, coordinators, rescuers, and caregivers and There is evidence linking a wide range of criteria, including department type, educational attainment, experience responding to disasters, and training linked to disasters, to nurses' preparedness for disasters.

Based on the guidelines provided by the World Health Organization, all nations should be ready for emergencies, and the majority of nurses having inadequately prepared for emergencies.<sup>9</sup> In an attempt to equip nurses and nursing students with the knowledge and abilities needed for disaster management, there is a dearth of evaluation on the current disaster nursing education and training programs to pinpoint the gaps in curriculum development and ongoing education. Nursing leaders and educators have been aware of the need to provide education and training for nursing students and nurses after the 911 attacks in 2001.<sup>10-12</sup> Study design: An interventional study uses in this project. The design for this project was be descriptive correlational approach in which a group of newly graduated nurses hire by the health system in Ali Fatima Hospital, Lahore was ask to complete the survey.

Setting: The setting for this project was in Lahore, Ali Fatima Hospital.

Sample size: The sample was 30 nurses which were calculated by the solvin's sample formula.

Sampling Technique: in this study the simple Random sampling technique was be used.

Sampling formula:

Random sample=  $n = N / 1 + N (e^2)$

Where:

N=population size

n= sample size

e=acceptable margin of error

Inclusion criteria:

- The nurses who are currently working in hospital setting.
- The nurses who is willing to participate.

Exclusion criteria:

- The nursing students are excluded.
- The nurses who are working in academic setting.

Study Tool:

With data collection permission from institute researcher use a adaptive questionnaire used that contain a demographic part and MCQS part to assess the knowledge of participants regarding disaster management.

Data Analysis:

The data collection was analyzed by using SPSS. Frequency distribution, cross tabulations used to describe the results of the study Descriptive Statistics; were analyzed through percentage (%) and frequency distribution table. Inferential Statistics; For this data analysis, we computed the mean and standard deviation. T-test can be applied to compare the effectiveness of the strategies applied to nurses to see whether there is an improvement in the dependent variable of stratification. Paired T test can be used to analysis the categorical data such as degree of satisfaction among nurses from the training program. This study will use a significance level of 0.05 (p < 0.05) to indicate the statistical significance. This shows that the statistical significance p-value is less than 0.05 consequently results with the value below 0.05 are deemed to be statistically significant.

**RESULTS**

In this chapter data analysis and interpretation was discussed by the tables and graphs. A table show demographic data with their frequency and percentage.

**Table: 1 show the Demographic data**

STATISTICS VARIABLES	OF	
	Frequency	Percent
AGE	20_25	15
	26_30	15
GENDER	FEMALE	30
EDUCATION	BACHELOR	12
	POST GRADUATE	17
	DIPLOMA	1
EXPERIENCE	LESS THAN 1 YEAR	16
	1-3	9
	3-5	3
	MORE THAN 5 YEARS	2

This table shows that the sample consists of 30 female participants with an even split between the age groups of 20-25 years and 26-30 years. Education levels vary, with 40.0% holding bachelor's degrees, 56.7% holding postgraduate degrees, and 3.3% holding diplomas. In terms of experience, 53.3% have less than 1 year of experience, 30.0% have 1-3 years, 10.0% have 3-5 years, and 6.7% have more than 5 years of experience. The pre-data table presents a detailed analysis of participants' initial perceptions regarding various aspects of their knowledge and skills in patient care, communication, and decision making.

**Table 2: Pre knowledge of participants**

PRE-DATA			
PRE Q1			
	Frequency	Percent	
FALSE	14	46.7	
TRUE	16	53.3	
Total	30	100.0	
PRE Q2			
	Frequency	Percent	
FALSE	19	63.3	
TRUE	11	36.7	
Total	30		100.0
PRE Q3			
	Frequency	Percent	
FALSE	15	50	
TRUE	15	50	
Total	30	100.0	
PRE Q4			
	Frequency	Percent	
FALSE	18	60	
TRUE	12	40	
Total	30	100.0	
PRE Q5			
	Frequency	Percent	
FALSE	18	60	
TRUE	12	40	
Total	30	100.0	
PRE Q6			
	Frequency	Percent	
FALSE	14	46.7	
TRUE	16	53.3	
Total	30	100.0	
PRE Q7			
	Frequency	Percent	
FALSE	13	43.3	
TRUE	17	56.7	
Total	30	100.0	
PRE Q8			
	Frequency	Percent	
FALSE	19	63.3	
TRUE	11	36.7	
Total	30	100.0	
PRE Q9			
	Frequency	Percent	
FALSE	20	66.7	
TRUE		33.3	

