**I. REPORT CHECKLIST**

The following checklist must be completed and submitted with the project report. By checking an item, *the student and advisor(s) agree that the work has been done appropriately*.

\_N/A\_\_1. If the research report will be or has been submitted for publication in a journal, provide the name of the journal here: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_x\_\_\_2. Project title is concise and clear; lists advisers, course no. & date submitted

\_\_x\_\_\_3. Abstract is no more than 250 words and retains headings

\_\_x\_\_\_4. Introduction provides a definition of the topic under study, the importance of the topic, and the issue addressed by the study and is no more than two (2) pages.

\_\_x\_\_\_5. There is NO literature review section

\_\_x\_\_\_6. Purpose(s) of project is clearly and concisely stated

\_\_x\_\_\_7. Methods section uses headings and represents a summary of the methods used. (Actual methods used should be described if they were modified from the proposal.)

\_\_x\_\_\_8. Data analysis described is appropriate and responds to the purpose.

\_\_x\_\_\_9. Appropriate tables are included in the results section.

\_\_x\_\_\_10. Text of results section interprets the findings reported in the tables, not repeating them.

\_\_x\_\_\_11. The discussion section includes a description of the most important findings, and relates findings to the literature.

\_\_x\_\_\_12. The final section of the discussion is the limitations section.

\_\_x\_\_\_13. The conclusions respond to the purpose statement.

\_\_x\_\_\_14. Reference list uses style from DI class (PhPr 861c) or is specific to journal.

\_\_x\_\_\_15. Data collection/recording form(s) and/or questionnaire(s) are included in the appendix.

\_\_x\_\_\_16. Information is placed in the appropriate section—introduction, methods, results, etc.

\_\_x\_\_\_17. Report does not exceed 15 pages excluding tables & figures & appendices.

Date report submitted: \_\_\_\_\_March 28, 2018\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student (1): Caroline Joseph\_\_\_\_\_\_\_\_

Student (2): Alexandria P. Tellez\_\_\_\_\_\_\_\_

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**Title of project:** Utilization of Local Anesthetic Medications in Pediatric Patients prior to Venipuncture for Blood Draw or Intravenous Medication Administration

**Course title: PhPr 896B**

## Date: March 25, 2018

## Faculty advisors: Megan Brandon, Pharm D. and Rachel Cramton, MD

**Students: Caroline Joseph and Alexandria P. Tellez (Pharm D. Candidates 2018)**

**ABSTRACT**

**Specific Aims** To increase nursing use of local anesthetics in pediatrics and to identify barriers for not using local anesthetics prior to any venipuncture. Subjects: Registered pediatric nurses working at Diamond Children’s BUMC-T hospital in General Medicine Units.

**Methods** Pre-questionnaires and post questionnaires administered at the end of each shift daily for two weeks on knowledge, preference, practices of the day, years of work experience and any additional comment. A PowerPoint Intervention directed at the nursing staff educating about each of the local anesthetics used prior to venipuncture. Only used the nurses (N=8) that completed both pre and post questionnaires and excluded all other questionnaires.

**Main Results** Out of the 50 possible registered pediatric nurses in the General Medicine Units, only 8 nurses (16%) completed both the pre and post questionnaires. There was an increase in the number of local anesthetic utilized prior to venipuncture from pre-questionnaires to post-questionnaires but it was not statistically significant. P value= 0.1817, CI=1.00 95% Confidence interval (-0.84-2.84).

**Conclusions** Nursing staff did increase use of local anesthetics prior to venipuncture even with an educational intervention but it was not statistically significant. We did identify barriers for not administering local anesthetics prior to venipuncture which included: no time, no order for local anesthetic was available, and contraindicated.

**INTRODUCTION**

The purpose of this study is to evaluate the effect of education on nurses’ about local anesthetic medication in pediatric patients prior to venipuncture, phlebotomy, and intravenous injections. Evidence-based child and family centered management of pediatric procedural discomfort is routine in most children’s hospitals. Standard of care for pediatric pain management includes pharmacological and behavioral interventions (Rosenberg et. al, 2016).Local anesthetic medications such as LMX, EMLA and Jet-Tip Injectors are utilized prior to venipuncture for blood draw and venous cannulation, which affects a substantial portion of the pediatric and adult population. It is important to utilize local anesthetic medications in pediatric patients prior to venipuncture because its use is proven to minimize pain, reduce distress and anxiety associated with needles, venipuncture etc., especially in the pediatric populations (Rosenberg et. al, 2016). According to a PubMed article on topical anesthetic before venipuncture procedures in pediatric patients, participants who received EMLA cream reported significantly lower VAS pain scores (p=0.001). Pain scores generated by the researcher were also significantly lower in the EMLA group than in the control group (p=0.000) (Gwetu, T. P. et. al, 2015). Currently, a problem with administering local anesthetics is its lack of consistent nursing utilizations in hospitals. Although it is available in most hospitals, its use prior to any venipuncture is underwhelming due to variable factors. Therefore, evaluating how pediatric nurses’ utilize local anesthetics before an education intervention session and after an education intervention will measure their level of understanding, and perhaps help identify barriers for not consistently administering local anesthetics prior to venipuncture to pediatric patients.

