

## Effect of Nursing Interventions on Nurses' Performance regarding Care Provided to Neonates Undergoing Umbilical Venous Catheter

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### Abstract

**Background:** Umbilical Venous Catheterization (UVC) is a life-saving procedure at neonatal intensive care units in neonates who require vascular access and resuscitation. The nurse has a vital role in increasing the usable life span and minimizing the catheter associated complications. **Aim:** This study aimed to evaluate the effect of nursing interventions on nurses' performance regarding care provided to neonates undergoing umbilical venous catheter. **Design:** A quasi-experimental design (pretest and posttest) was utilized in this study. **Settings:** The study was carried out at Neonatal Intensive Care Units (NICU) of Behna University Hospital and Benha Specialized Pediatric Hospital **Sample:** A convenience sample of all available bedside/ working nurses (n= 90) and a purposive sample of (90) neonates admitted to NICU at the time of the study **Tools of data collection:** Two tools were used, **I:** Socio-demographic characteristic and structured interviewing schedule including three parts: a) Nurses socio demographic characteristics, b) Neonates characteristics and medical history and c) Nurses' knowledge regarding care provided to neonates undergoing UVC and **II:** Observational checklists for nurse's performance regarding care of neonates undergoing UVC. **Results:** Knowledge and performance of nurses were higher on post (91.1% Vs 41.1% and 86.7% Vs 32.2%) than pre guidelines. There was a positive correlation between the studied nurses' total knowledge and practices scores regarding care of neonates undergoing UVC on posttest. **Conclusion:** The program had a positive effect in improving nurses' knowledge and practices post program implementation. **Recommendation:** Regular and continuous educational programs should be developed for nurses in NICU according to their needs aiming to upgrade their knowledge and improve their practice regarding to care of neonates undergoing umbilical venous catheter.

**Key words:** Nurse's performance, Neonates, Umbilical Venous Catheter.

### Introduction

Umbilical vein catheterization may be a life-saving procedure in neonates who require vascular access and resuscitation. The umbilical vein remains patent and viable for cannulation until approximately placement of the umbilical line, intravenous fluids and medication may be administered to critically ill neonates. When critically ill newborns

present to the emergency department, peripheral access is preferred. If this is impossible, umbilical vein catheterization may be attempted (Whiting, 2020).

An umbilical catheter is along, soft and hollow tube that is inserted in one of two umbilical arteries or the umbilical vein after cutting the cord Umbilical catheterization is sometimes used in term or preterm newborn

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and it can be inserted at birth or after few days when the cord stump is still connected to circulatory system (Miller & Moake, 2018).

An umbilical vein catheterization is a unique form of intravenous access that can be considered by the healthcare team when caring for a neonate. Physicians, residents, physician assistants, and nurse practitioners may place umbilical vein catheters this help of the nursing staff. In critically ill neonates, decisions about central venous access may require discussion between critical care providers and emergency personnel (Goodman et al, 2019).

Unique aspects of care of umbilical catheters require review between nurses, medics, and advanced providers. Neonatal ICU specialty-trained nurses should assume a significant role in the inter-professional healthcare team performing umbilical vein catheterization, preparing the patient, assisting during the procedure, and caring and monitoring the neonate afterward while administering necessary medications. This approach will lead to better neonates outcomes (Moen et al, 2019).

Umbilical vein catheterization requires assistance from several professionals, including the nurse. The nurse not only ensures that consent has been obtained but prepares the kit for catheterization. After inserting the line, an X-ray of the abdomen is abdomen before use; it is the nurse's responsibility to ensure that the line is not used before verification of the X-ray unless it is a dire emergency. Finally, the nurse is in charge of dressing changes and ensuring the site is always clean and dries (Zlotnik, 2019).

Once an umbilical venous catheterization has occurred, the nurses should ensure that all infusions take place in an

aseptic manner. The wound site dressings have to be changed regularly, and the stump site requires observation for bleeding. If there is any change in the functioning of the line, nursing should report it to the physician (Kuzniewicz et al., 2017).

The nurse has a vital role in increasing the usable life span of umbilical venous catheter and minimizing the catheter associated complications through replacing the three way taps and bungs after administration of blood products, giving the prophylactic heparin in central venous catheter as doctor order to reduce the incidence of catheter occlusion, flush any medication or solution very slowly to avoid oozing and put the newborn on supine or lateral position for at least 24 hours post procedure to closely monitoring of hemorrhage (Gupta et al., 2015).

