

**Effect of an educational Guideline on Maternity Nurses Knowledge regarding process of cord blood collection**

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**Abstract**

Background: umbilical cord blood is a rich source of stem cells, making it a valuable tissue resource in the clinical field of stem cell therapy and transplantation. Aim: evaluate effect of guideline on maternity nurses' knowledge about process of cord blood collection. Research question: what is effect of guideline on maternity nurses' knowledge regarding cord blood collection process. Research Design: Descriptive research design was utilized to fulfill the aim of this study material and methods: setting This study was conducted at Minia university hospital & General Minia hospital. sample: convenient sample included 78 nurses. Tool: in form of structured self-administrative questionnaire developed by the researcher which include: socio-demographic characteristics, knowledge about cord blood banking, diseases that can be treated with umbilical cord blood, recommended procedures during umbilical cord blood collection and barriers in applying cord blood banking. Results: The main finding of the study were majority of sample have inadequate knowledge . Conclusion: health education was effective in increasing knowledge about umbilical cord blood banking . recommendation: these finding indicate need to Adequate planned in-services related to cord blood collection and banking must established to develop nurses knowledge, attitude and practice

Key Words: Nurses, Maternity, Knowledge, umbilical cord

**Introduction**

Umbilical cord blood, the 100 or so milliliters of blood retained in the placenta and cord after birth, is an accessible source of hematopoietic stem cells. It has become therapeutically valuable tissue over the last fifteen years because it can act as a substitute for bone marrow transplant in the treatment of blood disorders. Since the 1970s, bone marrow transplant has been used to rebuild the patient's blood system as part of the treatment for leukemia, immune deficiency, aplasia and genetic metabolic disorders. <sup>(1)</sup>

Despite different knowledge and attitudes of obstetricians, maternity nurses and midwives regarding cord blood banking, these professions requested further information on the topic, and many had not received recent formal education on cord blood collection, storage options and transplantation .Most studies highlighted the importance of health care professionals being educated on cord blood banking so that they can accurately and confidently discuss this with their patients. <sup>(2)</sup>

Further research is required to identify and investigate health care professionals concerns regarding the practice of cord blood collection, the sources and influences associated with health professionals' negative views about cord blood banking, timing of cord clamping and safety of mother and infant. Understanding these factors may assist in addressing health professional knowledge and attitude deficits, which in turn impact their ability to provide parents with evidence-based, unbiased information to support autonomous parental decision-making in this important area. <sup>(3)</sup>

**Aim of the study**

The aim of this study to:-

1. Evaluate effect of educational guideline on maternity nurses knowledge regarding process of cord blood collection
  1. Research question
    - What is effect of educational guideline on maternity nurses' knowledge regarding process of cord blood collection?

**Subjects and Methods**

**Research Design:**

Descriptive research design was utilized to fulfill the aim of this study.

**Setting:**

This study was conducted at Minia university hospital & General Minia hospital.

**Sample:**

Convenient sample will utilized in this research 78 female nurses who work in Obstetrics and Gynecology Department at Minia university Hospital (60) & General Minia hospital (18)

**Inclusion criteria**

- All nurses working in Minia University Hospital in antenatal, labor, postpartum ward and outpatient clinics
- All nurses working in General Minia Hospital in antenatal, labor, postpartum ward and outpatient clinics
- Nurses who accepted to participate in the study

**Tool of the study:**

Structured self-administrative questionnaire

A structured self-administrative questionnaire was developed by the researcher for data collection to fully meet the demands of this research. After that the developed questionnaire are revised by Obstetrical and Gynecological experts in nursing and then has been translated into Arabic language. The questionnaire included:-

Part 1: (socio-demographic data): contained questions on the personal data of the recruited nurses such as age, qualifications, and years of experience.