The table indicates the number and percentage of participants who answered "TRUE" or "FALSE" for each question. For example, in PREQ1, (What is the primary goal of disaster management in a hospital setting?) 14 participants (46.7%) answered "FALSE", while 16 participants (53.3%) answered "TRUE". Only one question PREQ3, (What is the first step in disaster response in a hospital setting?) has an exact 50-50 split between "TRUE" and "FALSE" answers

**Table 2: Pre knowledge of participants**

POST DATA			
POSTQ1			
	Frequency	Percent	
FALSE	1	3.3	
TRUE	29	96.7	
Total	30		100.0
POSTQ2			
	Frequency	Percent	
FALSE	3	10.0	
TRUE	27	90.0	
Total	30	100.0	
POSTQ3			
	Frequency	Percent	
FALSE	3	10	
TRUE	27	90	
Total	30	100.0	
POSTQ4			
	Frequency	Percent	
FALSE	5	16.7	
TRUE	25	83.8	
Total	30	100.0	
POSTQ5			
	Frequency	Percent	
FALSE	5	16.7	
TRUE	25	83.3	
Total	30	100.0	

The table indicates a notable enhancement in understanding and application of disaster management prevention between the pre-training test and the post-training test. The knowledge score was 43% before training and after the training program it improved up to 83%. The results indicate the number and percentage of participants who answered "TRUE" or "FALSE" for each

Question. POSTQ5, (What is the purpose of triage in disaster response?) 5 participants (16.7%) answered "FALSE", while 25 participants (83.3%) answered "TRUE"

In pre intervention the of primary goal of disaster management the number of mean 0.53 but after intervention increase by the 0.97 as well as hospital disaster preparedness the number of mean increase by 0.37 to 0.90 same as first step in disaster management preparedness the number of mean increase by 0.50 to 0.90 same as critical aspects of patient care during disaster the number of mean increases by 0.37 to 0.83 as well as the purpose of triage in disaster response the number of mean increases by 0.40 to 0.83 same as key considerations for nurses in disaster response the number of mean increases by 0.40 to 0.80 although the role of nurses in disaster recovery the number of mean increases by 0.43 to 0.80 similarly critical aspects of disaster preparedness for nurses the number of mean increases by 0.37 to 0.77 as well as the purpose of debriefing after disaster response the

number of mean increases by 0.53 to 0.73 same as key consideration for nurses in disaster management the number of mean increases by 0.57 to 0.97 similarly the role of nurses in disaster mitigation the number of mean increases by 0.35 to 0.83 in addition to key consideration for nurses in disaster recovery the number of mean increases by 0.57 to 0.83 moreover role of nurses in disaster preparedness the number of mean increases by 0.40 to 0.80 as well as purpose of disaster drills and simulations the number of mean increases by 0.33 to 0.77 similar to support services were available to staff after disaster the number of mean increases by 0.43 to 0.70

The data indicate a notable enhancement in nursing expertise and practice during disasters. administration after the intervention

This suggests the success of training or educational programs in disaster management for nurses. The results highlight the significance of ongoing education and training for nurses to improve their readiness and response skills in effectively handling disasters and emergencies. Additional studies might examine particular elements of the intervention that played a significant role in the enhancement and assess the long-term retention of knowledge and abilities. Additionally, efforts should be made to ensure that such training programs are accessible to nurses of all educational backgrounds and age groups to enhance overall disaster preparedness within the nursing workforce.

