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Knowledge on Delayed Umbilical Cord Clamping after Birth among Nurse Midwives Working at Selected Hospital in Dhaka

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Abstract: The aim of this study was to assess the level of Knowledge on Delayed umbilical Cord Clamping after Birth among Nurse Midwives working at Selected Hospital in Dhaka**.** Delayed umbilical Cord clamping is the clamping of the cord within 1 to 3 minutes of birth or when the umbilical cord pulsation has stopped. A descriptive type of cross- sectional study was conducted from July 2023 to June 2024. Total 50 samples were selected through following convenient sampling technique among the total population 200. Data were collected through self-administered structured questionnaire. Descriptive statistics was used for data collection by using computer and scientific calculators. The study result showed that the mean age of the respondents was 35. 56 years where the mean service length was 8. 96 years. Most of the respondents 64% had completed Diploma in Nursing and rest 16 % B. Sc in Nursing , 18% Post Basic B. Sc in Nursing /Public Health and 2% M. Sc in Nursing respectively. The findings revealed that only 2% respondents had special training on ENC & EOC The overall knowledge showed that 2% respondents had excellent knowledge,10% had very good, 8% had good, 24% had average knowledge, 56% poor knowledge. The mean knowledge of the respondents was 58. 6%. On the basis of these findings' investigators suggest that nurse-midwives should be trained about Delayed umbilical Cord Clamping and observational study should be conducted in this area to assess practice and attitudes of Delayed umbilical Cord Clamping among nurse-midwives in different medical college hospital in different division of Bangladesh.

Keywords: Knowledge, Delayed umbilical Cord Clamping, Nurse-Midwives.

INTRODUCTION

Umbilical Cord Clamping is done to separate the newborn from the placenta and is a crucial step during the third stage of labor. The World Health Organization (WHO) defines Delayed Umbilical Cord Clamping (DCC) as the clamping of the cord within 1 to 3 minutes of birth or when the umbilical cord pulsation has stopped (World Health Organization [WHO], 2014). The WHO advocates for Delayed Umbilical Cord Clamping (not earlier than 1 minute after birth) to improve maternal and infant health and nutrition outcomes. Globally, multiple governing bodies recommend DCC in both preterm and term infants. After birth, the practice of DCC appears to be associated with reduced in-hospital mortality in preterm infants (Adams, 2023).

According to WHO recommendations, DCC in low-income and middle-income countries may be particularly beneficial, as many studies have documented improved iron stores during the first half of infancy, especially in resource-limited settings where iron deficiency anemia is highly prevalent (WHO, 2012). Other findings suggest that DCC may help promote enhanced iron stores in infants during the first six months after birth in populations where iron deficiency is common in pregnant women and infants who receive exclusive human breastmilk (Chaparro*et al.*, 2023).

Delayed cord clamping has many beneficial effects on newborns, including term and preterm infants. It has been found to decrease the risk of anemia up to 12 months of age, improve development up to 4 years, reduce the need for supplemental oxygen, lower the risk of infection, stabilize infant blood pressure, increase overall blood volume and hemoglobin levels, and improve circulation in premature babies. Additionally, DCC increases iron reserves up to 6 months after birth, reduces the need for blood transfusion, and helps lower the risk of bleeding in the brain and necrotizing enterocolitis. It also decreases the risk of intestinal disease in premature infants, promotes a more stable cardiovascular transition, and supports psychomotor development (Madhavanprabhakaran*et al.*, 2017).

In India, a study was conducted on 102 term infants to compare the effects of DCC and Early Cord Clamping (ECC) on iron stores at 3 months of age in infants born to anemic mothers.

ThestudyresultsshowedthatDCCsignificantlyeffectiveforthoseinfantswhohadHb<10g/dLat3 months ofagelessthan(44%) whereas Early Cord Clamping (86%) (Adams,2023). Delayed cord clamping can give babies an extra 1-3 months of iron stores to help bridge their transition from exclusive breastfeeding to solid foods. This can be

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especially helpful for breastfed babies that are a little slow to start solid foods. The main benefit of delayed cord clamping found in recent re-search is the reduction of anemia of infancy. A systematic review of term infants showed that delayed cord clamping, especially in anemic mothers, increased infants' hemoglobin status and reduced the risk of anemia at two to three months of age (Van Rheenen&Brabin, 2012). Another study found that the Increase in blood volume translates to better respiratory function, less intraventricular hemorrhage (IVH) and possibly lesssepsis for preterm infants. Delayed cord clamping improves hematocrit levels, reduces the need for blood trans fusions during hospital stay, improves blood pressure and in-creases circulating blood volume. (Valero, *et al.*, 2012).Delaying cord clamping also improves cerebral oxygenation (Lawton, 2015)

In Bangladesh there is no significant information available about Delayed umbilical Cord Clamping. Inadequate knowledge of nurse-midwives' influences the higher prevalence of neonatal and under five anemia related to ignoring DCC. During intra-natal period DCC can prevent anemia results of reduce infant and under five morbidity and mortality that's why researchers highly considered to conduct the study on Nurse-midwives' Knowledge regarding Delayed umbilical Cord Clamping working at Selected Hospital, Dhaka.

Justification of the Study

Delayed Umbilical Cord Clamping (DCC) has been reported to have better neonatal outcomes and appears to be safe, feasible, and effective, with no adverse effects in both term and preterm newborns. It has been argued that Early Cord Clamping (ECC) puts the newborn at increased risk of hypovolemic damage, iron loss, and severe blood disorders (such as Type 2 diabetes and hematopoietic stem cell issues). Additionally, ECC is associated with neonatal anemia, under-five anemia, increased bilirubin levels, delayed psychomotor development, risk for hemorrhage in the brain, unstable blood volume in newborns, necrotizing enterocolitis, and intestinal diseases.

In preterm infants, ECC increases the risk of blood transfusion and related complications (Mwakawanga&Mselle, 2020). As a result, it affects approximately 47.4% of pre-school children. Iron Deficiency Anemia (IDA) contributes to 50% of this global burden and is one of the leading causes of neonatal morbidity and mortality (ES Jombo, 2017).

Moreover, the World Health Organization (WHO, 2018) has recommended DCC for the prevention and treatment of postpartum hemorrhage. It also improves maternal and infant health as well as nutritional outcomes. Additionally, delaying cord clamping enhances cerebral oxygenation (Lawton, 2015).

In Bangladesh, most of the institutional normal vaginal delivery is conducted by Nurse -midwives. It's very important to have the beneficial maximum knowledge about Delayedumbilical Cord Clamping, because it is a current evidence-based practice. This study wasopenanewdoorforcaringofnewborns. So,itisnecessarytoconductstudyonassessment of nurse-midwives' knowledge regarding Delayed umbilical Cord Clamping at Selected Hospital, in Dhaka.

Research Question:

What is the level of knowledge of Delayed umbilical Cord Clamping after Birth among Nurse Midwives working at Selected Hospital in Dhaka?