Removal of umbilical venous catheter is a responsibility of medical staff but, an experienced nurse can remove the umbilical venous catheter not the arterial catheter when the registrar fellow is in the unit and after ensuring that there is another patent intravenous access. Also, removal of umbilical catheter is indicated when the nurse observes any skin blanching or bruising of limbs, toes or buttocks that indicate a problem in venous return. Furthermore, removal of umbilical venous catheter requires close monitoring of bleeding and documentation as insertion (Perry & Potter., 2014).

### **Significance of study**

Umbilical venous catheterization is a procedure for critically ill neonates. However, it is associated with several complications as blood borne catheter related general infection, air embolism, bleeding, and ischemia and thromboembolic complications as heart tamponade, disorder of heart rhythm

and pericardial or pleural effusion. In case of improper insertion of the catheter to the portal vein, there may appear thrombosis of hepatic vessels, necrotizing enterocolitis, perforation of the intestine, portal hypertension or liver cyst (Chinnaswamy et al., 2019). The researcher observed that many of these complications related to inadequate care given to those neonates so, it is important to conduct this study to evaluate the effect of nursing intervention on nurses' performance regarding care provided to neonates undergoing umbilical venous catheter.

#### **Aim of the study:**

This study aimed to evaluate the effect of nursing interventions on nurses' performance regarding care provided to neonates undergoing umbilical venous catheter

#### **Research hypothesis**

Nurses who receive the nursing intervention are expected to have higher level of knowledge and practice about Care Provided to Neonates Undergoing Umbilical Venous Catheter on posttest than pretest.

#### **Subjects and Method:**

##### **Research design:**

A quasi-experimental research design was used in carrying out the study.

##### **Research settings:**

This study was conducted at Neonatal Intensive Care Units (NICUs) of Benha Specialized Pediatric Hospital at Benha city affiliated to Ministry of Health and Population and Benha University Hospital.

##### **Research sample:**

1- A convenience sampling of 90 nurses who cared for neonates undergoing umbilical venous catheter at neonatal intensive care units at the previously mentioned settings (55 nurses from Benha Specialized Pediatric Hospital and 35 nurses

from Behna University Hospital).

2- A purposive sampling of 90 neonates who required umbilical venous catheterization at neonatal intensive care units at the previously mentioned settings for six months starting from the beginning of July (2020) to the end of December (2020) with the following criteria:

##### **Inclusion criteria of neonates;**

-Neonates whose umbilical cord is still connected to the circulatory system.

##### **Tools of data collection:**

**Data were collected through the following tools:**

**Tool (I): A structured interview sheet:** It was developed by the researcher in Arabic language after reviewing the related literature mention related literature and consisted of three parts:

**Part (I): Nurses' socio demographic characteristic such as;** age, gender, level of education, occupation, place of work, years of previous experience in NICU and training course.

**Part II (A): Neonates' characteristics such as;** age, gender, gestational age, birth weight and diagnosis.

**Part II (B): Medical data** such as duration of using umbilical venous catheter, type of UC and complications related to umbilical venous catheter.

**Part (III): Nurses' knowledge regarding care provided to neonates undergoing umbilical venous catheter.** It consisted of 38 multiple choice questions such as nurses' knowledge about umbilical venous catheter which included 11 items, nurses' knowledge regarding nursing role before UVC (4 items), nurses' knowledge regarding nursing role during UVC (5 items) and Nurses' knowledge regarding nursing role after insertion of UVC (17 items).

##### **Scoring system for nurse's knowledge**

Two grades were provided each

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complete answer, one grade for incomplete answer and zero for don't know.

### **Tool (II): Observational checklist of Nurses' practice related to care provided to neonates undergoing umbilical venous catheter:**

It was adapted from **Boin et al., (2013), Gupta et al., (2015) and Petersen & Denver, (2016)** and modified by the researcher. Details and divisions such as role before, during and after insertion of UVC and role in providing care to neonates undergoing umbilical venous catheterization at neonatal intensive care units. In addition, a checklist for hand washing, blood sampling from UVC and care bundle of UVC. It was used twice before and immediately after implementation of nursing interventions. It consisted of 99 steps. (Before umbilical venous catheterization \*19 steps\*, during umbilical venous catheterization \*8 steps\*, after umbilical venous catheterization \*14 steps\*, surgical hand washing\*11steps\* blood sampling technique from umbilical venous catheter 17 steps, ongoing care bundle of umbilical catheter \*13 steps\* and removal \*17steps\*).

### **Scoring system**

Each completely done step was scored 2, incompletely done was scored 1 and not done was scored zero.

