

# Knowledge and Practice of Nurses Towards Peripheral Intravenous Cannulation in Pediatric Patients in Selected Public Hospitals Khartoum – Sudan

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**Abstract:-** Placing an intravenous cannula for children is one of the nurse's role in emergency, intensive care unit or wards. It can be performed for diagnostic, nutritional or therapeutic reasons.

The overall aim of this study was to assess nurses' knowledge and practice towards peripheral intravenous cannulation in pediatric patients. An interventional hospital-based study design, quantitative approach was selected for this work. The study was conducted in two main public hospitals in Khartoum. The study population were Nurses of all categories who worked in the study area during the study period of data collection (60 nurses). Data collection techniques used are interviewing and observing. Tools used to collect data are questionnaire and observational check list. Data was processed and analyzed by computer program which is SPSS Ver.19.0 The study showed a significant relationship between the educational program and the change in the level of knowledge for nurses who participated in the study as the P.value found to be 0.00 and also significant change in the practice. So the study concluded that: Nurses are motivated to learn as evidenced by the change in their knowledge and practice after implementing the educational program.

**Keywords:-** Intravenous Cannula; Peripheral Intravenous Cannulation; Pediatric.

## I. INTRODUCTION

An intravenous peripheral cannula is considered as one of the important procedures done in either emergency room or in the wards and pediatric units to give medications, intravenous fluids, blood or blood products, taking blood samples for investigation or for nutritional purposes. Hence, nurses' knowledge and practice are crucial regarding this procedure. Since the patient skin is going to be penetrated for the insertion purpose, the intravenous cannula insertion has been considered as an invasive procedure that requires a thorough nursing care and attention to prevent complications (1)

The youngest the child's age, the more need for a skillful professional for cannulation to eliminate or reduce the risk of multi trials due to extremities movement, so a comprehensive

assessment of the vein, skin and general look of the child is important prior to the procedure. (2)

In spite of the development and technology in healthcare including intravenous therapy but still morbidities like phlebitis is the most occurring complication. (3)

Due to its invasive nature, transmitting infection may result and morbidity and mortality among vulnerable children such as neonates or low immune children are expected to increase so increasing the level of knowledge and skills of nurses is recommended. (4).

### ➤ Objective

The overall aim of this study was to assess the level of nurses' knowledge and practice towards peripheral intravenous cannulation in pediatric patients.

## II. METHODOLOGY

### ➤ Study design

This is an interventional hospital-based study aiming to assess the effect of educational program on nurses' knowledge and practice towards peripheral intravenous cannulation in pediatric patients.

### ➤ Study setting

The current study was conducted in two public hospitals that provide pediatric health care. Those hospitals are Ibrahim Malik Hospital and Turkey hospital. Both of them are sponsored by state ministry of health.

### ➤ Turkey hospital

It is located in Alkalakla- Khartoum providing care for all age groups with all medical specialties. The pediatric department consists of: emergency room and general wards or long stay rooms. Emergency room capacity is 40 beds.

### ➤ Ibrahim Malik teaching hospital

It lies in Alsaafa\_Khartoum, providing care for all age groups with various medical and surgical conditions. The pediatric ward capacity is 60 beds.

### ➤ Study population

The target population of the study were all BScs, MScs, diploma nurses who worked in emergency department during the period of data collection (60 nurses).

The sampling technique and sample size:

The sample was drawn from the population by the equation:

$$n = z^2 pq / e^2$$

Where:

$n$  = sample size

$z$  = 1.96

$p$  = prevalence of the procedure under study = 0.5

$q$  = 1 -  $p$  = 0.5 (5)

The calculated sample size was equal to 384 but the collected data obtained from ( 60 ) participants using consecutive none probability sampling technique.

➤ *Data collection tools and techniques:*

Data about nurses' knowledge was collected by interviewing technique using self-administered questionnaire while the nurses practice was assessed by observational checklist during performing the procedure under study.

The questionnaire composed of three sections:

- First sections contains the demographic data of the study participants.
- The second section contains data of knowledge about the indications or purposes of insertion and the pre-procedural care.
- The third section contains data of knowledge regarding intra and post-procedural care of patients.

➤ *Phases of the study:*

The study consisted of the following three consecutive phases:

➤ *Pre-intervention phase:*

A written consent from the hospitals managers was obtained to carry out the study. The data collection tools (questionnaire, checklist and the educational program) were designed including all variables to assess the peripheral intravenous cannulation. The research team includes the researcher and two other researcher assistants who were selected and trained for the purpose of data collection.

➤ *Interventional phase:*

The interventional phase includes the pre-assessment and conduction of educational program. So each research team member was assigned to teach a group of 3-4 nurses in the interventional group the standard knowledge and practice towards peripheral intravenous cannulation.