Research Aim: The aim of this study is to assess the level of knowledge on Delayed umbilical Cord Clamping after Birth among Nurse Midwives working at Selected Hospital in Dhaka

Specific objectives:

1. Toassessthelevelofrespondents'knowledgeregardingconceptofDelayedumbilical Cord Clamping.
2. Tofindoutthelevelofrespondents'knowledgeregardingbenefitsofDelayedumbilical CordClampingforboth mother and baby.
3. To determine the level of respondents' knowledge regarding adverse effects of Delayed umbilicalCordClamping.
4. Tostatethesocio-demographiccharacteristicsoftherespondents.

Research Variables

A. Socio-Demographic Variables

1. Age
2. Religion
3. Maritalstatus
4. Educational Qualification

A. Academic Qualification
B. Professional Qualification

5. Total length of Government Service
6. Length of service experienceincurrentplace
7. SpecialTrainingon EOC & ENC

B. Knowledge Related Variables:

1. ConceptofDelayedumbilicalCordClamping(me

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aning,timing,indicationand contraindication.)
2. Benefitsof DCC to the motherand baby
3. AdverseeffectsofDCC

Operational Definition:
Knowledge: The condition of knowing about a certain truth orscenario that you gain during training or skills, as well as the information, understanding,andabilitiesthatyougainthrougheducationor experience(Oxford University,2015)

Inthisstudy, knowledge refers to nurse-midwives understanding which includes clear conception (meaning,timingofumbilicalcordclamping,indicationandcontraindication),benefitsandadverseeffectsof Delayedumbilical Cord Clamping.

Nurse-Midwife: According to International Council of Nurses **(ICN)**, a Nurse is a person who has completed a program of basic, generalized nursing education and is authorized by the appropriate regulatory authority to practice nursing in his/her country. A nurse midwife is both a nurse and a midwife, having completed nursing and midwifery education leading to practice as a nurse midwife and sometimes credentialed in the specialty. (Wikipedia, 2023)

In this study, nurse-midwives refers to the respondents who were working,providing care andsupportto women duringlaborand the periodbaby'sbirthatgynae and Obstetricward in Dhaka Medical College Hospital.

LITERATURE REVIEW

A literature review is a comprehensive summary of previous research on a specific topic. It is the most important steps in the research process that is started from period of thinking about any researchable problem. The aim of this study to assess the knowledge of nurse-midwives regarding Delayed umbilical Cord Clamping and the relevant literature was reviewed in relation to the major concepts of the study. These include overview of Delayed umbilical Cord Clamping and knowledge regarding DCC among respondents.

Overview of Delayed umbilical Cord Clamping (DCC)

1. Concept of DCC
2. Meaning and timing of DCC
3. Indication of DCC
4. Contraindication of DCC
5. Benefits of DCC
6. Adverse effects of DCC,
7. Knowledge regarding DCC among respondents.

Concept of DCC
The umbilical cord is considered both the physical and emotional attachment between mother and fetus. This structure allows for the transfer of oxygen and nutrients from the maternal circulation into fetal circulation while simultaneously removing waste products from fetal circulation to be eliminated maternally (Basta, 2020).

Umbilical cord clamping is a crucial step during the third stage of labor that separates the newborn from the placenta. Clamping and cutting the umbilical cord after birth is one of the steps in the birth process at the time of birth, the infant is still attached to the mother via the umbilical cord, which is part of the placenta. The infant is usually separated from the placenta by clamping the cord (McDonald,2014).

Meaning and Timing of DCC
According to Qian (2019), define Delayed cord clamping (DCC) means, clamping the umbilical cord in more than 30 s after birth or when cord pulsation has ceased. Another study found that Delayed cord clamping is defined as the clamping of the cord within 1 to 3 minutes of birth, or when the umbilical cord pulsations have stopped (WHO, 2014). On the other hand, the current recommendation is to practice delayed cord clamping (DCC), is to wait for at least 60 seconds after birth before clamping the cord (Rana, *et al.*, 2019). DCC means neonatal cord clamping at least 30-60 seconds after birth or after cession of cord pulsation (Josephsen, *et al.*, 2019)

Indications of Delayed Cord Clamping:
All term babies who are vigorous at birth or not anticipated to require immediate resuscitation at birth, C-section and Vaginal deliveries, multiple gestation. Premature babies in coordination with the NICU team like: C-section and Vaginal deliveries, multiple gestation (Royal College of Midwives, 2015). Vigorous term and preterm infants, (Padilla-sanchez,2020). American College of Obstetricians and Gynecologists(2017) state that Delayed umbilical cord clamping appears to be beneficial for term and preterm infants. In term infants, delayed umbilical cord clamping increases hemoglobin levels at birth and improves iron stores in the first several months of life, which may have a favorable effect on developmental outcomes.

Contraindications of Delayed Umbilical Cord Clamping

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Most infants should receive DCC, but there are some contra indications of it. In the literature, absolute contraindications to DCC are few but have included the following: fetalhy drops, certain fetal anomalies (e. g. , diaphragmatic hernia at term), need for immediate resuscitation of mother or infant or disruption of the placental circulation (e. g. , bleeding vasa previa or placenta previa, placental transection (McDonald, *et al*, 2022). Relative contra indications to DCC are few, but include (in term infants) risk factors for significant hyper bilirubinemia (e. g. polycythemia, severe IUGR, pre-gestational diabetes), and cases where maternal antibody titers are high or when the first infant in a pair of monochorionic twins is delivered.

In all these circumstances, immediate cord clamping should be considered, requirement for immediate resuscitation (born pale, floppy with no or slow heart rate), Cord issues e. g. no pulsation, cord snapping or incision, placental abruption or early separation, uterine inversion, Monochorionic twins, Maternal concerns e. g. PPH, shock, seizure. need for resuscitation (Zhao, *et al.*, 2019)DCC is contraindicated in following conditions-Fetal intolerance to labor Cases with interruption of the placental Abruption, Maternal placenta previa, Vasa previa , Active maternal seizure ,Tight nuchal cord, Cord avulsion ,Apnea or poor respiratory effort at birth ,no spontaneous respiration by 20 – 30 seconds, Hydrops, Recipient twin in twin-to-twin transfusion syndrome, Myelomeningocele, Congenital heart disease with anticipated need for immediate intubation, Congenital Diaphragmatic Hernia, Gastroschisis (Royal College of Midwives,2014). Another Cord prolapses, Antepartum hemorrhage, Fetal compromise in a multiple gestation pregnancy, meconium aspiration, (McAdams,2015).

Benefit of DCC

The WHO,2018 recommended DCC for all deliveries because it can increase hemoglobin level in term newborns at birth, improve iron stores in the first months of life, and have a positive effect on developmental outcome, Increases: hematocrit , hemoglobin , blood pressure ,cerebral oxygenation , red blood cell flow, decreases risk of:(intra ventricular hemorrhage, necrotizing enterocolitis ,late-onset sepsis), Decreases need for: blood transfusions for anemia or low blood pressure ,surfactant ,mechanical ventilation. DCC can improve neuro-developmental outcomes in term infants aged 12 months and 4 years (Mercer, *et al.*, 2022). In contrast to ECC, DCC maintains constant blood flow from the placenta to neonatal blood circulation, increases ventricular preload, and contributes to a more stable hemodynamic transition when lung aeration occurs prior to cord clamping (Canton, *et al.*, 2022) reported that DCC significantly increased hemoglobin, serum ferritin and hematocrit levels in newborns at four weeks of age. On the other hand, DCC has No effect on maternal bleeding or length of the third stage of labor, Indication from "cord drainage" trials that less blood-filled placenta shortens the third stage of labor and decreases the incidence of retained placenta (WHO, 2018). Delayed umbilical cord clamping has been shown to improve iron stores in infants to 6 months of age. However, delayed cord clamping has not been shown to prevent iron deficiency or anemia after 6 months of age (Qian, 2019).