### **Tools validity and reliability:**

The study tools were revised by a panel of three experts in the field of pediatric Nursing what are their scientific degrees who reviewed the tools for clarity, relevance, comprehensiveness, understanding, applicability and ease for administration. Reliability for tools was applied by the researcher for testing the internal consistency of the tools by administration of tools to the same subjects under similar condition. Answer from repeated testing was compared

(test-re-test Reliability). As reliability of knowledge equal (0.742) and reliability of performance equal (0.859).

### **Ethical considerations:**

A written formal consent was obtained from nurses related to their acceptance to participate in the study. The researcher explained the aim, nature and expected outcomes of the research to the studied nurses before their inclusion in the study Nurses were assured that no harm will happen for them.

- Confidentiality and privacy was taken in to consideration. Nurses were assured that they have the right to withdraw from participation at any time.

### **Pilot study:**

A pilot study was carried out at the beginning of March 2020 on 10% (9 nurses) of the sample to evaluate the reliability, applicability, clarity and efficiency of the tools and estimate the proper time required for answering the questionnaire. The tool was modified according to the result of the pilot study and experts' opinion such as adding a question regarding difference between umbilical vein and umbilical artery Nurses who shared in the pilot study were excluded from the sample size.

### **Field of work:**

Data collection extended over a period of six months from the first of July (2020) to the end of December (2020).The researcher was available in the study setting three days weekly (Saturday, Sunday and Monday) at morning and afternoon shifts in Neonatal Intensive Care Units (NICUs) at Benha Specialized Pediatric Hospital at Benha city (Tuesday, Wednesday and Thursday) and at Benha University Hospital at the same shifts to collect the data by using previous tools. The researcher interviewed each nurse. At first the researcher introduced

herself to the participants and explained all information about the study aim, duration and methods to obtain their acceptance to participate in the study prior to data collection, and then the researcher assessed nurses' knowledge and practice using the questionnaire sheet.

**Nursing interventions** were implemented for nurses in terms of sessions during their official working hours. A total number of 8 sessions (3 sessions for knowledge, and 5 sessions for practice) were conducted. These sessions were repeated when required. The duration of each session was 45 minutes, including 15 minutes for discussion and feedback. Each session started by a summary of what has been taught during the previous session and the objectives of the new topics. Various teaching methods were used such as group discussion and lecture and various teaching media were used such as data show, or power point. Feedback and reinforcement of designed nursing interventions were performed according to the nurses' needs to ensure their understanding. Nurses were divided into 10 groups. Each group contained 9 nurses.

**General objective:**

The nursing interventions aimed to improve nurses' performance regarding care provided to neonates undergoing umbilical venous catheter based on fulfilling their needs of knowledge and practices.

**The study was carried out in the following 4 phases as the following:**

**-Assessment phase:** The researcher visited the settings and introduced herself to nurses and dealt with them using simple Arabic language. The questionnaire sheet was administered by researcher to nurses individually to assess their knowledge regarding care provided to neonates undergoing umbilical venous catheter. The average time needed for completion of each

interview was between 25-35 minutes.

**-Planning phase:** After determining the needed knowledge and performance, the researcher designed provided to neonates undergoing umbilical venous catheter.

**- Implementation phase:**

Implementation phase was lasted for 8 sessions Nurses were interviewed at neonatal intensive care unit. The researcher explained the aim of the study and methods of data collection. Each session started by a summary of previous session and the objectives of the new session. Every nurse had an opportunity to ask questions and share information with each other. Group discussions were conducted as follows

The 1<sup>st</sup> tool was administered to all nurses at neonatal intensive care units. The 2<sup>nd</sup> tool was used to observe every nurse throughout conducting UVC observation checked for every nurse at the morning and afternoon shifts after 9AM until 4PM.

**Evaluation phase:** In this stage assessment of pre-post knowledge and pre-post performance before and immediately after implementation of nursing interventions were done to evaluate the effect of implementing nursing interventions on nurses' knowledge and performance related to care provided to neonates undergoing umbilical venous catheter through filling tools (I, II).

**Statistical analysis:**

The collected data were organized, categorized and tabulated by using Statistical Package for Social Science (SPSS version 20). Frequencies and percentages were used for qualitative descriptive data. Chi-square, mean and standard deviations were used for quantitative data. Pearson correlation coefficient (r) was used for correlation analysis.

