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EFFECTIVENESS OF VISUAL INFUSION PHLEBITIS (VIP) SCORE IMPLEMENTATION ON REDUCING PERIPHERAL INTRAVENOUS PHLEBITIS RATES: A CORRELATIONAL STUDY

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Abstract
Vein inflammation, or phlebitis, is frequently linked to intravenous (IV) treatment. It may result in consequences like infection and cause pain, erythema, and edema. A proven technique for determining the degree of phlebitis and helping nurses make prompt clinical decisions about IV catheter management is the Visual Infusion Phlebitis (VIP) score. The VIP score encourages regular observation and offers a methodical way to spot phlebitis symptoms including discomfort, redness, or swelling early on. The basic aim of the research is to assess the knowledge and practice of nurses regarding the use of the Visual Infusion Phlebitis (VIP) Score. A quantitative, correlational study was conducted to evaluate the effectiveness of VIP (Visual Infusion Phlebitis) scoring strategies in reducing phlebitis incidence. The ethical guidelines were fulfilled according to BERA framework. The target population included Random Registered Nurses involved in IV therapy. Data Was collected using a self-administered structured questionnaire based on a Likert scale . Firstly, descriptive Statistics were run which lead to inferential statistics using SPSS version 21 to test hypothesis and to test the relationship between VIP scores and reduction score in phlebitis pearson correlation was applied. The results highlighted that there is a significant negative relationship between nursing adherence to phlebitis and incident rates . Incident Rate and Nurses Adherence are -0.981. This figure indicates a very strong negative linear relationship between the two variables.This suggests that when the level of "Nurses Adherence" increases, the "Incident Rate" tends to decrease both sharply and gradually.

INTRODUCTION

Phlebitis, the inflammation of a vein, is a frequent and concerning complication associated with peripheral intravenous (IV) therapy (Ertaş Akyüz, 2025). It may be mechanical, chemical, or bacterial in origin and often leads to discomfort, compromised venous access, and potentially serious complications such as

infection or thrombosis (Gonzalez, 2020). In hospitalized patients, the risk of phlebitis increases with the duration and method of IV therapy, particularly when best practices for insertion and maintenance are not followed (Sari, 2024; Stanescu, 2025). Phlebitis can significantly affect patient outcomes and healthcare costs due to extended hospital stays and additional treatments (Gul, 2025; Seid, 2024). Nurses play a critical role in identifying and preventing phlebitis, making their vigilance and use of appropriate tools paramount in clinical settings (Asman, 2024; Li, 2025).

Early detection and intervention are key strategies in preventing the progression of phlebitis (Toh S. W., 2025). Delay in identifying the signs can result in worsening of the condition, leading to severe pain, infection, or even sepsis in vulnerable patients (Zingg & Pittet, 2009). Phlebitis can be classified as mechanical (due to catheter movement), chemical (due to irritant drugs), or infectious (due to microbial contamination), and each type requires a slightly different prevention strategy. However, common to all forms is the need for frequent assessment and early recognition. Nurses are at the forefront of this care, and their ability to systematically evaluate IV sites using standardized tools can substantially reduce complications (Nickel, 2024). The Visual Infusion Phlebitis (VIP) score is a clinical tool developed to assist nurses in identifying early signs of phlebitis and taking appropriate action before the condition worsens. It was first introduced by Jackson (1998) and has since been widely adopted in clinical guidelines. The VIP score uses a 0–5 scale to grade phlebitis severity based on observable signs such as pain, redness, swelling, and palpable venous cords. A score of 0 indicates no symptoms, while a score of 5 reflects severe phlebitis with purulent drainage. The tool is simple, quick, and non-invasive, making it suitable for regular bedside assessments. VIP scoring is designed to encourage routine evaluation of intravenous sites and to prompt timely removal or replacement of cannulas when necessary. According to Marsh et al. (2021), incorporating the VIP score into nursing protocols significantly reduced phlebitis rates in various clinical settings. Regular use of this scoring system fosters consistency among nursing staff and helps in standardizing responses to early signs of inflammation