Delayed umbilical cord clamping for improved maternal and infant health and nutrition outcomes (Mwakawanga, 2020).When the umbilical cord is left unclamped after birth, a significant proportion of the blood from the placenta flows into the newborn, increasing the baby's blood volume by approximately 30% (MMid, 2022). some potentially important advantages of delayed cord clamping in healthy term infants, such as higher birthweight, early hemoglobin concentration, and increased iron reserves up to six months after birth (McDonald, 2014).

Adverse Effects of DCC

Delayed cord clamping can result in excessive placental blood transfer, which can lead to polycythemia and hypervolemia. Additionally, the breakdown of erythrocytes can elevate the level of bilirubin in the blood. As a result, delayed cord clamping may increase the risk of hypothermia, delayed resuscitation, polycythemia, and phototherapy-induced by hyperbilirubinemia (Mercer, *et al*, 2017). During the first two hours following delivery, the babies with DCC had greater amounts of total and direct bilirubin in their venous blood (Yan, 2023). Polycythemia, jaundice, and a higher need for phototherapy are possible disadvantage of DCC (Qian, *et al.*, 2019). The higher hemoglobin values by DCC increase neonatal jaundice in healthy newborn (Nakagawa, *et al.*, 2015). The concern persists about that delayed cord clamping may affect the early care of the neonate after birth and the timely implementation of asphyxia resuscitation (Rana, *et al.*, 2018).

Knowledge Regarding DCC

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In 2022, a descriptive study was conducted in Turkey by Akyildiz&Aksoy among 1274 delivery room midwives selected by stratified sampling technique. The study aimed to evaluate the knowledge and practices of delivery room midwives on delayed umbilical cord clamping (DCC). The study determines that the rate of midwives who knew and applied DCC correctly in term and preterm newborns was quite low. The majority of the midwives reported that they had no DCC protocol in their institution (80. 5%) and did not receive in-service training on DCC (76. 5%). This study has concluded that most midwives do not know the correct definition of DCC, do not apply DCC correctly, have quite short DCC times, have no DCC protocol in their institutions and do not receive in-service training on DCC.

A cross-sectional quantitative descriptive survey was conducted by Joan Devinand Patricia Larkin in 2018 to assess the knowledge regarding delayed clamping the umbilicalcord among midwives, at three maternity hospitals and two online midwifery groupsinIreland. A non-probabilitypurposeful sampling strategy were used. A total of 153 validparticipants were involved in this study. Participants had a wide range of experience,seventy-nine (51. 6%) had over 10+ years clinical experience, 34 (22. 2%) had between 5and 10 years of clinical experience, and 40 (26. 1%) had less than 4 years of clinicalexperience. Ninety-three(60. 8%)participantshadworkedinanobstetric-ledunit,whereas 6 (3. 3%) had worked in midwifery-led care. Fifty-five (35. 9%) participants hadexperienceofworkingin both modelsofmaternitycare. The study findings were, one hundred and forty (91. 5%) respondents practiced delayedcord clamping. Moreover, 62. 7 % (98/153) of participants routinely clamp the umbilicalcord>1 minute when practicing active management of the third stage of labor, with49. 1% (48/98) of those waiting until cord pulsations have ceased. This study recommends future practice include a syn-chronized approach to delayed cord clamping in the third stage of labor, including theprovisionofanationalguideline.

Another study was conducted by Madhavan, *et al.*, (2018). Across-sectional descriptive study was conducted among175participants. Here106(60. 6%)wereobstetriciansand55(31. 4%) participants were midwives, and the rest were maternal-fetal specialists andgeneral practitioners. Anon-probabilityconveniencesamplingtechniquewasused . All the participants were involved in intrapartum care delivery. The majority of the participants (75. 5%) were within the age group of 30-49 years, and 81. 2% of them had more than five years of intrapartum experience. The findings indicated that the timing of cord clamping varied among the participants. 87. 4 - 89. 6% of the care providers considered ECC timing to be within 1 min of birth, and70-72. 6%of themclampedumbilicalcord within 1 min for both normalterm and preterm newborns. The study concludes, the majority of the maternity care provider sare aware of the new guidelines regarding the timing of cord clamping, theystill follow ECC practice. This study also recommended to investigate the subject using alarge-scalestudy.

Finally, in a statement released by the Royal College of Obstetricians and Gynecologistsin 2013 in response to new evidence from the Cochrane Review on the timing of cordclamping, it was recommended that the umbilical cord should not be clamped earlier thannecessary,based on theclinical assessment ofthesituation.

RESEARCH METHODOLOGY

The research methodology described the entire process of the study which was covers theareas of research design, study place, study population, study period and sample size,sampling technique, selection criteria for the study, research instruments, pre-test andfinalizing of the questionnaire, data collection procedures, data processing, analysis and presentation and ethical considerations.

Study Design:
A descriptive type of cross- sectional study design was used to assess Knowledge on Delayed umbilical Cord Clamping after Birth among Nurse Midwives working at Selected Hospital in Dhaka.

Study Setting:
This study was conducted at Dhaka Medical College Hospital in Dhaka where bed capacityis 2600. There are all kinds of facilities available for ensuring quality services includingGynae and Obstetric, OPD and emergency unit. It is the largest tertiary level of govt. medical college hospital in Bangladesh where all categories of patients comethroughoutthe country for receiving better preventive, curative and rehabilitative care in nursing andmedicalaspects.

Study Period:
Thestudyperiodwasfrom July 2023 to June 2024

Study Population:

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The study population of registered nurse-midwives who were working at gynae and Obstetricward at Dhaka Medical College Hospital in Dhaka. The total number of study populations was200.

Samplesize:
Sample size wasSelected fifty (50) based on specific criteria from the total number of populations.

Sampling Technique:
A non-probability type of convenient sampling technique adopted for selectingthe sample of this study. Convenient sampling involves using respondents who were "convenient" to the researcher.

Selection Criteria
Inclusion Criteria

- Respondents who were working at gynaeandobstetricdept. inthishospital.
- Respondents who wereavailablеduringdatacollectionperiod.
- Respondentswhowere voluntarily participateinthisstudy.

Exclusion Criteria
Respondentswho did nottomeettheinclusioncriteria and who were not physically fit.

Research Instruments:
The instruments of this study were developed bythe researchers based on the basis of study objectives and variables after reviewing of the relevant literatures. The questionnairedivided into two Parts. Part- I socio-demographic information and Part- Ⅱ Knowledge related information.

Part- I covered the socio-demographic information of therespondents within 07 items. The questionnaire was design to collect the following data: age, religion, marital status, educational qualification (Academic & professional) , total length of government service, Current length of service in current place, special training on EOC And ENC.