**METHODS**

Design

This study used a pretest-posttest design.This study was approved by the University of Arizona Human Subjects Protection Program.

Subjects

Participants were recruited using a listserv from all the nurses working on Diamond Children’s Banner University Medical Center 5th Floor Ward. Participants were 18 years or older and were a registered pediatric nurse.

Intervention

PowerPoint Intervention directed at the monthly nursing staff meeting about each of the local anesthetics (Lidocaine Jet, EMLA, LMX) used prior to venipuncture. The objective of the PowerPoint was to provide the advantages and disadvantages of each type of anesthetic and provide ways to utilize them. The intervention was over a three day period in which the PowerPoint was presented at the staff meeting as well as printed out for those that did not attend the staff meetings.

Measures

Data were collected from all nursing using a paper and pencil questionnaire. There were 4 questions regarding knowledge, 1 on preference, 5 on practices of the day, and 1 on barriers to practice. Demographic data were collected on the years of work experience as a pediatric nurse and as a nurse in general as well as any additional comment question.

Data Collection

Pre-Intervention questionnaires and post-intervention questionnaires were administered at the end of each shift daily for two weeks to the nursing staff each. The questionnaires were placed at an easy to locate area at the nursing station for nurses to take and to return in the drop-box after completion each day.

Data analysis

Compared the frequency of the number of local anesthetics given prior to the education intervention with the post education intervention by using a paired t-test. There was a total of 50 nursing staff employed on the general medicine unit. Based on questionnaires returned, we estimated that had only 44% of nursing completed the pre-intervention questionnaire at least once and only 16% of nursing staff completed the post-questionnaire at least once. Therefore, we only analyzed the nursing staff that completed both the pre and post questionnaires. The frequency of the number of local anesthetics given was 0% (0/8) at pre-intervention and 50% (4/8) of local anesthetics given at post-intervention. Ordinal data were summarized using percentages. The paired t-test was used to compare whether the number of anesthetics increased from pre-intervention (0/8) to post intervention (5/8) due to the limited number of anesthetic reported being used.

**RESULTS**

The demographic characteristics of the participants were the number of years nurses actually worked as a nurse and as a pediatric nurse. Themedian years as a nurse and pediatric nurse were 10 years and 9.8 years, respectively. The range was from less than 1 year to 28 years as described in Table 1. Figure 2 was based on the pre-intervention questionnaire which describes the knowledge of how to use the topical anesthetic agents (J-Tip, LMX 4%, and EMLA) if definitely yes, mostly yes, mostly no, and no. Figure 3 was based on post-questionnaire knowledge which describes knowledge of how to use the topical anesthetic agents (J-Tip, LMX 4%, and EMLA) if definitely yes, mostly yes, mostly no, and no. Comparing how knowledgeable nurses were before intervention and after intervention showed that there was an increase in the knowledge that they gained with the education. The J-Tip knowledge had a 50% increase from 12.5% to 87.5% for ‘definitely knowledge of use’. The LMX knowledge had a 25% increase from 50% to 75%. And the EMLA knowledge had a 12.5% increase from 50% to 87.5%. In Figure 4, the nursing preferences changed slightly, whereas 87.5% of nurses preferred J-Tip in pre-intervention and decreased by 12.5% with 75% preferring J-Tip post intervention. There was an increase in EMLA preference at post-intervention with 25% preferring it. There was a 12.5% decrease in nursing preferring no anesthetic to 0%. Figure 5 compares the pre and post questionnaires of the total number of venipunctures done for the day, total number of local anesthetic used and what kind of local anesthetic was used. There was 100% of the venipunctures done for both pre and post questionnaires and 0% of local anesthetic were given in pre-questionnaire whereas post-questionnaire 83% were given local anesthetics prior to venipuncture. There was an increase in the number of local anesthetic utilized prior to venipuncture from pre-questionnaires to post-questionnaires, but it was not statistically significant [P value = 0.1817, CI=1.00 95% Confidence interval (-0.84 - 2.84)] as shown in Table 6.