Part 2: (question to assess nurses knowledge about umbilical cord blood banking) which included multiple choice questions such as, site of obtaining cord blood, time of obtaining it, advantages and disadvantages of cord blood, types of cord blood banks, effect of cord blood collection on mother and fetus, disease treatable with cord blood

,recommended procedure for cord blood collection, places for cord blood storage, length of time for cord blood storage, responsible persons for collecting cord blood, and technique of cord blood collection and importance of stem cell from umbilical cord blood.

**Scoring system** for the nurse's knowledge will be calculated as Below 60% will be regarded as inadequate knowledge, 60 % and above will be regarded as Adequate knowledge.

#### **Validity of tools**

To establish validity, the questionnaire will be piloted on panel of 4 experts of Obstetrics and Gynecological staff, and Nursing professors who reviewed the tool for clarity, relevance, comprehensiveness, understanding, applicability and easiness. A pilot study was conducted on 10% of female nurses (8 nurses) from Minia University Hospital and General Minia Hospital, to test feasibility of tools and time required to be applied. Simple modification was done of some items of the questionnaire that they were not consistent with this study. The participants of the pilot study were included in the study sample.

#### **Ethical consideration:**

Before the conduction of the pilot study as well as the actual study, an official permission and consent was obtained from the dean of the Faculty of Nursing, as well as the Director of Minia university hospital and General Minia hospital. Consent was obtained from nurses that are willing to participate in the study, after explaining the nature and purpose of the study. Study subject have the right to refuse to participate and or withdraw from the study without any rational any time. Study subject privacy was considered during collection of data No health hazards was present. Participants were assured that all their data are highly confidential.

#### **Procedure:**

The following phases were adopted to fulfill the aim of the current study; assessment, planning, implementation, and evaluation phases. These phases were carried out from the beginning of April 2016 to the end of October 2016 covering 6 months. Official approvals and letters to conduct this research were obtained from dean of researcher faculty to directors of the previous mentioned setting

#### **Assessment phase**

This phase encompassed interviewing the nurses to collect baseline data, at the beginning of interview the researchers greeted each nurse, explained the purpose, duration, and activities of the study and taken their oral consent. Pre-test was done to assess nurses' knowledge regarding cord blood collection and its barriers. The data obtained during this phase constituted the base line for further comparison to evaluate the effect of guideline. Average time for the completion of each nurse questionnaire was around (15-20 minutes).

#### **Planning phase**

Based on baseline data obtained from pre-test assessment and relevant review of literature, the educational intervention was developed by the researchers in a form of

printed Arabic brochure to satisfy the studied nurses' deficit knowledge, regarding cord blood collection.

General objective of the educational intervention was to improve nurses' knowledge about cord blood collection and stem cells.

Specific objectives of the educational intervention: after completion of the educational intervention, each nurse should be able to:

- Define umbilical cord blood
- Define umbilical cord blood banking
- Define stem cells
- Mention importance of umbilical cord blood
- Identify advantages and disadvantages of umbilical cord blood
- Identify diseases that can be treated by cord blood
- Identify types of cord blood banks
- Determine role of the nurse in cord blood collection which include:

- 1) After the infant is born, cut the cord as close to the infant as normal procedure permits.
- 2) Choose a site 4-6 inches from the cut end of the umbilical cord for drawing the cord blood.
- 3) Wipe the site with gauze to remove blood. Use iodine swab to clean the entire width of the cord within 4 inches of the chosen puncture site. After cleaning the site, do not allow secretions, non-sterile items, or maternal blood, to contaminate the puncture site.
- 4) Using sterile technique, remove the needle cap from the cord blood collection bag.
- 5) Insert the needle of the collection bag into the cleaned puncture site of the umbilical vein.
- 6) As the blood begins to flow, hold the needle in place and lower the collection bag to allow blood to flow into the bag by gravity.
- 7) While filling, gently rotate the bag to mix blood with anticoagulant.
- 8) When blood flow stops, remove the needle from the vein and allow the blood in the tubing to drain into the bag.
- 9) Clamp the tubing 3-6 inches below the needle (clamp enclosed).
- 10) Remove the needle and discard in a sharps container. Tie two knots in the tubing below the clamp.
- 11) Write mother's name and social security number on label provided in kit. Affix provided label on collection bag.