Part- Ⅱ contained 20 (twenty) knowledge related structured questionsregarding the Delayed umbilical Cord Clamping. Each knowledge relatedquestion carried out multiple options (4 options 1 was correct answer). Each correctanswer was carried 5 marks. There was no negative marking. Thus, total mark converted into 20×5=100.

Validity:
The Validity of the questionnaire was examined by 3 (three) experts in related field. The researchers were modified the instruments based on experts' recommendations.

Reliability
The questionnaire pre-tested on (10) Nurse-midwives' at ShaheedSuhrawardy Medical College hospital in Dhaka with the same characteristics of the targeted respondents to check acceptancy and consistency of theinstrument. After reviewing of pre-testing results, the necessary corrections were made for finalizing of data collection procedure by the researchers.

Ethical Consideration
Informed Consent: A writtenpermission was taken from the hospital authority of Dhaka Medical College Hospital (DMCH). Theinvestigators, explained the purpose of study clearly and informed consent was taken from the respondents.

Voluntary Participation: Objectives of the study was explained to the Nurses-midwives to participate them voluntarily then consent was taken from the respondents by the researchers.

Confidentiality &Anonymity: Confidentiality and anonymity were strictly maintained regarding obtained data from the respondents. The respondents were ensured that their names will not be published anywhere except the concern investigator.

Safe Storage of Data: The collected data was kept under lock and key to avoid express to others and it was destroyed after compilation of the study.

Data Collection Procedure:
Prior to data collection written permission was obtained from the Principal, College of Nursing Mohakhali, Dhaka. After approval of the study proposal, permission was taken from the hospital authority of Dhaka Medical College Hospital (DMCH). Theinvestigators, explained the purpose of study clearly and informed consent was taken from the respondents. The data was collected conveniently through self-administered develop questionnaire. The data were collected from two (02)day at 8 am -2 pm.

Data Management:
The collected data was checked, organized, coded manuallyfor verifying the omission, inconsistencies&improbability. Then put into the master sheetto see at a glance.

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Data Analysis, Interpretationand Presentation:
Collected data were analyzed manually by the researcher with the help of Microsoft excel and scientific calculator. The simple descriptive statistics were used for analysis like frequency*(f)*, percentage (%), mean & standard deviation (SD). Results were presented in form of table, pie chart and bar chart.

Grading Criteria:
The grading criteria were made according to the marks obtained number by the respondents. Total correct answer of knowledge related questions was allocated. Each right answer carried 5 (five) mark and total marks counted. The overall score estimatebasedon the followingcriteria. Total marks andgradingweredoneas 100%.

Knowledge level	Grading criteria
Excellent knowledge	90-100%
Very good knowledge	80-89%
Good knowledge	70-79%
Average knowledge	60-69%
Poor knowledge	< 60%

Excellent Knowledge: Respondents who obtained 90%–100% correct answers are considered to have excellent knowledge.

Very Good Knowledge: Respondents who obtained 80%–89% correct answers are considered to have very good knowledge.

Good Knowledge: Respondents who obtained 70%–79% correct answers are considered to have good knowledge.

Average Knowledge: Respondents who obtained 60%–69% correct answers are considered to have average knowledge.

Poor Knowledge: Respondents who obtained less than 60% correct answers are considered to have poor knowledge

RESULT

This chapter provides a detailed description of the results with appropriate intervention according to the objectives of this study. The results were presented through table, pie and column chart as simple frequency, percentage and mean. Initially socio- demographic results were showed and after that knowledge-based result was documented.

Part-1: Socio- Demographic Information

Table-1: Distribution ofRespondents by the Age
n=50

Variables	(f)	%
25-31 years	17	34
32-38 years	20	40
39-45 years	6	12
46-52 years	6	12
53-69 years	1	2
	n= 50	100
*Mean Age 35. 56 years Standard Deviation=7. 46		

Description: The above table shows that 40% respondent'sage in between 32-38 years which was majority in number, 34% within 25-31 years. 12% in 39-45 years,12% in 46-52 years and 2% respondent were within 53-59 years which was minority in number. The mean age of respondents was 35. 56 years. The standard Deviation was 7. 46

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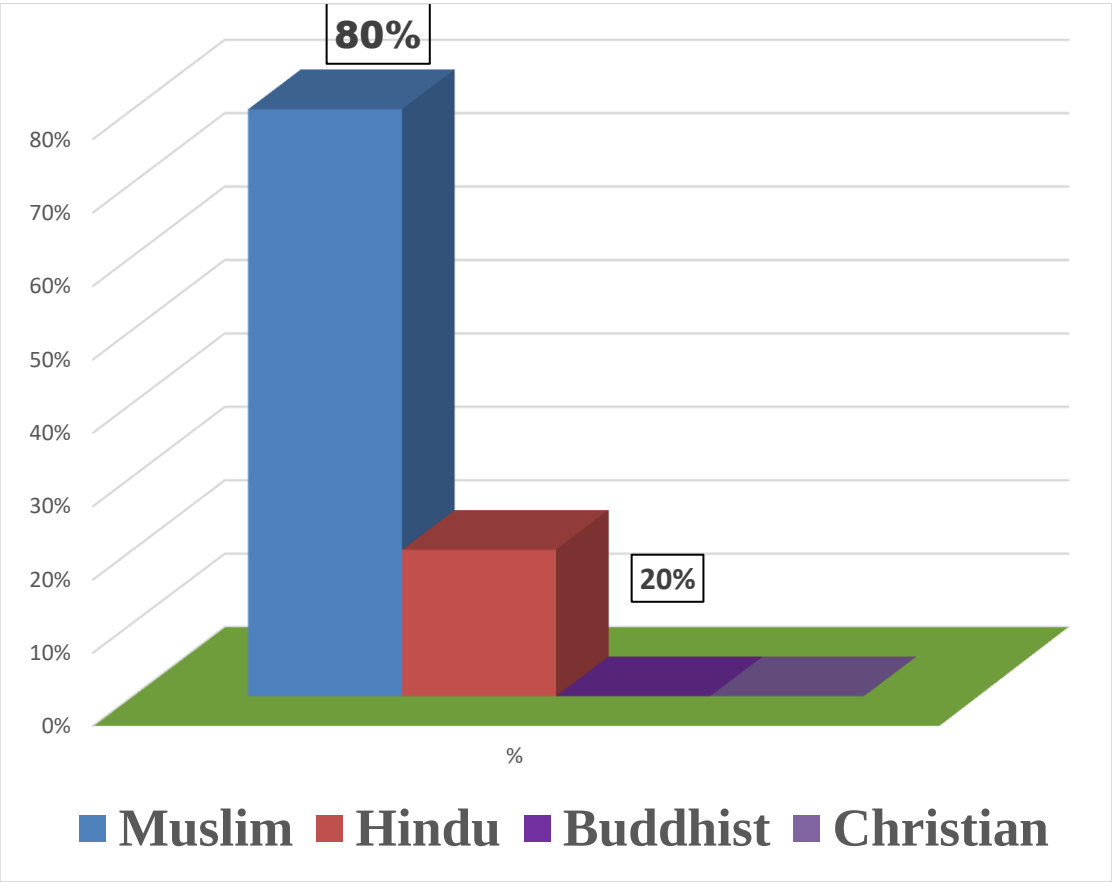

Figure -1: Distribution of Respondents by Religion
n=50

Description: The above column chart shows that out of 50 respondents 80% were Muslim and 20% were Hindu, there was no Christian and Buddhist.