**Level of significance:**

A statistical significant difference was considered if  $P < .05$ . A highly statistical



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significant difference was considered if  $P < .01$

### **Results:**

**Table (1):** Reveals that more than one third (35.6%) of nurses' aged from 25 to less than 30 years and their mean age was  $27.29 \pm 5.15$  years. Regarding level of education, more than two fifths (42.2%) of nurses had Bachelor in nursing science. Regarding their occupation, the majority (94.4%) of them were bedside nurses. According to their place of work, less than two thirds (61.1%) of them were working at Benha Specialized Pediatric Hospital. Regarding years of experience, more than one third (34.4%) had 2 years to less than 5 years and the mean of years of experience was  $5.34 \pm 4.17$ .

**Figure (1):** Reveals that less than three quarters (77.8%) were females. While, more than one fifth were males (22.2%)

**Figure (2):** Reveals that the majority (83.3%) of nurses didn't take a previous practice regarding care of neonates with umbilical venous catheter.

**Table (2):** Illustrates that more than one third (35.6%) of studied neonates aged 1 > 5 days and the mean age was  $2.64 \pm 1.19$ . Regarding gender, less than two thirds (62.2%) of them were males. According to diagnosis, the majority (85.6%) of studied neonates had respiratory distress syndrome. Concerning gestational age, more than two thirds (67.8%) were  $\leq 37$  weeks and their mean gestational age was  $32.29 \pm 4.39$ . Furthermore, less than three quarters (71.1%) of studied neonates weight were  $1000 \text{ gm} < 1500 \text{ gm}$  and the mean of neonates' weight was  $06 \pm 1.14$ . Regarding duration of using UVC, more than half (55.6%) of them used UVC for more than 14 days.

**Figure (3):** Clarifies that less than one third (32.2%) had good knowledge

preprogram implementation compared to 86.7% of them who had good knowledge post program implementation.

**Figure (4):** Illustrates that more than half (58.9%) of studied nurses had incomplete level of practice at preprogram implementation. While the majority (91.1%) of them had complete practice posttest.

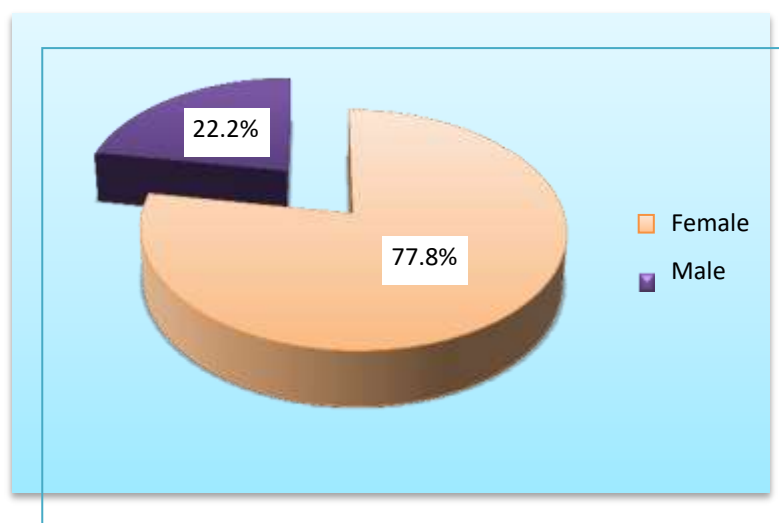
**Table (3):** Shows that there is no statistically significant relation ( $P < 0.05$ ) between total nurses' knowledge and their age, level of education, occupation and place of work

**Table (4):** Shows that there is no statistically significant difference ( $P > 0.05$ ) between total practices and nurses' age, gender, level of education, occupation, place of work and years of experience. Correlation between total knowledge and total practices of studied nurses pre and posttest

**Table (5):** Shows that there is positive correlation between total knowledge of studied nurses and their total practice at pre and posttest.

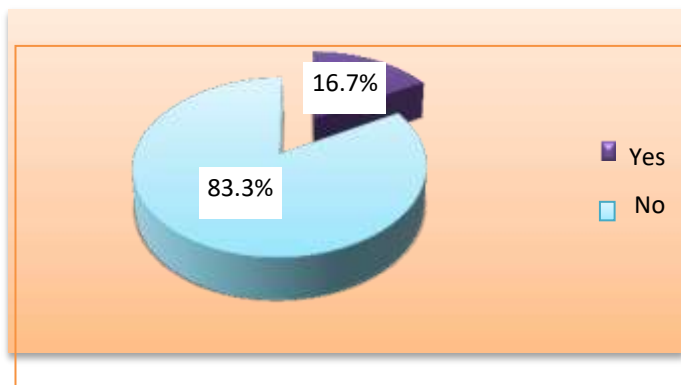
**Table (1): Frequency distribution of the studied nurses regarding their social characteristics (n=90)**