#### **Implementation phase**

An educational brochure that distributed to all nurses .Arabic language was used to suit the nurses' level of understanding. Brochure contained information about cord blood banking such as definition of cord blood, definition of cord blood banking, definition of stem cells, importance of cord blood, advantages and disadvantages of cord blood, diseases that can be treated by cord blood, duration of cord blood banking, method of cord blood collection, and types of cord blood banking by staying with nurses in each shift

explaining the content of brochure within 30 minutes and leaving nurses reading brochure then giving nurses time if there is any misunderstanding point clarifying it.

**Evaluation phase**

Posttest was done two times. the first time Immediately after distributing brochure and explaining it content and second time after three months of implementation of the educational intervention, the follow up test for nurses' knowledge were done by the same format

of the pretest to evaluate the effect of the implemented guideline.

**Statistical analysis**

The collected data was tabulated, computerized, analyzed and summarized by using descriptive statistical tests to test research questions by using SPSS version (20). Probability (p value) less than 0.05 was considered significant and less than 0.001 was considered highly significant

**Result**

Table (1): Distribution of studied nurses according to personal characteristics

Socio-demographic characteristics	No. (n=78)	%
Age (years)		
• <25 years	14	17.9
• 25-30 years	57	73.1
• >30 years	7	9.0
Mean ±SD	28.34±9.57	
Qualification		
• Nursing secondary school	36	46.2
• Nursing technical institute	29	37.2
• Nursing bachelor	13	16.7
Years of experience		
• <5 years	28	36
• 5-10 years	31	39.7
• > 10 years	19	24.3
Mean ±SD	11.65±7.81	

It show that mean of age 28.34±9.57. Regarding nurses qualification it was observed that near half of sample 46.2% were secondary educated. According to years of experience it was founded that sample with mean of 11.65±7.81 years

Table (2): Relationship between knowledge of the nurses about umbilical cord blood banking in pretest, immediate and posttest

Knowledge	Pre (n=78)		Immediate (n=78)		Post (n=78)		P value
	No.	%	No.	%	No.	%	
• Inadequate	75	96.2	13	16.7	32	41.0	0.000*
• adequate	3	3.8	65	83.3	46	59.0	

Significant p-value was considered when p-value was less than 0.05 <60(inadequate) >=60(adequate)

It show that majority of sample in pretest have inadequate knowledge while minority of sample have adequate knowledge by comparison with immediately posttest it was founded that more than three quarter of sample have adequate knowledge and less than one quarter of sample have inadequate knowledge.

Table (3): Distribution of sample according to knowledge about cord blood collection

Level of knowledge about cord blood collection	Pre N=78		Immediate N=78		Post N=78		P value
	No.	%	No.	%	No.	%	
Nurses knowledge about source of umbilical cord blood collection							
• Umbilical cord	38	48.7	72	92.3	71	91.0	0.000*
• Placenta	3	3.8	0	0.0	0	0.0	
• Don't know	37	47.4	6	7.7	7	8.9	
Nurses knowledge about part of umbilical cord we can obtain blood							
• Arterial	4	5.1	2	2.6	3	3.8	0.000*
• Venous	4	5.1	21	26.9	24	30.8	
• Both vessel	28	35.9	50	64.1	37	47.4	
• Don't know	42	53.8	5	6.4	14	17.9	
Nurses knowledge about time of obtaining umbilical cord blood							
• Before placenta separation	31	39.7	7	9.0	8	10.3	0.000*
• After placenta separation	2	2.6	9	11.5	28	35.9	
• Before and after placenta separation	5	6.4	58	74.4	32	41.0	
• Don't know	40	51.3	4	5.1	10	12.8	