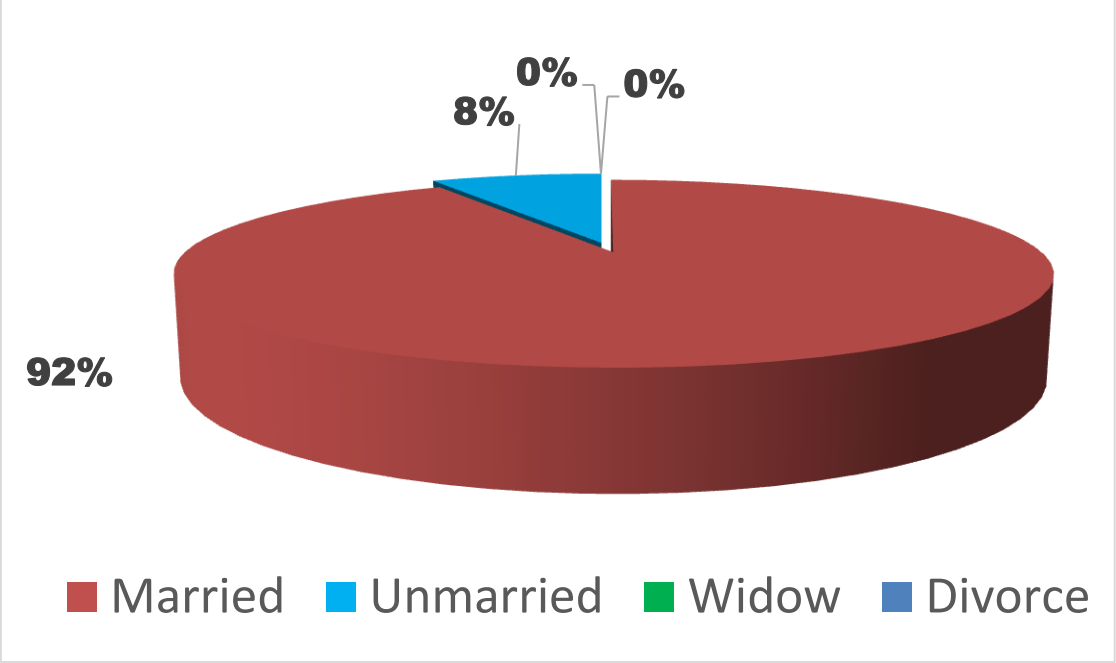

Figure -2: Distribution of Respondents by Marital Status
n=50

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Description: The above pie chart showed that majority of the respondents 92% were married and rest of 8% were unmarried.

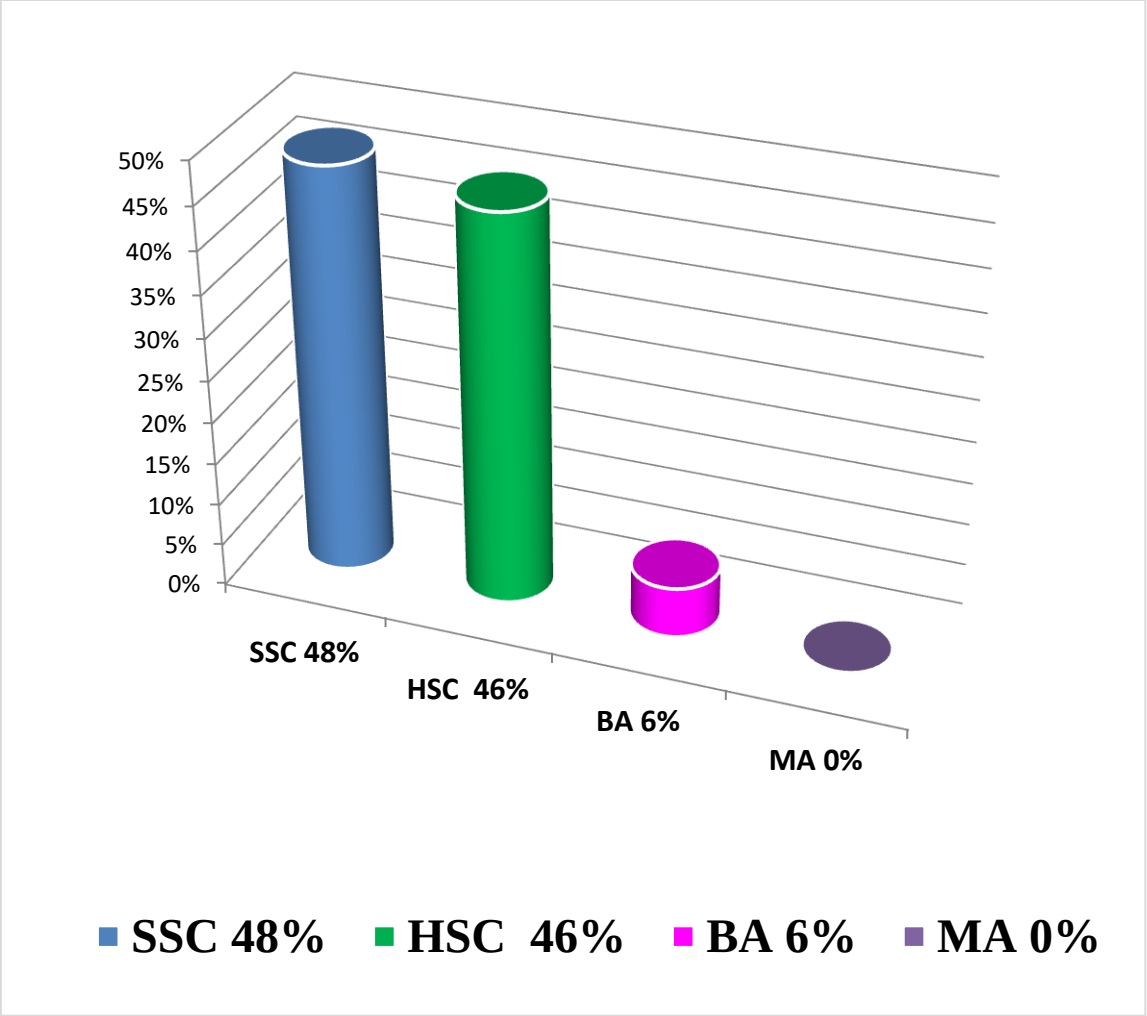

Figure 3: Distribution of Respondents by Academic Qualifications
n=50

Description: The above column chart shows that the level of education, the majority 46% respondents were HSC passed,40% SSC passed and only 6% BA/BScpassed which was minority in number.