Nurses characteristics	No	%
<b>Age in years</b>		
20 > 25	27	30.0
25 > 30	32	35.6
30 > 35	16	17.8
35 > 40	15	16.7
Mean $\pm$ SD	27.29 $\pm$ 5.15	
<b>Level of education</b>		
Diploma of nursing	4	4.4
Diploma of nursing with specialist	4	4.4
Nursing technical institute	35	38.9
Bachelor in nursing science	38	42.2
Post graduate	9	10.0
<b>Occupation</b>		
Unit supervisor	5	5.6
Bed side nurse	85	94.4
<b>Place of work</b>		
Benha University Hospital	35	38.9
Benha Specialized Pediatric Hospital	55	61.1
<b>Years of experience</b>		
> 2 years	18	20.0
2 > 5 years	31	34.4
5 > 8 years	17	18.9
8 years and more	24	26.7
Mean $\pm$ SD	5.34 $\pm$ 4.17	



**Figure (1): Percentage distribution of studied nurses regarding their gender (n=90).**

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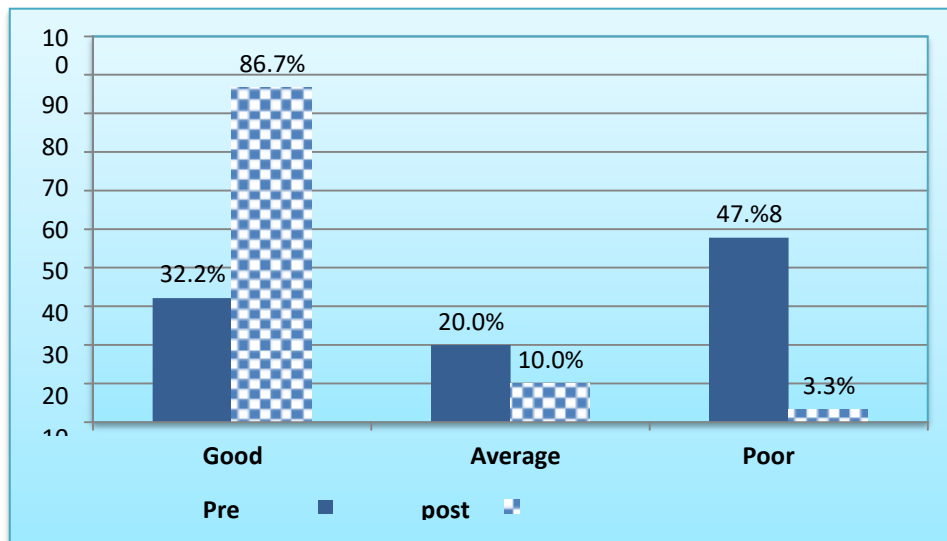


**Figure (2): Percentage distribution of studied nurses regarding their previous experience regarding UVC(n=90).**

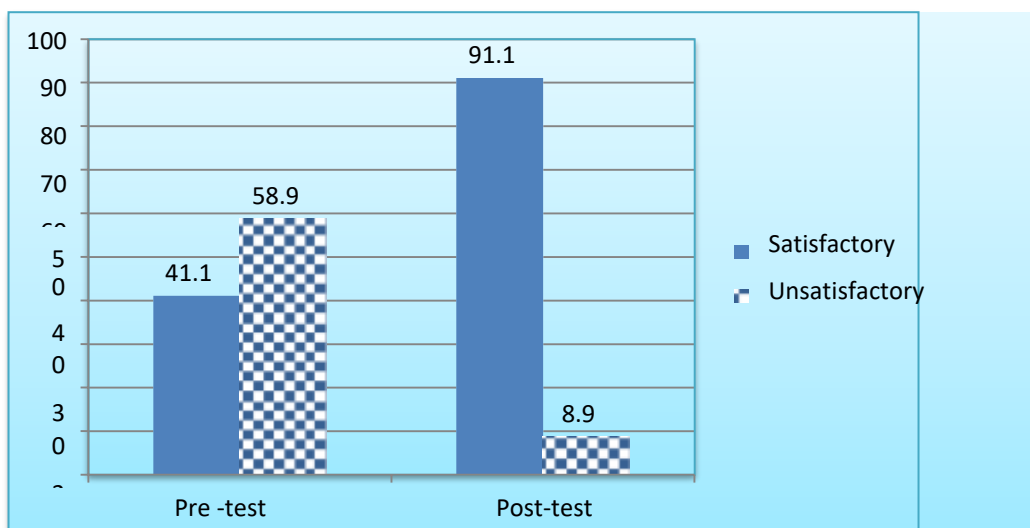
**Table (2): Frequency distribution of studied neonate regarding characteristics (n=90)**