When compared to other developing nations, the incidence and prevalence of infusion-related phlebitis are noticeably higher in Pakistan's cities, especially Karachi (Shahnaz, 2021). According to a study done at Dow University Hospital, hospitalized patients who had peripheral intravenous catheters (PIVCs) had an incidence rate of 39.1% (Yaqoob et al., 2023). Compared to the 0.1% to 63.3% range shown in research from other developing countries, this rate is noticeably higher (Chang, 2018; Thangkratok P. P., 2025; Sakakida, 2025; Sar2025; Sari 2016). Among the elements causing this variation. There is a direct association between extended catheter use and an increased incidence of phlebitis (Yaqoob et al., 2023). According to Yaqoob et al. (2023), poor nursing practices considerably increase the incidence of phlebitis. Higher rates of phlebitis have been associated with conditions such as tuberculosis (Chen, 2025; Nabipur, 2025; Yaqoob et al., 2023; Buriro et al., 2024). Incidence Variability: According to other research, the rate in pediatric patients after chemotherapy is 1.3% (Farooqi et al., 2022; Buriro et al., 2025). In Pakistan, there is less consistent effective adherence to best practices for catheter placement and maintenance (Ahmad., 2025; Sheikh, 2025; Farooqi et al., 2022; Buriro et al., 2024; 2025). On the other hand, although the high rate in Karachi draws attention to systemic issues in healthcare, it also highlights the possibility of improvement through improved nursing education and adherence to established protocols, which could bring Pakistan's rates closer to those of other developing nations.

A number of variables, such as infusion site selection, catheter size, and infusion rate, affect the development of phlebitis in IV patients. To reduce the risk of this frequent issue, it is essential to comprehend these elements. Higher infusion rates, especially when using specific drugs, can raise the risk of phlebitis. For example, because of their irritating qualities, medications such as amiodarone and noradrenaline have been linked to increased rates of phlebitis (Yasuda et al., 2022; Buriro et al., 2025). According to studies where extended catheterization was a substantial risk factor, continuous intravenous infusion has also been associated with an increased incidence of phlebitis (Karaoğlan, 2022).Phlebitis and catheter size have a complicated relationship. According to some research, the size of the catheter

bore and the incidence of phlebitis are not significantly correlated (Toh S. W., 2025).Other studies, however, suggested that while smaller catheters can lessen discomfort, they may also result in increased pressure and flow rates, which could raise the risk of phlebitis (Ertaş Akyüz G. &., 2025). The development of phlebitis is greatly influenced by the infusion site selection. Compared to catheters implanted in the elbow region, those placed in the forearm are typically linked to decreased incidence of phlebitis (Muddasani, 2024). Furthermore, the risk of phlebitis is increased when previously catheterized veins are used (Cernuda Martínez, 2024).The risk profile for phlebitis can be further complicated by patient-specific characteristics including age and underlying medical problems, even if these factors are crucial in assessing phlebitis risk.

Research Hypothesis:

H0: There is no relationship between nurse's adherence to visual infusion phlebitis and the incidence rate of phlebitis.

H1: There is a significant negative relationship between nurse's adherence to visual infusion phlebitis and the incidence rate of phlebitis.

Problem Statement:

In hospitalized patients, peripheral intravenous (IV) phlebitis is still a frequent and avoidable side effect of intravenous medication (Nasiri, 2025). It can cause severe pain and suffering for the patient, lengthen hospital stays, raise medical expenses, and increase the risk of deadly systemic infections like sepsis (Ibarz, 2024). The prevalence of phlebitis frequently surpasses suggested thresholds, even with established protocols and the availability of standardized evaluation instruments such as the Visual Infusion Phlebitis (VIP) Score (Torné-Ruiz, 2024).The gap between nurses' theoretical understanding of phlebitis prevention techniques and their regular implementation in clinical practice, particularly with regard to the methodical and precise use of the VIP Score for early detection and intervention, may be one of the factors contributing to the ongoing problem of phlebitis (Ahmad, 2025). The literature currently in publication indicates that phlebitis rates can vary and emphasizes the necessity of better care and monitoring (Toh, 2025; Thangkratok, 2025; Asman, 2024). Healthcare facilities may continue to have higher-than-acceptable phlebitis rates, endangering patient safety and placing an increasing strain on healthcare resources, unless nurses' current knowledge and adherence to VIP Score guidelines are clearly understood and the tangible effects of its regular use are demonstrated.to improve patient outcomes and healthcare efficiency, it is imperative to quantitatively assess nurses' current knowledge and practice of the VIP Score and determine whether its systematic and consistent application significantly lowers the incidence of phlebitis.