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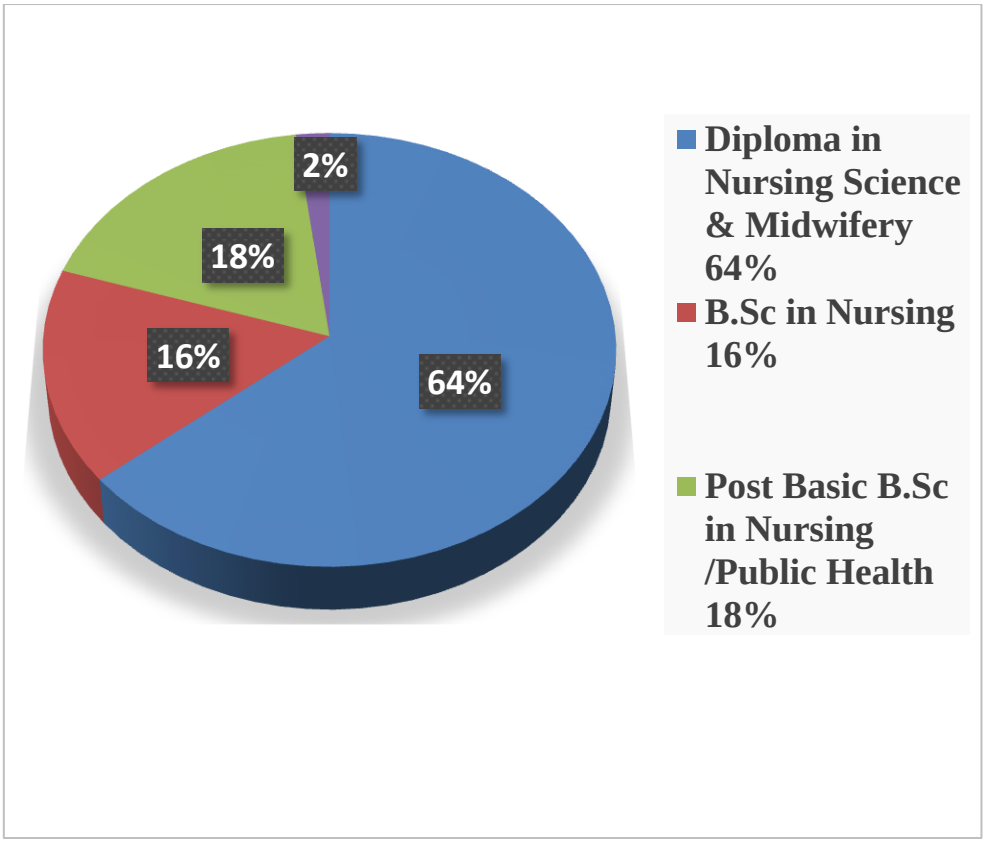

Figure -4: Distribution of Respondents by Professional Qualifications
n=50

Description: The above pie chart shows that the professional qualification of the 50 respondents. Among the respondents 64% have diploma in nursing science and midwifery degree which is majority in number, 16% BSc in nursing science, 18% post basic BSc in nursing and Public Health Nursing and only 2% M. Sc. in Nursing or MPH in nursing.

Table 2: Distribution of Respondents by Total Length of GovernmentService and service length in current place
n=50

Variables	Categories	(*f*)	(%)
Total government Service length	1-9 years	38	76
	10-18 years	4	8
	19-27 years	6	12
	>28 years	2	4
	*Mean	8. 84 years	
Service length in current place	1-9 years	46	92
	10-18 years	1	2
	19-27 years	1	2
	>28years	2	4
	*Mean	6. 5 years	

Description: The table- shows that out of 50 respondents, the majority 76% belonged to 1-9 years of total government service experience,whereas 12% in between 19-27 years,8% in between 10-18years and rest of 4% were >28years. The respondents total Government service length mean was 8. 84 years. In case of service length in current place,the majority of the respondents 92% belonged to 1-9 years, each group in between 10-18 years and 19-27 years were 2% and rest of other 4% were> 28 years. The service length of mean in current place was 6. 5 years.

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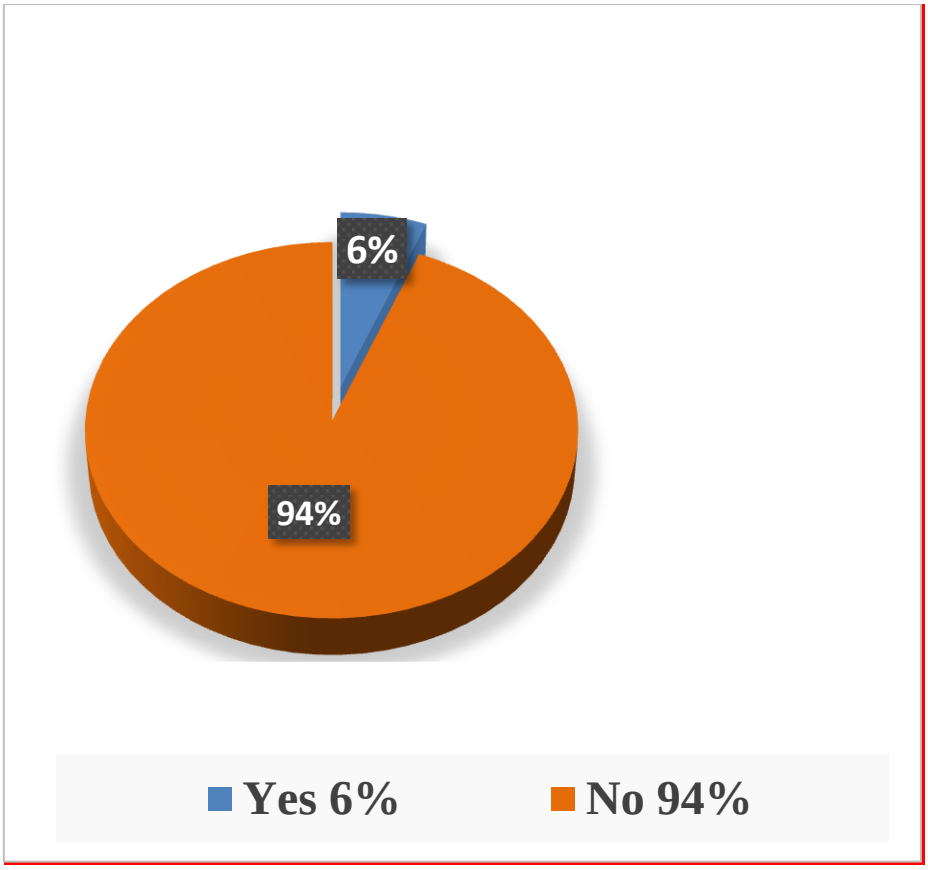

Figure -5: Distribution of Respondents by Special Training on EOC(Emergency Obstetric Care) / ENC (Essential Newborn Care).
n=50

Description: The above pie chart represents that only 6% respondents had special training on EOC (Emergency Obstetric Care) / ENC (Essential Newborn Care). And themaximum 94% respondents didn't have any special training on EOC and ENC.