Neonates' characteristics	No	%
<b>Age</b>		
>24hours	16	17.8
1day >5days	32	35.6
5days>10 days	29	32.2
10 day and more	13	14.4
Mean ±SD	2.64±1.19	
<b>Gender</b>		
Male	56	62.2
Female	34	37.8
<b>Diagnosis</b>		
Rispiratory distress syndrome	77	85.6
Infant of diabetic mother	7	7.8
Congenital heart disease	6	6.7
<b>Gestational age</b>		
≤ 37 weeks	61	67.8
37 weeks< 39weeks	29	32.2
Mean ±SD	32.29±4.39	
<b>Weight of neonate in grams</b>		
1000gm< 1500 gm	64	71.1
1500gm < 2000 gm	12	13.3
≥ 3000 gm	14	15.6
Mean ±SD	2006.26±1.14	
<b>Duration of using UVC in days</b>		
7days ≥ 14 day	40	44.4
More than 14days	50	55.6





**Figure (3): Percentage distribution of studied nurse regarding their total knowledge level pre and post nursing intervention implementation (n=90)**



**Figure (4): Percentage distribution of studied nurses regarding their total practices level (n=90)**

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**Table (3): Relation between socio demographic characteristics of nurses and total knowledge on pre and posttests**

Nurses' characteristics	Pretest						X <sup>2</sup>	P-value	Post test						X <sup>2</sup>	P-value
	Poor (n=43)		Average (n=18)		Good (n=29)				Poor (n=3)		Average (n=9)		Good (n=78)			
	No	%	No	%	No	%			No	%	No	%	No	%		
<b>Age in years</b>																
20 >25years	14	32.6	4	22.2	9	31.0	1.68	0.947	1	33.3	4	44.4	22	28.2	3.872	0.694
25 >30 years	14	32.6	8	44.4	10	34.5			1	33.3	4	44.4	27	34.6		
30 >35 years	7	16.3	4	22.2	5	17.2			0	0.0	1	11.1	15	19.2		
35 > 40 years	8	18.6	2	11.1	5	17.2			1	33.3	0	0.0	14	17.9		
<b>Gender</b>																
Female	37	86.0	10	55.6	23	79.3	6.883	0.032	3	100.0	8	88.9	59	75.6	1.706	0.426
Male	6	14.0	8	44.4	6	20.7			0	0.0	1	11.1	19	24.4		
<b>Level of education</b>																
Diploma of nursing	2	4.7	1	5.6	1	3.4	8.402	0.395	0	0.0	1	11.1	3	3.8	6.397	0.603
Diploma of nursing with speciality	1	2.3	1	5.6	2	6.9			0	0.0	0	0.0	4	5.1		
Nursing technical institute	18	41.9	9	50.0	8	27.6			1	33.3	6	66.7	28	35.9		
Bachelor of nursing science	17	39.5	4	22.2	17	58.6			2	66.7	2	22.2	34	43.6		
Post graduate	5	11.6	3	16.7	1	3.4			0	0.0	0	0.0	9	11.5		
<b>Occupation</b>																
Unit supervisor	3	7.0	0	0.0	2	6.9	1.324	0.516	1	33.3	0	0.0	4	5.2	4.968	0.083
Bedside nurse	40	93.0	18	100.0	27	93.1			2	66.7	9	100.0	74	94.8		
<b>Place of work</b>																
Benha University Hospital	19	44.2	5	27.8	11	37.9	1.454	0.483	3	100.0	3	33.3	29	22,62	4.927	0.085
Benha Specialized Pediatric Hospital	24	55.8	13	72.2	18	62.1			0	0.0	6	66.7	49	38,22		
<b>Years of experience</b>																
Less than 2 years	9	20.9	2	11.1	7	24.1	3.787	0.705	1	33.3	1	11.1	16	12,48	6.069	0.416
2 years to less than 5 years	14	32.6	9	50.0	8	27.6			0	0.0	6	66.7	25	19,5		
5 years to less than 8 years	8	18.6	2	11.1	7	24.1			1	33.3	1	11.1	15	11,7		
8 years and more	12	27.9	5	27.8	7	24.1			1	33.3	1	11.1	22	17,16		