**DISCUSSION**

The primary findings of this study indicated are not statistically significant due to the limited amount of data collected from the pre and post-intervention questionnaires. Perhaps it can be seen that the education invention played a successful role in increasing nurses to use local anesthetic prior to venipuncture, but unable to confirm any information due to lack of participation and time constraints. The paired t-test had no statistical significance in increasing nursing local anesthetic usage prior to venipuncture, P=0.1817, Cl=1.00 95% CI (-0.84-2.84). Comparing the number of medication station pulls from the units from November (25), December (42), January (45), and February (29) there was no increase in the use of for local anesthetics that can be determined as significant. This could be contributed to the barriers of administering local anesthetic prior to venipuncture which were no time, no order available for local anesthetic, contraindicated, and other reasons. The top 2 reasons were that there was no time and no order available for the local anesthetic. The nursing staff had comments for the other reasons such as “pharmacy takes too long to verify orders, J-Tip caused vasoconstriction and it makes it harder to get the specimen, the vein blew out, J-Tip is quick but the loud pop sound scares the kids, and EMLA is more successful but takes too long to work.” There are advantages and disadvantages to J-Tip, LMX, and EMLA and not all can be changed to make one perfect solution. Further staff education and policy changes will help reduce barriers for ordering topical anesthetics in the future.

Similar study was done but over an 18 month period whereas our study was done over 1 month. The intervention included quality improvement processes like needs assessment, self-identified champions, small test of change, and data transparency.1 Instituted system changes within the electronic health record including altering all existing pediatric admission order sets to have preselected orders for topical lidocaine to reduce barriers for ordering topical analgesia and thereby decreasing the barriers of insufficient time and lack of order.1 Stepwise development of a multimedia education framework as well as public data sharing of participation promoted by nursing and physician education facilitated and reinforced by pocket cards and staff competencies, training and education.1 In this study additional time, education is necessary to gather enough information to decrease any biases from such a small number of participants and to support the study. The barriers are still the same for both of these studies.

There were several limitations to this study. The limitations of the project are that the questionnaires will be given to each nurse on shift and filed out at the end of shift but nurses may not turn in questionnaire if forgotten or unwilling.   Initially expected to have at least 25 participants for the pre-intervention and post-intervention filling out daily questionnaires for 1 week. There was an extension to the time period for filling out questionnaires in an effort to collect more questionnaires since the first week there were very little questionnaires collected as was the situation at post-intervention. The collection was extended to the last day before the Intervention also due to the low response rate of the questionnaires. The intervention period lasted only 3 days due to the time sensitivity of the project. Starting January 1, 2018, there was a new protocol initiated for mandatory anesthetic prior to venipuncture so if there was data collect afterward it would be invalid. Therefore the questionnaires were only collected until December 30, 2017. There were only 22 participants over the course of 2 weeks for pre-intervention and 8 participants over the course of 2 weeks for the post-intervention. The questionnaires were also filled out only once by the participants not daily. The data collected limited our results since we were expecting at least 175 questionnaires to track any changes in practice from pre to post intervention. Since the project will analyze information from nursing staff, the project may not be generalizable to other nursing staff in other hospital locations.  It was assumed that the nurses understand what is being asked in each question and that they are answering accurately and honestly. It was also assumed that the nurses are willing participating and we would have enough data to analyze.

**CONCLUSIONS**

The education provided to nursing staff on the importance of anesthetic prior to venipuncture appeared to have no statistical significance despite an increase in knowledge and an increase in local anesthetic usage post-questionnaire. There were changes in the amount of anesthetic used in pediatric patients prior to venipuncture but that not statistically significant due to the limited amount of data collected and small sample size. The barriers to administering local anesthetics prior to venipuncture included nursing staff unable to find the time and there was no order available.

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2. Gwetu, T. P., & Chhagan, M. K. Use of EMLA cream as a topical anesthetic before venipuncture procedures in field surveys: A practice that helps children, parents and health professionals. SAMJ: South African Medical Journal. 2015; 105(7), 600-602.
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4. Ali, S., McGrath, T., & Drendel, A. L. An evidence-based approach to minimizing acute procedural pain in the emergency department and beyond. Pediatric emergency care. 2016; 32(1), 36-42.
5. GraphPad Software. QuickCalcs: Paired t test. 2018. <https://www.graphpad.com/quickcalcs/ttest2/> Accessed March 26, 2018.

