

Patient Perceptions and Experience of Pain, Anxiety and Comfort during Peripheral Intravenous Cannulation in Medical Wards: Topical Anaesthesia, Effective Communication, and Empowerment

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Abstract *Background:* Peripheral intravenous cannulation (PIVC) is one of the most common invasive procedures that healthcare personnel perform daily, often a source of patients' pain, anxiety, dissatisfaction and discomfort. Despite the importance of increasing patient's comfort in medical care, this need has been increasingly overlooked during PIVC, especially in the current busy clinical settings. Doctors and nurses play a significant role in providing effective, easy-to-implement pharmacological and non-pharmacological management to help patients cope with pain, distress, and anxiety in the frequently performed cannulation. *Objective:* To assess adult patient perceptions and experience of comfort, pain and anxiety during PIVC in medical wards. *Design and Setting:* A cross-sectional descriptive study was carried out on 120 adult patients admitted to medical wards. *Methods:* Patients aged 18 to 65 who had undergone PIVC for 24 to 48 hours, with an 18 gauge Vasofix cannula and were alert and conscious during cannulation were included in the study. The study was guided by Kolcaba's Theory of Comfort. A structured face-to-face survey was used to collect data. Descriptive statistics were used to analyse the data. *Results:* One hundred and fourteen patients (95%) experienced pain and 88 patients (73.3%) reported anxiety during PIVC. Forty-seven patients (53.2%) stated that they were afraid of needle pain, 26 patients (30.2%) were afraid of staffs' ability during PIVC, and 12 (13.5%) were afraid of blood or bleeding. Ninety-two patients (76.6%) indicated that their healthcare professional only pricked them once during cannulation. Only a small number of patients (11.7%) were offered topical anaesthesia and very few patients (15.8%) were given the option to choose their preferred site for cannulation. The majority of patients, 110 (91.7%), expressed the need for topical anaesthesia and 116 patients (96.7%) reported effective communication for pain relief. One hundred and eighteen patients (98.3%) said they thought they would have been more comfortable if they had been able to choose the site for cannulation. *Conclusions:* The results may raise awareness of the need to reduce patients' pain and anxiety during PIVC. Using both pharmacological and non-pharmacological approaches, including topical anaesthesia, effective communication (friendly and informative staff) and empowerment to choose the site for cannulation; patients will be more relieved and subsequently reduce negative experiences that aids recovery.

Keywords Anxiety, Cannulation, Comfort, Communication, Experience, Perception, Pain, Topical anaesthesia

1. Introduction

Peripheral intravenous cannulation (PIVC) is a common procedure performed on patients. Up to 80% of patients have a peripheral intravenous cannula inserted while in hospital [1]. Regarded as a minor surgical procedure, it is also one of the most common invasive procedures that healthcare personnel perform [2]. Peripheral intravenous cannulae are an inexpensive method of delivering medications, blood products, and diagnostic reagents to assist with diagnosis,

parenteral intravenous nutrition or infusion over periods of days to months [3].

However, placing a cannula brings pain and anxiety, and interferes with activities of living (ALs), which negatively affects patient comfort [4, 5]. Distress was more likely to be reported if there was no understanding of why the intravenous cannula was placed, as PIVC is a source of pain and anxiety [4, 6]. It was previously reported that the practitioner's manner and approach will have a direct bearing on the patient's experience [7].

Most research literature on intravenous cannulation focuses on technical practice and mechanistic care of PIVC [1, 6]. However, only few studies had highlighted concerns on patient's discomfort [4]. In the usual practice, patients are usually not well informed prior to a PIVC procedure, seldom

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offered with topical anaesthesia before cannulation, and the patient is not allowed to choose the insertion point [3, 4, 8]. In fact, patient's perceptions, experiences of comfort and emotional involvements should be acknowledged as well [9, 10].

The experience of having PIVC during hospitalisation can be distressing and traumatising for most patients and may result in dissatisfaction with treatment [11]. Therefore, the objective of the study is to determine patient perceptions and experience of comfort, pain and anxiety during PIVC in medical wards. The study was guided by Kolcaba's Theory of Comfort, which emphasises the understanding of comfort as having one's comfort need met in four contexts –physical, psychospiritual, sociocultural and environment [12, 13]. We found that by using appropriate measures to raise awareness on PIVC among healthcare personnel, patient's perceptions and experience of pain, anxiety and comfort can be minimised to aid in recovery.