Part -2: Knowledge Related Information

Table-3: Distribution of Nurse- Midwives' knowledge Regarding the concept of Delayed Umbilical Cord Clamping.
n=50

Q. No	Variables	Correct Answer		Incorrect Answer	
		(f)	%	(f)	%
1	The meaning of Delayed Cord Clamping is clamping of umbilical cord after stopping of pulse	**16**	**32**	**34**	**68**
2	The optimal time for clamping umbilical cord after delivery is 1 to 3 minutes	**22**	**44**	**28**	**56**
3	The practice for Delayed cord clamping is required good knowledge about DCC	**28**	**56**	**22**	**44**
4	The indicator of evidence-based practice is DCC	**07**	**14**	**43**	**86**
5	During performing Delayed cord clamping, the position of the baby should be placed on mother's abdomen	**37**	**74**	**13**	**46**
6	The 100 ml blood is transmitted by ensuring Delayed cord clamping	**15**	**30**	**35**	**70**
7	Delayed cord clamping is applicable for HIV positives mother	**5**	**10**	**45**	**90**
8	The significant contraindication of delayed cord clamping for the neonates is need for immediate resuscitation	**43**	**86**	**07**	**14**
9	The delayed cord clamping is ineligible for baby who is not crying after birth	**48**	**96**	**02**	**04**

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10	The most common contraindication of delayed cord clamping is birth asphyxia	**38**	**76**	**12**	**24**
11	The absolute contraindication of Delayed Cord Clamping for mother is eclamptic convulsion	**26**	**52**	**24**	**48**
n = 50		**Mean=25. 9**		**Mean=24. 1**	

Description: The above table shows that knowledge of the respondents regarding concept of DCC. Among 50 respondents, (32%) provided correct answer regarding meaning of Delayed Cord clamping, (44%) provided correct answer regarding optimal time for clamping umbilical cord is 1 to 3 minute after delivery, (56%)respondents provided correct answer on the area of practice for Delayed cord clamping required,(14%) provided correct answer about indicator of evidence-based practice, (74%)gave answer correctly regarding during performing Delayed cord clampingthe position of the baby should be placed on mother's abdomen, (30%)provided correct answer on 100 ml of blood is transmitted by ensuring Delayed cord clamping, (10%) provided correct answer regarding delayed cord clamping is applicable for HIV positive mother which was the minority in number, (86%) gave answer correctly on significant contraindication of delayed cord clamping for the neonates, (96%) provided correct answer regarding delayed cord clamping is ineligible for baby who is not crying after birth. which was majority in number, (76%) gave answer correctly on the most common contraindication of delayed cord clampingand (52%) provided correct answer regarding absolute contraindication of Delayed Cord Clamping for mother is eclamptic convulsion.

Table 4: Distribution of Nurse- Midwives' knowledge regarding benefits of Delayed umbilical Cord Clamping
n=50

Q. No	Variables	Correct Answer		Incorrect Answer	
		(f)	%	(f)	%
12	The early benefit of delayed cord clamping for premature baby except risk of brain hemorrhage	42	84	08	16
13	The false statement regarding Delayed cord clamping is expensive	46	92	04	08
14	The most important neonatal benefits of Delayed cord clamping are reducing the risk of neonatal sepsis and increase iron store	35	70	15	30
15	The immediate advantage of delayed cord clamping is improving the transitional circulation	34	68	16	32
16	The outcome of delayed cord clamping is except newborn needs immediate medical care	12	24	38	76
17	The crucial maternal benefit of delayed cord clamping is decreasing the incidence of retained placenta	38	76	12	24
18	The late neonatal outcome of delayed cord clamping is except decrease blood cell volume	40	80	10	20
n=50		Mean=35. 3		Mean=14. 7	

Description: The above table demonstrated that knowledge regarding benefits of delayed umbilical cord clamping. Most of the respondents(84%) provided correct answer regarding early benefit of delayed cord clamping for premature baby is except risk for brain hemorrhage,maximum (92%)respondentswere provided correct answer in the area of the false statement regarding Delayed cord clamping, (70%) gave correct answer regarding the most important neonatal benefits of Delayed cord clamping,(68%) provide answer correctly regarding immediate advantage of delayed cord clamping , the minimum (24%) of the respondents provided correct answer on the outcome of delayed cord clamping is except newborn need immediate medical care, (76%) gave answer correctly regarding the crucial maternal benefit of delayed cord clamping, (80%) provide answer correctly regarding late neonatal outcome of delayed cord clamping is except decrease red blood cell volume.

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Table -5: Distribution of Nurse- Midwives' knowledge regarding adverse effects of Delayed Umbilical Cord Clamping.

n=50

Q. No	Variables	Correct Answer		Incorrect Answer	
		(f)	%	*(f)*	%
19	The potential risk for delayed cord clamping is hyperbilirubinemia	12	24	38	76
20	The possible adverse effect of delayed cord clamping is polycythemia	38	76	12	24
	n=50	Mean=25		Mean=25	

Description: The above table represented that knowledge regarding adverse effect of DCC. The majority (76%)respondents provided correct answer in the area of the possible adverse effect of delayed cord clamping is polycythemia whereas the minimum (24%)respondents provided correct answer in the area of the potential risk for delayed cord clamping is hyperbilirubinemia,

Table 6: Distribution of respondents by overall level of knowledge based on grading criteria

n=50

Variable	Categories	*f*	%	Total Mark
Excellent	90-100%	1	2	90
Very good	80-89%	5	10	410
Good	70-79%	4	8	290
Average	60-69%	12	24	750
Poor	<60%	28	56	1390
		n=50	100	2930
***Mean Secore = 58. 6 (Poor level)**				

Description: The findings revealed that respondent'soverall knowledge regarding Delayed Umbilical cord Clamping 56% of the respondents had poor knowledge, 24% had average knowledge 8% had good knowledge, 10% had very good knowledge and 2% had excellent knowledge regarding delayed umbilical cord clamping.

The mean knowledge of the respondents is 58. 6%.

Table-7: Distribution of the respondent knowledge regarding delayed umbilical cord clamping based on educational level and special training.

n=50

Educational Level		(*f*)	%	Obtained Score	Mean Score
Post Basic		10	20	565	56. 5
Basic B. sc		8	16	445	55. 62
Diploma in Nursing science & Midwifery		32	64	1945	60. 78
Total		50	100	2955	59. 1
Special Training on EOC & ENC	yes	3	6	210	70
	No	47	94	2745	58. 40
Total		50	100	2955	58. 40

Table: shows that majority of the respondents 64% had Diploma degree, their obtained score was 1945, mean was 60. 78. 18% respondents had post basic degree, their total obtained score was 445 and mean score was 55. 62. 16% respondents had Basic B. scDegree, their total obtained score was 55. 62. Based on receiving training only 6% respondents received training, their obtained score was 210 and mean score was 70 and 94% respondents didn't receive any training regarding ENC & EOC, their obtained score was 2745 and mean score was 58. 40.