➤ *Evaluation phase:*

The post-assessment questionnaire was conducted for both interventional and control groups to assess the impact of the educational program nurses' knowledge and practice towards peripheral intravenous cannulation.

➤ *The data processing and analysis:*

Data were analyzed using the Statistical Packages for Social Sciences (SPSS). Results were presented in the form of simple frequency tables, graphs and cross tabulation to calculate.

P value by using Chi-square and performing statistical significance analysis to test the impact of the intervention on the knowledge and practice of nurses towards the insertion of intravenous cannulation in pediatric patients.

➤ *The ethical approval:*

The study proposal was sent for the hospital managers and it was officially endorsed by the ethical committee in the Hospitals where the study was conducted.

Any participant was informed about the aims of study, the right to participate /withdraw and his/her role as a participant, and then a verbal consent was taken.

### III. THE RESULTS AND DISCUSSION

The current study about nurses' knowledge and practice towards peripheral intravenous cannulation in pediatric patients was conducted in two public hospital Khartoum –Sudan.

Majority of participants in both groups were female 51(85 %) this result is similar to (6) and inconsistent with (1) whose findings revealed 37(61.7%) of the participants are male.

Regarding level of education, it is found to be (in both groups) 8, 48 and 4 for Diploma, Bsc and Msc. respectively. Regarding receiving training courses, the current study revealed that 24 (40%) didn't receive training courses, 30(50%) nurses received training courses inside the country while only 6(10%) nurses were trained outside the country in both groups. Nurses' knowledge regarding indications for peripheral intravenous cannulation in pediatric patients are significantly changed in the intervention group post educational program as expressed by the P.value equal to 0.002 on the other hand, no significant change in the control group as evidenced by the P.value equal to 0.066.

Selecting the suitable cannula size for the pediatric patient is an important issue in peripheral intravenous cannulation, the current study showed significant change in nurses' knowledge pre-and post-educational program with P.Value equal to 0.00 in the intervention group, this result was consistent with (7)

Peripheral intravenous cannula must be removed after 72 hours or less, the current study reported this good practice among the intervention group, this finding agreed with (7)

Nurses were knowledgeable regarding indications and purposes of peripheral intravenous cannulation, preparing equipment, appropriate selection of a vein and suitable size of cannula for peripheral intravenous cannulation, removal or changing cannula after 12-72hours, possible complication of peripheral intravenous cannulation and documentation of the procedure. Moreover, they reflected good level of practice in the intervention group post-educational program.

**IV. CONCLUSION**

The current study concluded that nurses were motivated to learn so that their level of knowledge changed markedly post-intervention in the intervention group. The educational program achieved the desirable effects on nurses’ knowledge and practice.

**RECOMMENDATIONS**

The current study recommended conduction of training programs for nurses in order to improve their knowledge and skills. Conducting studies in a large group of nurses involving more hospitals may give an accurate result that can be generalized.