2. Methods

PubMed, Google Scholar and Web of Science databases were searched for publications of relevant studies between 1990 and 2013, using the following search terms: peripheral intravenous cannulation, comfort, pain, anxiety, perception and experience.

2.1. Sample and Setting

A cross-sectional descriptive design was carried out on a sample of 120 patients with PIVC in the adult medical wards of a district hospital in Malaysia. Inclusion criteria were: (i) aged 18 to 65 years old, (ii) admitted in medical wards, (iii) alert and conscious during the peripheral intravenous cannulation procedure, and (iv) had PIVC for 24 to 48 hours, with an 18 gauge Vasofix cannula. Patients were excluded if they had altered cognitive function and mental status, were unable to communicate or understand and converse in English or Malay, if they had a central venous cannula or were receiving chemotherapy. The sample size was calculated based on power at 0.80 with an alpha of 0.05, confidence level of 95%, and response distribution of 63%. The required sample size for the study was 108. Twelve subjects were added in this sample size to cater for 10% of attrition and the total sample size for this study was 120.

2.2. Instrument

The Peripheral Intravenous Cannulation Instrument (PICI) was a structured, self-designed questionnaire based on Theory of Comfort and previously relevant published articles [4, 8]. The content was based on physical and psychological comfort. A panel of academic professionals, researchers and healthcare personnel discussed and analysed the validity and feasibility of the instrument. A pilot study with six patients in another hospital who met the inclusion criteria was used to test reliability, face validity and feasibility. The panel of

experts reached consensus on the format and contents of the amended items after two formal meetings. An alpha coefficient of Cronbach was included in the interval [0.70, 0.72] corresponded with satisfactory internal consistency after two items were identified and removed (using the Omitted Item Statistics Sections of the output) to improve reliability.

2.3. Data Collection

Patients consented to the study purpose, its duration, potential benefits and potential risks. Written patient consents were obtained. The survey was done after PIVC was placed and generally took 20 to 25 minutes to complete. It was administered through face-to-face interviews, either in English or Malay, depending on the patient's language preference. All identifiable information and research data was coded.

2.4. Statistical Analysis

All analyses were performed using SPSS, version 18.0 and statistical significance was set at $P < 0.05$. The internal consistency of the self-designed instrument items was determined by Cronbach's alpha. Descriptive statistics: mean, standard deviation, percentages and frequencies were used to illustrate the data.

2.5. Ethics Approval

The study was approved by research ethics review boards at both the International Medical University Joint-Committee of the Research and Ethics Committee [Ref: BN101/2010(07) 2013] and the Medical Research and Ethics Committee [Ref: KKM/NIHSEC/800-2/2/2/P13-239]. The Director of the hospital granted permission to conduct the study. The study was registered with the National Medical Research Register [Ref: NMRR-12-1276-14450].

3. Results

A total of 132 patients were approached in the medical wards; 120 (91%) responded. Of these, two declined to participate due to the lack of time and 10 did not meet eligibility criteria. Patient demographics are listed in Table 1. The patients comprised of 67 males (55.8%) and 53 females (44.2%). The mean age was 44.2 (*SD* 14.3) years (range 18 – 65). On ethnicity, 66 (55%) were Malay, 35 (29.2%) were Indian, and 19 (15.8%) were Chinese. Average hospitalisation lasted 36.2 (*SD* 7.3) hours (range 24 – 48). There were 101 patients (84.2%) who stated that they had been admitted to the hospital before, while 19 patients (15.8%) stated that they had never been admitted to the hospital. In accordance, 42 patients (35%) were admitted for uncontrolled diabetes mellitus, 41 patients (34.2%) had hypertension, 14 patients (11.7%) were admitted for asthma, 12 patients (10%) were admitted for gastrointestinal tract problems, 6 patients (5.3%) were admitted for unknown

origin fever, 3 patients (2.4%) were admitted for burn injuries, and 2 patients (1.4%) were admitted for urinary tract infection and food poisoning. Of their experience with cannulation, 94 patients (78.3%) stated that this was not their first time. Patients stated the reason(s) for PIVC as follows: administration of medications, 98 patients (81.7%); administration of fluids, 88 patients (73.3%); blood test, 27 patients (22.5%); blood transfusion, 9 patients (7.5%); and one (0.8%) for unknown reason.