Literature Review

Theoretical Framework: The KAP theory model was proposed by American Everett M. Rogers in the late 1950s and early 1960s.A framework for comprehending and influencing behavior, the Knowledge-Attitude-Practice (KAP) paradigm is especially useful in health studies. (Lioa, 2023; Buriro et al., 2025). It suggests that changing one's behavior is a process that includes learning new things, cultivating optimistic outlooks, and eventually implementing desirable behaviours. In essence, it implies that people's attitudes are influenced by their understanding of a subject, and that attitudes therefore have an impact on their behaviours' appropriate theoretical framework for this study is the Knowledge-Attitude-Practice (KAP) Model, which offers a methodical way to investigate the connection between nurses' comprehension of the Visual Infusion Phlebitis (VIP) Score and how it affects patient outcomes. According to this paradigm, a person's attitudes toward a subject can be influenced by their knowledge of it, and these attitudes in turn might affect their practices or behaviours (Mantello, 20023; Lashari & Umrani, 2023). It is expected that nurses who have a thorough understanding of the VIP Score's components, application, and goal will grow to appreciate its value in preventing phlebitis. It is then anticipated that these optimistic outlooks will result in regular and precise application of the VIP Score in their day-to-day clinical work. Finally, it is expected that a decrease in the incidence of phlebitis will be substantially correlated with the constant and accurate use of the VIP Score (practice), enhancing patient safety and treatment quality. This paradigm makes it possible to investigate the ways in which

knowledge-based educational interventions may result in better nursing practices and, ultimately, better patient outcomes.