**Table 1: Characteristics of Study Subjects**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Years as Nurse** | **Median Years as Nurse** | **Median Years as Pediatric Nurse** |
| **Participant 1** | 2 | **10 Years** | **9.8 Years** |
| **Participant 2** | 18 |
| **Participant 3** | 13 |
| **Participant 4** | 14 |
| **Participant 5** | 1.5 |
| **Participant 6** | 28 |
| **Participant 7** | <1 |
| **Participant 8** | 4 |

**Figure 2: Knowledge of Anesthetic Agents Use based on Pre-Intervention Questionnaire**

**Figure 3: Knowledge of Anesthetic Agents based on Post- Intervention Questionnaire**

**Figure 4: Preference of Anesthetic Agents prior to venipuncture based on Pre and Post Intervention Questionnaires**

Figure **5: Anesthetic Use based on Pre and Post Intervention Questionnaire (N=8)**

*N/A = No IV injection given, hence no local anesthetic needed*

**Table 6: Increase in Anesthetic Local from Pre and Post Questionnaires**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Pre-Questionnaire Number of Usage of Local Anesthetic** | **Post-Questionnaire Number of Usage of Local Anesthetic** | **P-value** | **95% CI** |
| **Participant 1** | 0\*\* | 0\*\* | 0.1817 | (-0.84 - 2.84) |
| **Participant 2** | N/A\* | 0\*\* |
| **Participant 3** | N/A\* | 2 |
| **Participant 4** | N/A\* | 1 |
| **Participant 5** | 0\*\* | 1 |
| **Participant 6** | 0\*\* | 1 |
| **Participant 7** | 0\*\* | 0\*\* |
| **Participant 8** | N/A\* | 0\*\* |

*Note:*

*0 = No local anesthetic given, in spite of IV injection administration*

*N/A = No IV injection given, hence no local anesthetic needed*

**APPENDICES**

 

**Senior Project Members: Caroline Joseph, Alexandria P. Tellez,**

**Advisors: Megan Brandon Pharm.D., BCPS, Rachel Cramton M.D., FAAP**

**Please write ID below: (first initial AND last 4 of your lawless # or any unique ID as long as you use it throughout questionnaire period)** (EXAMPLE: A1234, CAT99)

**Pre and Post Intervention Questionnaire**

|  |
| --- |
| [Directions / Instructions:] *Please complete the following questionnaire at the END of your shift (DAILY until December 12) about the use of local anesthetic medications in pediatric patients prior to venipuncture for blood draw or intravenous medication administration.*  ***Please do NOT forget write your ID # on top of each questionnaire you fill out.***  *Also note, that you will only fill out one questionnaire per day.*  *This should only take ~10 minutes of your time. After you complete the questionnaire, please drop it off at the* ***Drop Box (RED CHRISTMAS BOX)*** *at the nurses’ station at DN5.* |

1. Do you know how to use J-Tip Injector (Jet -Tip Needle Free Injector)?

* 1. Definitely Yes
  2. Mostly Yes
  3. Mostly No
  4. Definitely No

1. Do you know how to use L.M.X 4% cream (Lidocaine 2.5% and Prilocaine 2.5%)?
   1. Definitely Yes
   2. Mostly Yes
   3. Mostly No
   4. Definitely No
2. Do you know how to use EMLA cream (formerly ELA-Max, Lidocaine 4%)?
   1. Definitely Yes
   2. Mostly Yes
   3. Mostly No
   4. Definitely No
3. Which Local anesthetic do you prefer? (Please CIRCLE one)
   1. J-Tip® Injector (Jet -Tip Needle Free Injector)
   2. EMLA® Cream (Lidocaine 2.5% and Prilocaine 2.5%)
   3. LMX 4% Cream (formerly ELA-Max, Lidocaine 4%)
   4. None

i. Why do you prefer this local anesthetic?

I prefer this because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. How many times did you administer intravenous injection, (intravenous cannulation, phlebotomy, and incision) today? (i.e. how many times did you poke a patient for IV injection today?) (Please write a NUMBER below)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. How many times did you administer a local anesthetic such as J-Tip or LMX or emla before giving the IV injection today? (Please write a NUMBER below)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* + 1. Which Local anesthetic did you use today? (Please CIRCLE one or more)
       1. J-Tip® Injector (Jet -Tip Needle Free Injector)
       2. EMLA®. Cream (Lidocaine 2.5% and Prilocaine 2.5%)
       3. L.M.X. 4% Cream (formerly ELA-Max, Lidocaine 4%)
       4. None
  1. How many times did you NOT administer a local anesthetic before giving the IV injection today?(Please write a NUMBER below)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* + 1. What barriers do you see for NOT administering a local anesthetic? (Select all that apply)
       1. No time
       2. No order for local anesthetic was available
       3. Unaware of guideline / policy
       4. Contraindicated
       5. Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  1. On the last patient you administered the local anesthetic, what were the outcomes? (Please elaborate)
     + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. How long in years have you practiced as a Nurse?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. How long in years have you practiced as a Pediatric Nurse?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What other comments do you have? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| **Reminder:** *Please complete the following Pre –Intervention questionnaire at the end of your shift*  *DAILY for the next week*  *Please drop this off at the drop box (****RED CHRISTMAS BOX****) at the nurses’ station at DN5.*  *We really appreciate your time and cooperation with us for our Senior project..*  ☺ |