Table 1. Patient demographics (n=120)

Variables	Frequency	Percentage
<u>Gender</u>		
Male	67	55.8
Female	53	44.2
<u>Ethnicity</u>		
Malay	66	55.0
Indian	35	29.2
Chinese	19	15.8
<u>Marital Status</u>		
Single	28	23.3
Married	89	74.2
Widowed	3	2.5
Divorced	-	-
<u>Education Level</u>		
None	15	12.5
Primary	38	31.7
Secondary	46	38.3
Diploma/Degree	21	17.5

The findings on patient comfort and responses about the site of the cannula, presence of pain during PIVC, pain experienced, previous number of attempts of PIVC and satisfaction about multiple attempts of PIVC are presented in Table 2. In our study, 114 patients (95%) had the cannula inserted at their hand and only 5% had the cannula at their elbow. Meanwhile, 107 patients (89.2%) were comfortable with their cannula site. When asked whether the location of the cannula interfered with their daily activities, 67 patients (55.8%) agreed that it did.

Pain experienced during PIVC was reported by 114 patients (95%) while only 6 patients (5%) did not experience pain throughout the procedure (Figure 1). Among the 114 patients who had reported pain, 41 patients (36%) expressed mild discomfort, 33 patients (28.9%) experienced moderate discomfort, 25 patients (21.9%) reported that the experience was painful, and 15 (13.2%) said it was very painful. Figure 2 presents data on whether patients were offered topical anaesthesia spray to relieve pain and the need for topical anaesthesia during PIVC. Results showed that 116 patients (88.3%) mentioned that healthcare personnel did not offer them topical anaesthesia spray during PIVC and 110 patients (91.7%) stated that they required topical anaesthesia to relieve pain, while only 10 (8.3%) did not require it prior to the procedure.

Table 2. Physical comfort (pain) and psychological comfort (anxiety) during PIVC (n=120)

Variables	Frequency	Percentage
Were you comfortable with the place where the needle was inserted?		
Yes	107	89.2
No	13	10.8
When the needle was inserted into the vein, did you feel any pain?		
Yes	114	95.0
No	6	5.0
If yes, how would you describe the pain?		
Mild discomfort	41	36.0
Moderate discomfort	33	28.9
Painful	25	21.9
Very painful	15	13.2
How many attempts were made before the needle was successfully inserted?		
Once by the healthcare personnel	92	76.6
Twice by the same healthcare personnel	20	16.7
Multiple attempts by multiple healthcare personnel	8	6.7
If there were more than one attempt at needle insertion, how do you feel about your experience?		
Not at all satisfied	11	39.2
Slightly satisfied	4	14.3
Somewhat satisfied	9	32.2
Satisfied	4	14.3
Do you feel that better communication with the doctor or nurse (including smiling, friendliness, and kindness) would help in reducing pain and nervousness (anxiety)?		
Yes	116	96.7
No	4	3.3
Were you nervous/ afraid during placement of the needle into your vein?		
Yes	88	73.3
No	32	26.7
If yes, how would you describe your nervousness (anxiety) during the placement of the needle?		
Mild	46	52.3
Moderate	19	21.6
Nervous	15	17.0
Very Nervous	8	9.1

Anxiety was experienced by most of the patients (73.3%) during PIVC (Figure 1). Of the 88 patients who experienced it, 46 patients (52.3%) described it as mild nervousness, followed by 19 (21.6%) with moderate nervousness, while 15 (17%) patients reported nervousness, and only 8 (9.1%) patients felt very nervous throughout the procedure. Patients were asked to identify their cause of anxiety and 47 (53.2%) stated that they were afraid of the needle pain, 26 (30.2%) were concerned about the ability of the staff, 12 (13.5%)

were afraid of blood or bleeding and 3 (3.1%) stated that hospital environment caused anxiety (Figure 3). Of the 88 patients who experienced anxiety, only 10 patients said healthcare personnel asked about their anxiety during PIVC. Almost all patients, 116 patients (96.7%), reported effective communication to relieve pain and anxiety.

Our results showed that 20 patients (16.7%) had been pricked twice by the same healthcare personnel and only 8 (6.7%) patients reported that they were pricked more than twice by more than one healthcare staff member. Eleven patients (39.2%) reported not at all satisfied with more than one attempt at cannula insertion (Table 2). Eighty-four patients (70%) stated that they were informed of the reason for cannulation. On whether the information received had helped to reduce anxiety, only 10 patients (11.9%) reported that they did not find the information given reduced their anxiety. The majority of the patients (97.6%) were reported to be satisfied with the information given. Only 12.5% were not warned about the pain prior to cannula insertion. Nineteen patients (15.8%) stated that they were asked to choose the site for cannulation, whereas 101 patients (84.2%) reported that they were not given a choice. Majority of the patients (98.3%) felt their comfort level would increase if they were given the option to choose a preferred site for needle insertion.