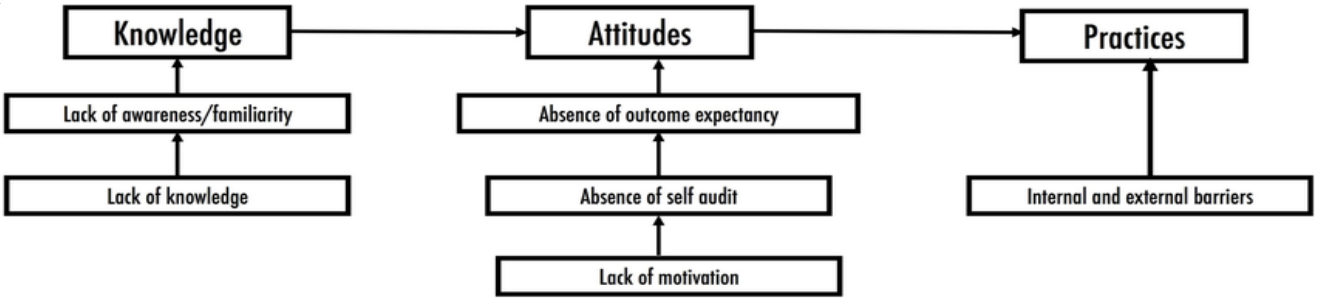

Fig 1: The KAP theory model was by American Everett M. Rogers 1950s

Role of Nurses in VIP Score Implementation

Nurses are essential agents in the successful implementation of VIP scoring systems. Their education, clinical judgment, and frequent interaction with patients place them in an ideal position to carry out routine assessments. Proper training in the use of the VIP score enables nurses to interpret scores correctly and respond accordingly—such as by rotating sites, stopping infusions, or alerting medical staff when severe symptoms are present (Wang, 2024; Rickard et al., 2012). Without the active participation of nurses, the effectiveness of the VIP tool would be greatly diminished. However, challenges remain in ensuring consistent use of the VIP score. Studies have shown variability in its application across different wards and shifts, often due to a lack of awareness, time constraints, or inadequate documentation practices (Alexandrou et al., 2018). Continued education and auditing are necessary to improve compliance and maintain high standards in IV site care (Nickel B. G., 2024). Furthermore, integrating the VIP score into electronic health records can improve visibility and accountability in busy hospital settings. A number of studies have highlighted the effectiveness of using the VIP score in reducing phlebitis. A study by Ray-Barruel et al. (2014) found that consistent use of the VIP scoring tool in medical-surgical wards led to a significant decline in reported phlebitis cases. Another study conducted in intensive care units revealed that nurses trained in VIP scoring demonstrated higher detection rates and timely intervention compared to those who used unstructured assessments (Keogh et al., 2016). These findings reinforce the notion that structured assessment tools not only improve patient safety but also empower nurses by giving them a validated framework to guide clinical decisions. The benefits are not limited to patient outcomes alone. Hospitals that implemented the VIP scoring system also reported fewer cases of cannula-related bloodstream infections, which translate into decreased antimicrobial use, reduced hospital stay duration, and lowered healthcare costs (Moureau et al., 2012; Buriro et al., 2025). As antimicrobial resistance continues to be a global health concern, reducing the incidence of preventable infections becomes even more vital.

Training and Quality Improvement Initiatives

To ensure proper and consistent use of the VIP scoring tool, hospitals must invest in nursing education and quality improvement initiatives. Training programs that combine theoretical instruction with hands-on simulations have proven effective in improving nurse confidence and accuracy in phlebitis assessment (Gonzalez, 2020; Buriro et al., 2025). Additionally, periodic audits and feedback loops can help identify areas for improvement and reinforce the importance of adherence to protocols. Leadership support is another crucial factor in sustaining the use of the VIP score. Nurse managers and infection control teams must collaborate to integrate VIP scoring into daily routines, develop clear escalation pathways for abnormal scores, and foster a culture of accountability. In some settings, visual cues such as bedside posters or checklist reminders have been used to enhance compliance with VIP scoring protocols.

Phlebitis is a preventable complication of IV therapy that continues to pose challenges in healthcare settings (Seid K. L., 2024; Sari I. P., 2024; Ahmad K.

K., 2025). The Visual Infusion Phlebitis (VIP) score is a valuable tool that equips nurses with a structured and effective method for early detection and prevention. By implementing and consistently using the VIP scoring system, nurses can significantly reduce the rate of phlebitis, enhance patient safety, and improve overall healthcare outcomes. Ongoing education, quality assurance, and institutional support are essential to optimize the use of this evidence-based practice and to ensure that nurses are fully empowered to lead phlebitis prevention strategies.

Research Methodology:

Research Design: A quantitative, correlational study was conducted to evaluate the effectiveness of VIP (Visual Infusion Phlebitis) scoring strategies in reducing phlebitis incidence among nurses. The study was carried out in the hospitals of Karachi. A correlational research strategy, a kind of non-experimental study that examines the link between two or more variables without changing them, was used in the department with a sample size of 65. It does not ascertain whether one variable influences change in another; instead, it concentrates on finding patterns and evaluating the direction and strength of relationships between variables.

Sampling Technique: The participating nursing units were chosen using simple random sampling technique, in accordance with hospital availability and implementation viability. To ensure that every eligible nurse has an equal chance of participating in the knowledge and practice assessment survey, a straightforward random sampling technique was used to choose individual nurses within these units.

Inclusion Criteria: Registered nurses currently working in ICU, medical or surgical wards.

Exclusion Criteria: Nursing interns, students, or unlicensed support staff.

Data Collection Instrument: A standardized self-administered survey form created with Google Forms was used to evaluate nurses' self-reported practice and knowledge of the VIP Score. This self-administered questionnaire was piloted to check the validity of the questionnaire The questionnaire reliability was then assed using Cronbach alpha. It was Likert scale questionnaire with 3 sections .one section to assess demographic information of the sample and rest of the two represented the variables to assess the correlation between variables.