Level of knowledge about cord blood collection	Pre N=78		Immediate N=78		Post N=78		P value
	No.	%	No.	%	No.	%	
Do you know amount of blood obtained from umbilical cord							
• Yes	14	17.9	67	85.9	60	76.9	0.000*
• No	64	82.1	11	14.1	18	23.1	
Amount of blood that can obtained from umbilical cord							
• Less than 100 ml	0	0.0	2	3.0	3	5.0	0.000*
• 100 ml	11	78.6	58	86.6	37	61.7	
• More than 100 ml	3	21.4	7	10.4	20	33.3	
Time needed for collecting umbilical cord blood							
• 10 minute	4	5.1	62	79.5	49	62.8	0.000*
• 5 minute	1	1.3	5	6.4	9	11.5	

It show that 47.4% of sample in didn't know the source of obtaining cord blood while in post test it was observed that 91% of sample identified that umbilical cord is the source of obtaining cord blood. As regarding time of obtaining cord blood it was observed that 51.3% of sample didn't know the correct time of obtaining cord blood while 41% of sample in post test know time of obtaining cord blood.

Table (4) :Distribution of sample according to Knowledge about Advantages, disadvantages & diseases treatable with umbilical cord blood

Knowledge about Advantages , disadvantages & diseases treatable with umbilical cord blood	Pre N=78		Immediate N=78		Post N=78		P value
	No.	%	No.	%	No.	%	
Nurses knowledge about Advantages of using umbilical cord blood							
• Available source of hematopoietic stem cells	32	41.0	75	96.2	60	76.9	0.000*
• Lifesaving procedure	6	7.7	46	59.0	36	46.2	
• Treat some of diseases	37	47.4	43	55.1	38	48.7	
• Don't know	14	17.9	0	0.0	0	0.0	
Nurses knowledge about Disadvantages of using umbilical cord blood							
• May endanger newborn survival	27	34.6	27	34.6	15	19.2	0.014*
• Transmission of blood born infectious diseases	16	20.5	21	26.9	36	46.2	
• May cause anemia to newborn	3	3.8	0	0.0	1	1.3	
• Difficult of cord blood collection from cases because of diseases	16	20.5	30	38.5	26	33.3	
• Don't know	16	20.5	0	0.0	0	0.0	
*Nurses knowledge about Diseases that treatable with umbilical cord blood cells							
• Malignancies	31	39.7	75	96.2	66	84.6	0.000*
• Leukemia or lymphoma	36	46.2	71	91.0	62	79.5	
• Blood diseases	26	33.3	64	82.1	54	69.2	
• Metabolic disorders	23	29.5	64	82.1	54	69.2	
• Immunodeficiency	26	33.3	72	92.3	62	79.5	
• Bone marrow failure	27	34.6	65	83.3	51	65.4	
• Don't know	31	39.7	3	3.8	7		

It show that 17.9% of sample didn't know advantages of cord blood in pretest while all sample in posttest identified advantages.as regarding disadvantages it was observed that 20.5% didn't know disadvantages of cord blood in pretest while all sample in posttest identified disadvantages. Findings of the present study represented that, 96.2% reported that cord blood can treat malignancies, 79.5% reported that can treat leukemia and immunodeficiency, while 69.2% reported that can treat blood diseases and metabolic disorders. sample had a considerable knowledge regarding the diseases that can be treated by the cord blood.

**Discussion**

In spite of many benefits of the stem cells obtained from umbilical cord blood, the umbilical cord was considered medical waste and disposed of following delivery along with the placenta due to the lack of knowledge about its the benefits and uses. (4) In addition, from the researchers' clinical experience, they found that there was poor knowledge regarding cord blood collection and stem cells among maternity nurses. Hence, it is imperative to raise nurses' knowledge about recent issues of

cord blood collection and stem cells. (5) This study was aimed to evaluate effect of educational guideline on maternity nurses' knowledge regarding cord blood collection and its utilization.