**Table (4): Relation between socio demographic characteristics of nurses and total practice on pre and posttests**

Nurses' characteristics	Preprogram implementation				X <sup>2</sup>	p-value	Post program implementation				X <sup>2</sup>	p-value
	Unsatisfactory (n=53)		Satisfactory (n=37)				Unsatisfactory (n=8)		Satisfactory (n=82)			
	No	%	No	%			No	%	No	%		
<b>Age</b>												
20 >25years	15	28.3	12	32.4	0.961	0.811	2	25.0	25	30.5	3.518	0.318
25 >30 years	19	35.8	13	35.1			5	62.5	27	32.9		
30 >35 years	11	20.8	5	13.5			0	0.0	16	19.5		
35 >40years	8	15.1	7	18.9			1	12.5	14	17.1		
<b>Gender</b>												
Female	38	71.7	32	86.5	2.757	0.097	8	100.0	62	75.6	2.509	0.113
Male	15	28.3	5	13.5			0	0.0	20	24.4		
<b>Qualification</b>												
Diploma of nursing	3	5.7	1	2.7	1.875	0.759	0	0.0	4	4.9	2.063	0.724
Diploma of nursing with speciality	2	3.8	2	5.4			0	0.0	4	4.9		
Nursing technical institute	18	34.0	17	45.9			4	50.0	31	37.8		
Bachelor of nursing science	24	45.3	14	37.8			4	50.0	34	41.5		
Post graduate	6	11.3	3	8.1			0	0.0	9	11.0		
<b>Occupation</b>												
Unit supervisor	2	3.8	3	8.1	0.78	0.377	1	12.5	4	4.9	0.807	0.369
Bedside nurse	51	96.2	34	91.9			7	87.5	78	95.1		
<b>Place of work</b>												
Benha University Hospital	16	30.2	19	51.4	4.106	.043*	4	50.0	31	37.8	0.456	0.499
Benha Specialized Pediatric Hospital	37	69.8	18	48.6			4	50.0	51	62.2		
<b>Years of experience</b>												
>2 years	8	15.1	10	27.0	4.137	0.247	2	25.0	16	19.5	1.577	0.665
2 years >5 years	21	39.6	10	27.0			4	50.0	27	32.9		
5 >8 years	8	15.1	9	24.3			1	12.5	16	19.5		
8 years and more	16	30.2	8	21.6			1	12.5	23	28.0		

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**Table (5): Correlation between total knowledge and total practices of studied nurses on pre and post test**

	Total knowledge			
	Pretest		Posttest	
	r	P-value	R	p-value
<b>Total Practices</b>	0.52	0.047*	0.67	0.007*

\*Statistical significant at p-value < 0.05.

No statistical significant at p-value > 0.05

**Discussion**

Both arterial and venous umbilical catheters are a vital component of care. They provide a stable route for fluid and medication administration, vascular pressure monitoring, and frequent blood sampling. Umbilical catheters, despite their widespread use, are not without complications. So neonatal nurses must be aware of and monitor carefully for associated complications (**Eifinger et al., 2018**).

Concerning to neonates' weight, less than three quarters of studied neonates weight were 1000gm < 1500 gm. and the mean of neonates' weight was 2006.26±1.14. This finding is congruent with the study of **Dongara et al (2017)** who conducted a study about "Umbilical venous catheter versus peripherally inserted central catheter in neonates. It was reported that mean weight of neonates was 2.139gm,

Regarding duration of using UVC, more than half of neonates used UVC for more than 14 days. These findings disagreed with **Dongara et al (2017)** who conducted a study about "Umbilical venous catheter versus peripherally inserted central catheter in neonates'. It was stated that the duration for which the UVC was kept in site was 3.23 days. From the researcher point of view shorter duration of UVC placement was associated with favorable outcomes of UVC.

In relation to nurses' knowledge, there

was a highly statistically significant difference in nurses' knowledge about umbilical venous catheter pre and post test. This result was in the same line with **Cooper, (2019)** who conducted a study about "Improving nurses' knowledge of central line- associated blood stream infection". It was found that the mean knowledge scores of nurses has increased from 72.1 pre to 94.1 post-program implementation. Then, it decreased to 90.6 in follow up phase.

Also, the finding of the current study is in accordance with **Pareek et al., (2018)** who conducted a study about "Effectiveness of planned teaching program regarding knowledge on selected venous access device care among B. Sc nursing. They reported that there was a significant improvement of nurses' knowledge post nursing intervention. The researcher attributed this to sustained information

It is obvious from the current study that, total nurse's level of practice was highly statistically significant improved on post test. This was in line with **Shahid et al, (2014)**. From McMaster University who developed guidelines for standardizing the use of umbilical catheters in children's hospital in Hamilton. They supposed that the absence of guidelines on UVC use and inability to predict the hospital course might sway the frontline staff to overuse UVC in preterm infants. Implementation of guidelines standardizing the use of UVC in the NICU seems to be helpful.