Ethical Consideration: Before collecting data, the participants consent was taken which clearly highlighted that this data is being collected for just research purpose and they can withdraw research at any point. To guarantee the safety and welfare of every participant, ethical guidelines were closely followed during the whole study. Consent that was informed was collected from nurses and involvement was completely optional. Every participant received complete information regarding the goals of the study. By employing codes rather than personal identifiers, confidentiality and anonymity were preserved, and all data was treated with the utmost privacy. Prior to data collection, ethical clearance was obtained from the institution via a consent form. In summary, every BERA framework protocol was adhered.

Data Analysis: Data was analyzed using SPSS version 21. First of all, the validity of the questionnaire was tested through Cronbach alpha. After that descriptive analysis was run to see the frequencies, mean, median mode and standard deviation of the variables to make sense of the data. Lastly inferential statistics were used to test hypothesis. To test the correlation between adherence of nurses to phlebitis score and reduction of peripheral intravenous phlebitis rates.

Results:

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Adherence to Visual Infusion Phlebitis	65	7.00	35.00	26.8462	7.84863
Incidence Rate of Phlebitis	65	6.00	30.00	22.8308	6.67919
Valid N (listwise)	65				

Table 1 shows the descriptive explanation of the variables which are adherence to visual phlebitis and incident rate of phlebitis .A sample of 65 was taken after calculation which is depicted in the table as N 65.The table shows clearly that adherence to visual infusion phlebitis minimum score is 7.00 and as high as 35.00.The standard deviation of 7.84863 with the average adherence score was 26.8462.There is a greater dispersion which is denoted by higher standard deviation. Which shows variability of adherence score around the mean. The other variable incidence rate of Phlebitis score ranges between 6.00 to 30.00. The event rate notified is 22.8308 with a standard deviation score of 6. 67919.This standard deviation showed that the incident rates were a little less scattered than the adherence scores. Overall, these descriptive statistics provide a basic understanding of the data distribution for adherence and phlebitis incidence rates in the 65 cases studied. They offer details on the typical scores and the range of variance observed for each variable. Out of a possible range of up to 35.00, the mean score of about 26.85 indicates that nurses generally demonstrated a rather high degree of adherence.

Meanwhile, the average incidence rate of phlebitis in the study group varied between 22.83 and 30.00. The standard deviations reveal a moderate level of heterogeneity in both occurrence rates and adherence levels across the sample, indicating that while there are some general trends, individual scores differ somewhat from these averages. This descriptive summary establishes the framework for understanding the context of the subsequent correlation analysis by displaying the distribution and typical values of the significant variables in the dataset.

Table 2:Correlations

		B2	B3
Nurses Adherence	Pearson Correlation	1	.981**
	Sig. (2-tailed)		.000
	N	65	65
Incident Rate	Pearson Correlation	-.981**	1
	Sig. (2-tailed)	.000	
	N	65	65

**. Correlation is significant at the 0.01 level (2-tailed).

This table, "Table 2: Correlations," displays the number of observations, the Pearson correlation coefficient, and the statistical significance of the relationship between two variables, clearly "Nurses Adherence" (represented as B2) and "Incident Rate" (shown as B3). The table shows that the connection between "Incident Rate" and "Nurses Adherence" is -0.981. This figure indicates a very strong negative linear relationship between the two variables. This suggests that when the level of "Nurses Adherence" increases, the "Incident Rate" tends to decrease both sharply and gradually. Conversely, when adherence is low, the incidence rate is higher. The Sig. (2-tailed) value for this association is 0.000. According to the footnote, this p-value is far lower than the conventional significance level of 0.01.

The correlation has a significance level of 0.01 (2-tailed). It is quite unlikely that the strong negative correlation found was the result of chance, especially considering this high level of statistical significance. We are therefore very confident that, in the population from which this sample was drawn, there is a true inverse relationship between incidence rates and nurses' adherence. Finally, by verifying that the correlation was computed using data from 65 paired observations, the N value of 65 for both variables ensures that the analysis is based on a consistent sample size. In conclusion, Table 2 provides compelling statistical evidence of a strong and significant inverse relationship between nurses' adherence and the incidence rate of phlebitis. It is important to remember that in conclusion, Table 2 provides statistical evidence of a strong and significant inverse relationship between nurses' adherence and the incidence rate of phlebitis. Although this association suggests that stronger adherence is associated with lower incidents, it is important to remember that correlation does not indicate causation. Further research would be necessary to

examine potentially relevant factors and causal pathways.