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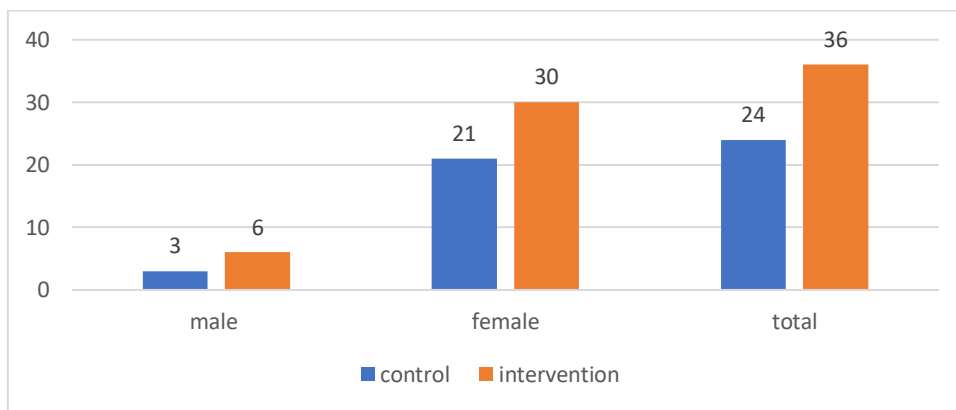
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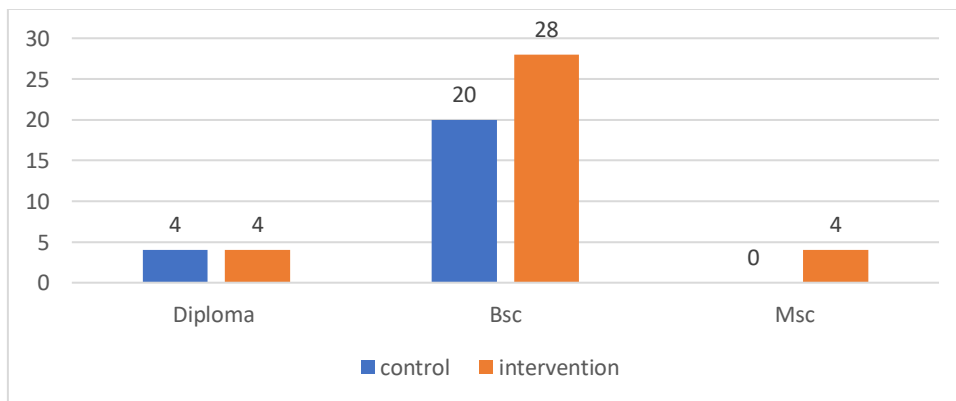
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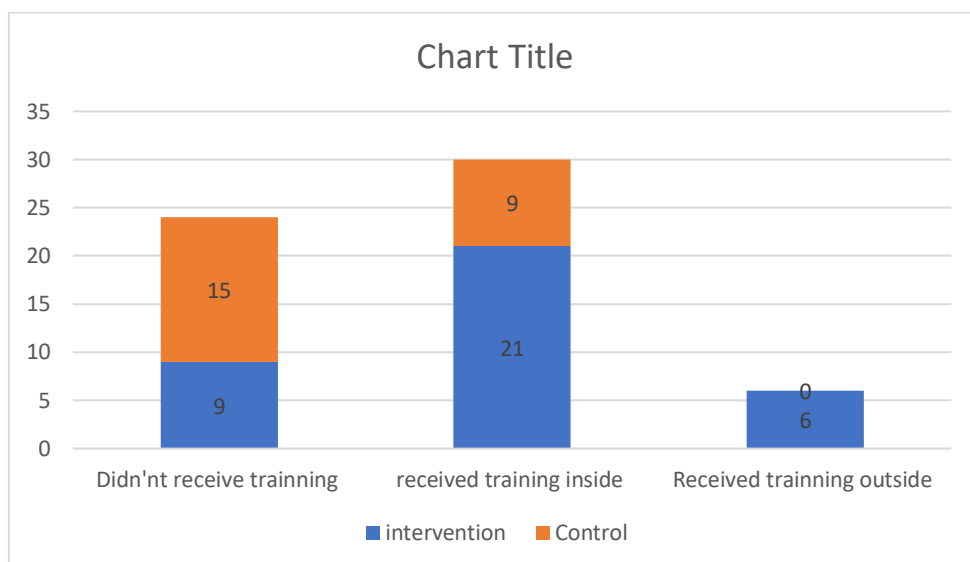
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Fig(1): Gender distribution among Nurses in both intervention and control groups(n=60)



Fig(2): Level of Education among Nurses in Both Intervention and Control Groups(n=60)



Fig(3): Receiving Training Courses among Nurses in Both Intervention and Control Groups(n=60)

Table (1) The nurses’ Knowledge regarding indications and purposes of peripheral intravenous cannulation in pediatric patients (interventional & control) (n=60):

	Intervention group				Control group			
	Pre-		Post-		Pre-		Post-	
	No	%	No	%	No	%	No	%
<b>Know</b>	16	44.4%	33	91.9%	8	33.6%	10	41.6%
<b>Not Know</b>	20	55.6%	3	8.1%	16	66.6%	14	58.4%
<b>Total</b>	36	100%	36	100%	24	100%	24	100%

Intervention Group: Chi- square = 22.345 P.value = 0.002

Control Group: Chi- square = 8.231 P.value = 0.066

Table (2) The nurses’ Knowledge regarding suitable size of cannula for peripheral intravenous cannulation in pediatric patients (interventional & control) (n=60):

	Intervention group				Control group			
	Pre-		Post-		Pre-		Post-	
	No	%	N	%	No	%	N	%
<b>Know</b>	4	11.1%	28	77.7%	4	16.6%	5	20.8%
<b>Not Know</b>	32	88.8%	8	22.2%	20	83.3%	19	79.1%
<b>Total</b>	36	100%	36	100%	24	100%	24	100%

Intervention Group: Chi- square = 36.345 P. value = 0.000

Control Group: Chi- square = 7.231 P. value = 0.056

Table (3) The nurses’ Knowledge regarding appropriate selection of vein for cannula for peripheral intravenous cannulation in pediatric patients (interventional & control) (n=60):