DISCUSSION

The present study was conducted to assess the level of knowledge regarding delayed umbilical cord clamping working at Selected Hospital Dhaka. The funding of the present study are

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discussed in two parts: Ⅰ)Socio-demographic information and Ⅱ) Knowledge related information

Part: Ⅰ) Socio-Demographic Information of the Respondents

According to the study findings, it was found that the respondent's mean age was 35. 56 years and the age range was 25-59 years. In Oman a study found that the majority of the participants age were (75. 5%) within age group 30-49years (Madhavanprabhakaran, *et al.,* 2017). In this study the majority 80% respondents were Muslim and other 20% were Hindu. Most of the respondent's 92% were married whereas only 8% respondents were unmarried. In case of professional qualification, the maximum respondent's 64% had Diploma in nursing science and midwifery. The highest respondents'length of government service 44% were in between 1-9 years and lowest 2% were 21-25 years. On the area of service experience, the maximum 92% respondentshad been working in obstetric and gynae ward for 1-9 years and minimum 2% between 19-27 years. Their mean service experience was 6. 5 years. In similar study found thattheir mean work experience in delivery room was 8. 9 years (Akyildiz&Aksoy, 2022). In case of Special training, only 6% respondents had training on Emergency Obstetric Care (EOC) and Essential Newborn Care (ENC), but most of the respondents' 94% had no training on related field.

Ⅱ) Knowledge Related Information of the Respondents

The present study revealed that, in the areas of knowledge-based questions, nurse-midwives showed inadequate knowledge in concept part, their mean knowledge was 25. 9 in this part. Whereas,32% respondents reported that delayed cord clamping means clamping the umbilical cord after stopping the pulse. Alongside similar study found that 47. 2%respondents defined DCC as clamping the umbilical cord after cessation of pulsation(Akyildiz&Aksoy, 2022). Another study revealed that,84. 2% participants agreed with clamping the umbilical cord until pulsation had ceased (Devin & Larkin, 2018). In this study, 44% respondents reported that the optimal time for delayed cord clamping is 1-3 minutes after delivery.

In contrast a study reported that 51% 0f the participantsconsidered the timing of DCC as below 01 minute of birth (Madhavanprabhakaran, *et al.*, 2017). As well as in current study, 74% respondents stated that,during performing Delayed cord clamping, the position of the baby should be placed on mother's abdomen. Another study published in Ireland in 2018 by Devin & Larkin where 94% midwives stated that a healthy baby should be placed on mothers abdomen during performing DCC.

Moreover, the area of benefitsonDelayed umbilical CordClampingforboth mother andbaby, the respondents mean knowledge was 35. 3, that indicate poor level. Whither 68% respondents stated that, the immediate advantage of DCC is improve transitional circulation. This finding is supported by another study where 50% of the participants reported that the most important benefit of DCC is the physiologic transition of the newborn (Madhavanprabhakaran, *et al.,* 2017).

Furthermore, in this study, 70% respondents' reported thatthe most important neonatal benefit of DCC is increase irone store and reduce the risk of anemia. This finding is supported by another study where high iron stores and reduced risk of anemia were the most frequently reported benefits of DCC in both term and preterm infants (Peberdy, *et al.,* 2022; Mwakawanga&Mselle, 2022 and Qian, *et al.,* 2019).

On the other hand, in the area ofadverseeffects of DCCthe respondents mean knowledge was 25. In this areamost of the respondents stated that polycythemia and hyperbilirubinemia is the major adverse effect of DCC. This result is supported by other studieswhere participants' reported polycythemia and jaundice as the major risk associated with DCC (Qian, *et al.,* 2019; Madhavanprabhakaran, *et al.,* 2017;and Nakagawa, *et al.,* 2015).

Nurse-midwives' are responsible for the monitoring newborn after birth,newborn screening, provision of anticipatory guidance, identification of problems and referral.

The findings revealed that nurse-midwives overall knowledge is poor regarding Delayed umbilical cord Clamping. Among all 56% respondent's had poor knowledge, 24% average ,8% good , 10% very good and 2% had excellent knowledge regarding delayed umbilical cord clamping. In this study, the overall mean score of knowledge-based information was 58. 6 which indicate the poor level of knowledge. Based on the results of the present study, it has been believed that nurses-midwives demonstrated the poor level of knowledge on ensuring delayed umbilical cord

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clamping which has negative impact on neonatal health.

In this study, researcher observed that only 1 (2 %) respondent who obtained excellent knowledge, she was 52 years old and had a degree in diploma in nursing science & midwifery. Within 27 years of service length, she had been working for 6 years in labor ward and also specialized training on essential newborn care.

On the other hand, most of the respondents 28 (56%) had poor knowledge. Many Factors might contribution to the poor level of knowledge regarding Delayed umbilical cord Clamping among nurse-midwives in this study. whither maximum respondents age range 30-51 years, who had only degree on diploma in nursing & midwifery, average service length was 8. 14 years they did not working in labor ward and had no any special training. Researchers assumed that, the working experience and special training on EOC & ENC may be theinfluencingfactor related to their poor level of knowledge. Very few nurses had special training on newborn care and they had very good knowledge on DCC. The nurse - midwives have been providing quality care to the mother and baby with good knowledge on management and complications during labor and child birth. Finally, Researchers suggested that ,nurse- midwives need in service training on Essential Newborn Care and Emergency Obstetric Care that helps to play vital role in providing quality care to the newborn.

LIMITATION OF THE STUDY

1. The study was conducted only one hospital Dhaka Medical College hospital, so the finding cannot be generalized to all the settings in Bangladesh.
2. Data were collected by conveniently which may have possibility of bias
3. This study only focused on the assessment of knowledge level but not the practice and attitude of nurses-midwives'.
4. Due to time constraint, the study involved only 50 respondents. So, the results may not appropriate with large scale survey.
5. There was no allocated budget for this research project to carry out the study smoothly. Research expenditure was provided by the researchers**.**

CONCLUSION AND RECOMMENDATION

This chapter represents the conclusion of the study based on the research findings, strength, and recommendation of the study. A descriptive cross-sectional study was conducted to access the knowledge regarding delayedumbilical cord clamping among nurse midwife working at selected hospital in Dhaka. In this chapter, the conclusion and recommendations of the study are addressed.

CONCLUSION

Fifty (50) respondents were recruited from Dhaka Medical College Hospital, Dhaka. A structured, self-administered questionnaire was used to measure the level of knowledge regarding Delayed umbilical Cord Clamping working at DMCH Dhaka. The respondents' mean age were 35. 56 years ±7.46with a range from 25 - 59 years. The respondents Overall, mean score of knowledge was 58. 6. Notably there was significant difference in the level of knowledge relating to working experience and special training. Finally, it is suggested to need in service training for nurse midwives on Essential Newborn Care and Emergency Obstetric Care so that they can play vital role in providing quality care to the newborn. In conclusion, the study on respondents exhibited the poor level of knowledge.

RECOMMENDATION

According to the study finding for improving the Nurse-midwives' knowledge regarding Delayed umbilical Cord Clamping, in DMCH, the following recommendation was proposed by the investigators.

1. Provide specialized training on Essential Newborn Care and Emergency Obstetric Care to improve the Nurse-midwives' knowledge about DCC as well as ensuring proper care to the neonates.
2. Arrange workshop and seminars on Delayed umbilical Cord Clamping to update knowledge.
3. Released current guidelines on DCC and circulate in every policymakers /hospital. It should be hung in the labor room in such a way that it is clearly visible.
4. In-service refresher training program continuing in-service education program to be emphasized for the nurse- midwives' on DCC
5. This study also highlights the need for a national policy in this regard.

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6. Further study should be conducted on DCC regarding practice and attitudes among Nurse-midwives' in different Medical College Hospital in different division of Bangladesh.

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