Discussion:

The study found that VIP scores help detect early signs of phlebitis which aligns with studies (Daud, 2024; Doesburg, 2019; Bhardwaj, 2021) .Localized variations in skin temperature brought on by the body's inflammatory response are a symptom of phlebitis (Daud A. &., 2024). Furthermore, the occurrence of phlebitis is closely correlated with the kind of drug provided via peripheral access and the length of catheter dwell time (Ertaş Akyüz, 2025). According to one study, 39.3% of patients with PIVCs reported one or more problems, with a phlebitis rate of 17.6%, above the indicated rate of 3% (Seid K. L., 2024). Since 56% of the examined studies utilized different phlebitis assessment scales, the absence of consistency in these assessment tools makes it more difficult to compare results.

The study also finds that VIP score allows for timely removal of IV lines before phlebitis worsens which aligns with the studies (Rainer, 2024; Aceranti, 2024).The frequency of phlebitis in patients is considerably decreased when nurses follow best practices for treating the condition (Guanche-Sicilia, 2021; Gunasundram, 2021). Numerous studies have shown that phlebitis rates can be successfully reduced by putting in place evidence-based nursing practices, standardized care bundles, and structured nursing education programs (Hodge, 2024; Wakchaure, 2025). Phlebitis incidence and severity are decreased as a result of these measures, which also improve early identification, standardize care, and increase nurses' adherence to best practices (Toh S. W., 2025; Ahmad K. K., 2025).According to a study that used a Peripheral Venous Catheter (PVC) care bundle, phlebitis rates decreased over time as a result of notable advancements in phlebitis identification and assessment (Muñoz, 2024; Nickel, 2024). Better detection led to an early rise in reported cases, but the long-term result was a decline in incidence (Gunasundram et al., 2021).

The efficacy of standardized methods in reducing phlebitis was demonstrated by another study that discovered that a systematized nursing care routine decreased the incidence of phlebitis from 26% to 12% (Oliveira, 2024; Erdoğan, 2025) .The frequency and severity of phlebitis were considerably reduced by structured nursing education programs. Phlebitis rates were significantly lower in the training-receiving intervention group than in the control group in research that included both groups (Oliveira A. R., 2024).

Evidence-based nursing practices were shown to reduce the incidence of chemotherapy-induced phlebitis (Toh S. W., 2025; Farooq, 2025). Patients receiving evidence-based care had significantly lower phlebitis rates than those receiving routine care (Alasmari, 2024; Erdoğan B. C., 2025; Bibiano Guillén, 2024).A bundle approach reduces late detection cases by 66% and enhances nurses' adherence to optimal practices by providing training and tools for early phlebitis identification (Toh S. W., 2025; Cho, 2025). Although these studies demonstrate the benefits of following best practices, it's vital to keep in mind that better detection techniques can cause an initial spike in phlebitis reports. On the whole, nonetheless, the trend points to a decrease in incidence with continued use of best practices. This emphasizes how crucial it is to maintain and enhance patient outcomes through ongoing education and procedure revisions.

Conclusion:

It is concluded that there is a strong negative relationship between nurse's adherence to VIP and the incident rates. This negative correlation suggests as the adherence of nurses increase the incident rate decreases and vice versa. The study highlights that without VIP score it will be hard to assess the risk of phlebitis .It also suggest the nurses who use VIP score their patients experience less phlebitis symptoms. The VIP score strengthens decision making related to IV site score. This can help standardize phlebitis statements. It is suggested that continuous education is the corner statement. It releases phlebitis rates. A notable reduction in the incidence of phlebitis has been associated with structured nurse education programs. Frequent assessments with the VIP score have demonstrated efficacy; one research reported a 90% decrease in phlebitis diagnosis following protocol implementation. It has been demonstrated that doing daily evaluations and closely following catheter management protocols enhances overall care quality and lowers complications. Sustaining high

compliance rates requires ongoing monitoring and training.

Future Research Suggestions: It is recommended to do intervention research on phlebitis rates. In order to check causation, experimental research is suggested on this topic.

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