When exploring the knowledge of the nurses about the umbilical cord blood banking , an important element highlighted in this study is the lack of nurse's knowledge in basic clinical information regarding UCBB. In the present study it was observed that majority of sample have inadequate knowledge in pretest .By comparison with

posttest it was founded that more than three quarter in immediate posttest have an adequate knowledge

The present study was in the same line with <sup>(6)</sup>, who assess maternity nurses knowledge about umbilical cord blood banking who founded that more than three quarter of the studied nurses had inadequate knowledge. Results of current study were Similar to study which was done by <sup>(7)</sup> Hatzistilli et. al, 2014, to examine the health professionals' knowledge and attitude towards the umbilical cord blood donation in Greec, and concluded that, the knowledge regarding the donation of umbilical cord blood was evaluated to be majority of the sample have inadequate knowledge regarding the collection's, storage and use of UCB

The present study findings are similar to <sup>(8)</sup> Lovis, V. 2010, who study evaluation of the effectiveness of self-instructional module on knowledge of placental stem cell and its utilization among staff nurses in selected hospitals at Mangalore. Who found that the majority of staff nurses have poor knowledge in the pre-test. Whereas in the posttest, most of the staff nurses had good knowledge regarding cord blood collection and stem cells and its utilization.

In contrast to current results <sup>(9)</sup>, who study Pregnant Women's Knowledge and Attitudes about Stem Cells and Cord Blood Banking. In the US who reported that three quarter described themselves as minimally informed, minority described themselves as extremely knowledgeable, near half of study were unaware of the potential for cord blood use by a sibling and less than quarter of study were educated by their healthcare provider on cord blood banking.

Inadequate knowledge may be related to the fact that cord blood collection are new advanced trend and the nursing schools curriculum, especially the secondary level schools are still deficient in this issue. As well as after graduation, nurses neglect reading updating their professional knowledge besides lack of motivation.

The present study show that more than half of sample didn't know source of blood collection, minority of sample reported that arterial, while more than quarter reported that venous while near half of sample reported that arteries and venous are correct site of obtaining cord blood. This result was similar to study done by <sup>(6)</sup>, who study Nurses, Knowledge about Umbilical Cord Blood Banking who founded that more than half of sample didn't know, more than one third reported that both vessel, while near quarter reported that venous is the correct site for collection

Findings of the present study represented that, 96.2% reported that cord blood can treat malignancies, 79.5% reported that can treat leukemia and immunodeficiency, while 69.2% reported that can treat blood diseases and metabolic disorders. Sample had a considerable knowledge regarding the diseases that can be treated by the cord blood. They knew that the cord blood can treat immunodeficiency diseases, malignancies, metabolic disorders and bone marrow failure.

The results of current study different from study done by <sup>(10)</sup> Deeksha Pandey, 2016 about Banking Umbilical Cord Blood (UCB) Stem Cells: Awareness, Attitude and Expectations of Potential Donors from One of the Largest Potential Repository in India who founded that one third of study were unsure what to expect out of UCB banking. Around one-fifth thought it would be useful for chronic diseases such as hypertension and diabetes and minority of

study thought it would be useful to treat cancer, chronic illness and also useful in regenerating organs in future. One-fourth of study was over optimistic, and they felt that it could be used for any of the indication above.

### **Conclusion**

Study can be concluded that there was a statistically significant improvement in nurses' knowledge immediately, and three months after intervention. The implementation of an educational intervention was effective and significantly improved nurses' knowledge towards cord blood collection and banking. Furthermore, the above mentioned findings proved and supported the research question.

### **Recommendations**

- Training programs related to cord blood collection and banking should be provided for health care professional
- Booklet regarding cord blood collection and stem cells should be available in labor unit
- counseling should be provided for pregnant women during antenatal period about umbilical cord blood banking options, benefits, and procedure not adversely affect health of mother or newborn
- More studies should be done and we should increase sample to generalize finding

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