Fewer infants were exposed to the risks of UVC and fewer resources were used.

The current study revealed that there was a positive correlation between total knowledge of studied nurses and their total practice on pre and post test. This result was in contradiction with **Deshmukh & Shinde, (2014)** who emphasized that, there was a significant negative correlation between nurses' knowledge and practice regarding UVC prevention before and after the training program. From the researcher's point of view, these current findings may be due to the nurses' knowledge which act as an important and independent factor in carrying out infection control practices.

Finally, Neonatal ICU specialty-trained nurses should assume a significant role in caring for umbilical vein catheterization, preparing the patient, assisting during the procedure, and caring and monitoring the neonate after ward while administering necessary medications. This approach will lead to better neonates outcomes.

### **Conclusion**

Nurses who receive the nursing intervention had higher level of knowledge and practice about care provided to neonates undergoing umbilical venous catheter on posttest than pretest.

### **Recommendations**

#### **For the nurses**

- Providing up-to-dated, regular educational programs about UVC, UVC infection and UVC nursing care should be developed for the health care team members in NICU.
- Information relates to UVC infection and UVC care should be provided in formats and ways as manual booklets and pamphlets that are suited to nurses' level of understanding.
- All sectors of the health care system should be educated/ trained on UVC nursing care to recognize how to control UVC infection in

NICU and how to initiate and maintain correct and suitable preventive measures.

- Periodically monitoring of the knowledge and adherence to UVC care for all personnel involved in the insertion and maintenance of UVC.
- Use maximal sterile barrier precautions, including the use of a cap, mask, sterile gown, sterile gloves, and a sterile full body drape, for UVC care.

#### **For the hospital' management team:**

- Hospital managers should facilitate the accessibility of modern equipment used in the prevention of UVC infection to obtain the quality output of UVC care.
- Hospital managers should communicate the ministry of health to arrange the campaigns for critical care nurses to provide them with adequate information and skills regarding management and prevention of UVC infection which leads to good management practice

#### **For further study:**

- Studies to assess the risk factors and barriers that affect nurses' application to UVC nursing care bundle for the preterm infant.
- Replication of this study with a larger sample at different neonatal intensive care units and with longitudinal follow-up for neonatal measures.

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## تأثير التدخلات التمريضية على أداء الممرضات تجاه الرعاية المقدمة للأطفال حديثي الولادة الخاضعين لتركيب قسطره السره الوريديه

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يعتبر تركيب قسطره السره الوريديه اجراء منقذ لحياء المواليد في وحدات العناية المركزه للأطفال حديثي الولاده، حيث انها طريقه سريعه وغير مؤلمه، كما انها تمكن الفريق الطبي بادخال السوائل والأدويه والدم بطريقه سريعه عندما يكون هناك صعوبه في تركيب قسطره وريديه طرفيه. لذلك هدفت هذه الدراسه الي تأثير التدخلات التمريضية على أداء الممرضات تجاه الرعاية المقدمة للأطفال حديثي الولاده الخاضعين لتركيب قسطره السره الوريديه. وقد أجريت هذه الدراسة في وحدات العناية المركزه للأطفال حديثي الولاده في كل من مستشفى بنها الجامعي ومستشفى الأطفال التخصصي علي جميع الممرضات العاملات في هذه الوحدات وعددهم (٩٠) ممرضه ( ٥٥ ) ممرضه من مستشفى بنها للأطفال التخصصي و ( ٣٥ ) ممرضه من مستشفى بنها الجامعي خلال سته أشهر من بدء الدراسه من أول شهر يوليو حتي نهايه شهر ديسمبر عام ٢٠٢١. حيث أوضحت الدراسة أن هناك دلالات احصائية عاليه بين معلومات وممارسات الممرضات تجاه الرعاية المقدمه للأطفال حديثي الولاده الخاضعين لتركيب قسطره سره وريديه بعد تنفيذ التدخلات التمريضية. كما يوجد ارتباط ايجابي بين معلومات وممارسات الممرضات قبل بدء التدخلات التمريضية وبعد تنفيذ التدخلات التمريضية. وأوصت الدراسة بأن هناك حاجة إلي تقديم برامج تعليمه دوريه ، ومحدثه عن كيفية العناية بقسطرة السره الوريديه للفريق الطبي بوحدات العناية المركزه للأطفال حديثي الولاده وإعداد كتيبات او منشورات بطريقه مبسطه خاصة بكيفيه العناية وطرق منع العدوي بقسطرة السره الوريديه .