4. Discussion

The mean age of respondents was 44.2 (*SD* 14.3) years (range 18 – 65), which indicated that the majority of the patients were in the middle age developmental group. Most of the patients (55%) in this study were Malay (n=66). Pain was experienced by 95% of the patients during PIVC. This finding is similar to a study conducted by Halter and colleagues, which reported that 75% of patients experienced pain when the intravenous cannula was placed [4]. Intravenous cannulation is a very painful and distressing procedure, which may even stop patients from seeking healthcare and refusing to undergo cannulation [14]. This implies that patients may benefit from pharmacological and non-pharmacological pain management to reduce pain during PIVC. Positive and effective communication with patients to address their concerns may help in alleviating pain.

The findings was supported by a previous study, 70% of patients indicated that they would request topical anaesthesia for cannulation [5]. Puntillo and colleagues [15] reported that patients who were experiencing pain before a procedure were more likely to receive analgesia during the procedure. It may indicates that healthcare personnel might not be sensitive to the patients' comfort needs in regards to pain. Fourteen patients (11.7%) patients who had topical anaesthesia prior to cannulation experienced mild to moderate pain. This also suggests that the use of topical anaesthesia prior to PIVC is an efficacious comfort measure that can significantly improve the quality of care and comfort of patients.

Anxiety was experienced by most of the patients, 73.3%, during PIVC. This is supported by Burke and colleagues, [16] who reported that discomfort associated with intravenous cannulation can cause patient anxiety and dissatisfaction. Healthcare personnel should acknowledge anxiety during PIVC, and they should design comfort measures to reduce anxiety and make patients more comfortable.

The results show that only 19 patients (15.8%) were offered the option to choose a preferred site for needle insertion. A total of 118 patients (98.3%) felt their comfort level would increase if they were given the option to choose a preferred site. The majority of patients wanted to be allowed to choose the preferred site for cannula insertion. This finding implies that healthcare personnel should involve patients in deciding the site for intravenous cannulation if there are no medical contraindications as it directly affects the movement and function of the limb. These findings are further supported by Polak and colleagues, [3] who found that patient willingness to undergo future cannulation was strongly related to cannula location and interference with activities of living. Cannulating over joints should be avoided as it causes discomfort, reduces patient mobility and interferes with activities of living.

The effectiveness of communication by healthcare personnel in relieving pain and anxiety was evidenced by 116 patients (96.7%), who reported effectiveness of communication in relieving pain and anxiety. This finding is supported by Simonsen-Rehn and colleagues, [17] who found that participants emphasised the importance of communication and kindness in addition to a proactive approach in patient care. This implies that the majority of patients are more comfortable with their care if they feel that they are actively involved by being told about the procedure being performed.

The importance of providing adequate information relating to the procedure was supported by 74 patients (88.1%) in this study, who stated that the information given to them has helped to reduce their anxiety. Lücker and Stahlheber-Dilg [18] stated that the provision of clear and comprehensive information relating to the procedure should reduce patient anxiety. Healthcare personnel should provide adequate explanations to alleviate fear and anxiety.

There were 110 patients (91.7%) who preferred topical anaesthesia before cannulation. However, only 14 (11.7%) were offered topical anaesthesia prior to PIVC. This implies that topical anaesthesia may act as optimistic pain management in order to increase patient comfort and reduce the fear of cannulation. Experience of anxiety during intravenous cannulation may result in vasoconstriction, it then cause the procedure more difficult for patient and healthcare personnel and more painful for the patient [19]. Hence, in settings where topical anaesthesia is not accessible, it is important to reassure the patient with effective communication (including smiling, friendliness and kindness) to ease pain and anxiety. Patient care should continue to be holistic – effective communication with patient during PIVC must be established in order to ensure

continuous rapport between healthcare personnel and patients.

One limitation of the study is that it may not be possible to generalise the findings for other demographic areas in view of the use of the convenience sampling method. Future study on culture and ethnicity in pain perception could be considered. Perceptions and experiences of pain and anxiety might vary between those first experiencing PIVC and those who have had the procedure before. The research was specific to adults and cannot be generalised for children. Future studies in a larger population and different settings would be required to refine the questionnaire and test-retest correlations.