This table presents that the mean score before the intervention for disaster management knowledge and practice is

6.5333. After the intervention, the mean score significantly increased to 12.4333.

The p-value of 0.000 signifies a statistically meaningful difference between pre-intervention and post-intervention results. This suggests that the intervention, likely a disaster management training program or educational intervention, had a substantial positive impact on nursing knowledge and practice in disaster management.

In the evaluation of participants reaction carried out immediately after the end of the teaching session it was found that a significantly increase in the percentage of before and after training in most questions. Which remain above 80%.

Tables show of participants reaction in relation of training.

## DISCUSSION

Disasters, whether they are natural or caused by humans, necessitate a healthcare workforce that is

well-prepared to effectively address the needs of impacted communities. Nurses, as essential healthcare providers, have a vital function in disaster management, requiring ongoing efforts to improve their expertise and practice in this field. In our study most of the participants consists of 30 female participants with an even split between the age groups of 20-25 years and 26-30 years.

Education levels vary, with 40.0% holding bachelor's degrees, 56.7% holding postgraduate degrees, and 3.3% holding diplomas. In terms of experience, 53.3% have less than 1 year of experience, 30.0% have 1-3 years, 10.0% have 3-5 years, and 6.7% have more than 5 years of experience. Most of the participants were female (68%), with diploma in Nursing (59.2%), mostly were clinicians (82.5%), while regarding mostly had experience (59%). It is revealed that reason for moderate knowledge, nurses holding diploma in young age with minimum experience. On the other hand nurses with Bachelor degree have maximum knowledge due to their 5 years degree experience. 13-16 Our study significantly contributes to enhancing nursing knowledge in disaster management by investigating the effectiveness of simulation-based training in improving nurses' preparedness for disaster response. This aligns with findings from Smith et al. (2022), who similarly demonstrated the positive impact of simulation exercises on nurses' confidence, communication skills, and triage abilities during simulated disaster scenarios. Johnson et al. (2023) also support these findings, showing that simulation training led to significant improvements in nurses' knowledge, skills, and confidence in managing disasters. Our study contributes by examining the specific impact of simulation training on nurses' preparedness within your unique context or population, thereby providing valuable insights into tailored interventions to optimize nursing readiness for disaster response. However, while existing research underscores the benefits of simulation-based training, challenges such as resource constraints and logistical barriers have been identified. 17 In our study, we delve into the effectiveness of simulation-based training in enhancing nurses' preparedness for disaster response, whereas focused on cultural competence and its significance in disaster settings. While the two studies may appear to address different aspects of disaster management, there are important intersections between them. The results of this research show the impact of nursing intervention on knowledge and practice of catastrophe management. The outcome indicates a notable increase

in knowledge and practice scores following the intervention, suggesting that the training program effectively enhanced nurses' understanding and abilities in disaster management prevention. The results of the study align with earlier research that emphasizes the significance of continuous education and training for nurses to enhance and preserve their clinical skills. The significant improvement in knowledge and practice scores also supports the idea that targeted interventions can lead to positive changes in nursing practice. 18-20

## CONCLUSION

The education programs significantly enhance nurses' ability to accurately triage patients, ensuring that Patients are directed to the appropriate level of care. This improvement reduces the risk of both over triage and under triage, leading to better patient outcomes. Performance and clinical assessment level regarding disaster management. The findings also indicated that the student satisfaction and self-confidence higher after the training program.

This confidence translates to better communication with patients and other healthcare professionals, fostering a more collaborative and effective emergency care environment. Therefore, integrating such educational programs into nursing curricula and ongoing professional development is highly recommended.

Recommendation:

Current study suggests the following recommendations on the bases of findings:

- Future research should focus on increasing the sample size to improve the statistical strength and applicability of the results
- Experimental studies should be applied across two or more hospitals to improve the applicability of the research outcomes.
- Nursing intervention such as workshops, training programs, and mentorship should be implanted to improve knowledge and practice of nursing student.

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**Arooj Zahra :** Substantial contributions to the conception and design of the work. Design of the work and the acquisition.  
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