	Intervention group				Control group			
	Pre-		Post-		Pre-		Post-	
	No	%	N	%	No	%	N	%
<b>Know</b>	11	30.5%	28	77.7%	8	33.3%	8	33.3%
<b>Not Know</b>	25	69.4%	8	22.2%	16	66.6%	16	66.6%
<b>Total</b>	36	100%	36	100%	24	100%	24	100%

Intervention Group: Chi- square = 22.231 P. value = 0.001

Control Group: Chi- square = 6.470 P. value = 0.085

**Table (4) The nurses’ Knowledge regarding appropriate selection of vein for cannula for peripheral intravenous cannulation in pediatric patients (interventional & control) (n=60):**

	Intervention group				Control group			
	Pre-		Post-		Pre-		Post-	
	No	%	N	%	No	%	N	%
<b>Know</b>	20	55.5%	30	83.3%	15	62.5%	16	66.6%
<b>Not Know</b>	16	44.4%	6	16.6%	9	37.5%	8	33.3%
<b>Total</b>	<b>36</b>	<b>100%</b>	<b>36</b>	<b>100%</b>	<b>24</b>	<b>100%</b>	<b>24</b>	<b>100%</b>

**Intervention Group: Chi- square = 28.425 P. value = 0.00**  
**Control Group: Chi- square = 6.831 P. value = 0.069**

**Table (5) The nurses’ Knowledge regarding preparation of the patient environment and vein for peripheral intravenous cannulation in pediatric patients (interventional & control) (n=60):**

	Intervention group				Control group			
	Pre-		Post-		Pre-		Post-	
	No	%	N	%	No	%	N	%
<b>Know</b>	13	36.1%	32	88.8%	8	33.3%	7	29.1.6%
<b>Not Know</b>	23	63.8%	4	11.1%	16	66.6%	17	70.8%
<b>Total</b>	<b>36</b>	<b>100%</b>	<b>36</b>	<b>100%</b>	<b>24</b>	<b>100%</b>	<b>24</b>	<b>100%</b>

**Intervention Group: Chi- square = 22.351 P. value = 0.002**  
**Control Group: Chi- square = 5.232 P. value = 0.078**

**Table (6) The nurses’ Knowledge regarding possible complications of peripheral intravenous cannulation in pediatric patients (interventional & control) (n=60):**

	Intervention group				Control group			
	Pre-		Post-		Pre-		Post-	
	No	%	N	%	No	%	N	%
<b>Know</b>	9	25.0%	30	83.3%	5	20.8%	6	25%
<b>Not Know</b>	18	75.0%	6	16.6%	19	79.16%	18	75%
<b>Total</b>	<b>36</b>	<b>100%</b>	<b>36</b>	<b>100%</b>	<b>24</b>	<b>100%</b>	<b>24</b>	<b>100%</b>

**Intervention Group: Chi- square = 27.391 P. value = 0.001**  
**Control Group: Chi- square = 8.242 P. value = 0.095**

**The nurses ’practice in peripheral intravenous cannulation (n=60)**

	Intervention group(36)				Control group(24)			
	Pre-		Post-		Pre-		Post-	
	Yes	No	Yes	No	Yes	No	Yes	No
<b>washing hands</b>	24 66.6%	12 33.3%	36 100%	0 0.0%	18 75%	6 25%	19 79.1%	5 20.8%
<b>Assessing patients pre procedure</b>	18 50%	18 50%	35 97.2%	1 2.7%	12 50%	12 50%	12 50%	12 50%
<b>Preparing equipment</b>	9 25%	27 75%	36 100%	0 0.0%	11 45.8%	13 54.1%	14 58.3%	10 41.6%
<b>Selecting vein</b>	10 27.7%	26 72.2%	34 94.4%	2 5.5%	10 41.6%	14 58.3%	12 50%	12 50%
<b>Wearing gloves</b>	7 19.4%	29 80.5%	36 100%	0 0.0%	4 16.6%	20 83.3%	5 20.8%	19 79.1%
<b>Practicing Sterile technique</b>	11 30.5%	25 69.4%	35 97.2%	1 2.7%	5 20.8%	19 79.1%	10 41.6%	14 58.3%
<b>Changing/ removing cannula 12-72hours</b>	13 36.1%	23 63.8%	35 97.2%	1 2.7%	8 33.3%	16 66.6%	11 45.8%	13 54.1%
<b>Assessing patients post procedure</b>	16 44.4%	20 55.5%	36 100%	0 0.0%	12 50%	12 50%	12 50%	12 50%
<b>Documentation</b>	8 22.2%	28 77.7%	36 100%	0 0.0%	11 45.8%	13 54.1%	15 62.5%	9 37.5%