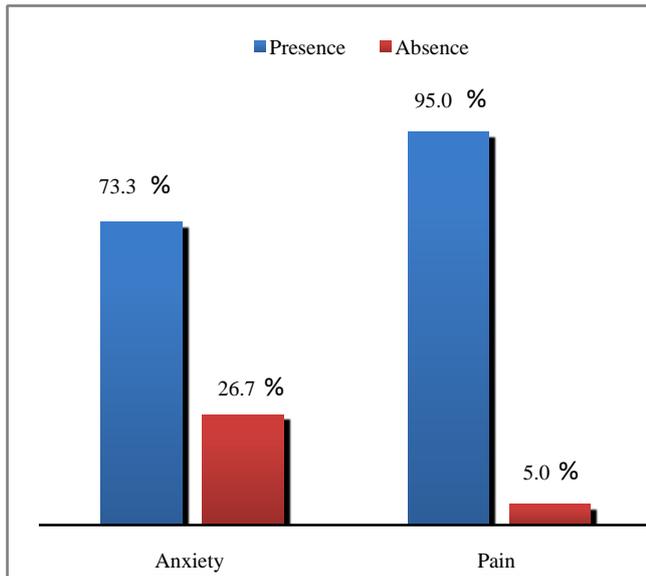


Figure 1. Patients' experiences of pain and anxiety during PIVC (n=120)

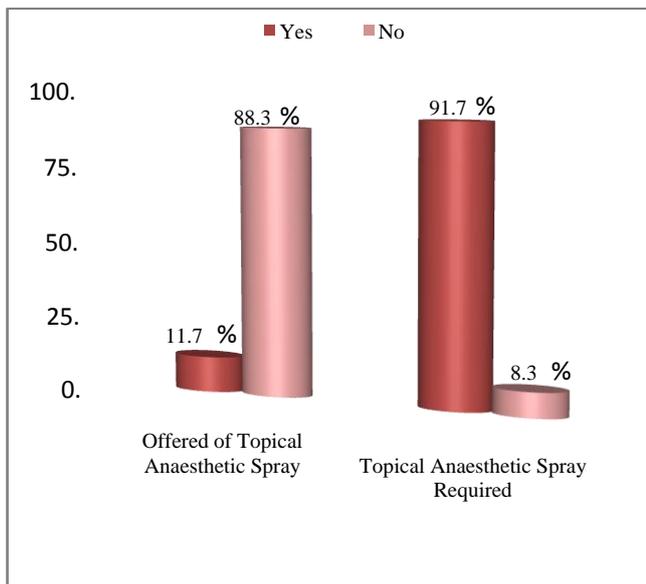


Figure 2. Offered of topical anaesthetic spray by the healthcare personnel; patients who required topical anaesthetic spray during PIVC (n=120)

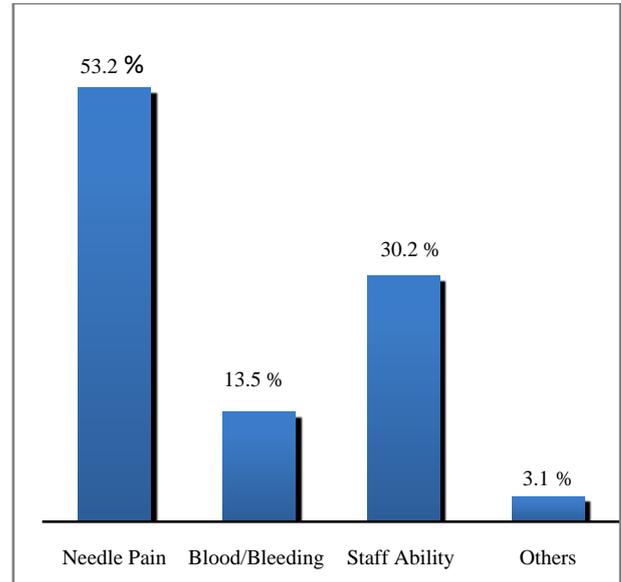


Figure 3. Causes of patients' anxiety during PIVC (n=120)

5. Conclusions

Patients who undergo PIVC may experience pain, anxiety and discomfort throughout the procedure. The importance of meeting the need for comfort, relieving pain and anxiety during cannulation, should be emphasised as it may contribute to a more efficient treatment process. Since there was a positive response on the need for topical anaesthesia prior to PIVC, pre-treatment with topical anaesthesia should be suggested as an option for pain relief for adult patients. The study could provide information that facilitates the improvement in quality of care during the procedure, as it shows that the majority of patients' comfort levels are affected during PIVC. The use of topical anaesthesia, effective communication and patient empowerment should be acknowledged to produce better care outcomes.

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