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Assessment of the training on placenta and umbilical cord given to midwives

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Abstract

Objective: The aim of this study was to assess the interactive training on placenta and umbilical cord given to midwives who provide care for pregnant women and newborns.

Methods: The midwives accepted the invitation for interactive presentation before the training. The introductory information of participants was collected by a questionnaire form prepared by researchers. Assessment of the knowledge of the participants on placenta and umbilical cord was performed by using a 24-question questionnaire form prepared by the researchers in accordance with the literature. A pre-test was conducted before the training. The participants were not informed whether the test would be repeated at first and third months after the training or not. The test was repeated 1 and 3 months later. Friedman test was used in the comparison of the mean values of more than two dependent groups as the data did not provide parametric characteristics, and Kruskall-Wallis test was used for the comparison of two groups. Statistically significant level was considered $p<0.05$ for all the data.

Results: The mean age of midwives included in the study was 37.23±6.19 (range: 25 to 51) years, 52.9% of them had bachelor's degree, 88.2% of them were married, their total experience in their profession was 15.88±6.90 years and they were working in the same unit for 7.5 (range: 1 to 26) years. Of the participants, the mean pre-test score was 12.88±2.15, and mean final test scores 1 month and 3 months later were 21.61±1.75 and 23.23±0.85, respectively.

Conclusion: Interactive training given on placenta and umbilical cord provides a positive contribution to increase the knowledge score of midwives. It may be suggested to repeat in-service trainings in the organization regularly.

Keywords: Placenta, umbilical cord, midwife, interactive training.

Özet: Plasenta ve umbilikal kordon hakkında ebelere verilen eğitimin değerlendirilmesi

Amaç: Bu çalışma gebelere ve yenidoğana bakım veren ebelere, plasenta ve umbilikal kordon hakkında verilen interaktif eğitimin değerlendirilme amacıyla yapılmıştır.

Yöntem: Eğitim faaliyeti öncesinde ebeler interaktif sunum davetini kabul ettiler. Çalışmada katılımcıların tanıtıcı özelliklerini içeren bilgiler araştırmacılar tarafından hazırlanan anket formu ile toplandı. Katılımcıların konu ile ilgili bilgilerinin değerlendirilmesi araştırmacılar tarafından literatür doğrultusunda hazırlanan 24 soruluk soru formu kullanılarak yapıldı. Eğitim öncesi ön test uygulandı. Eğitimden 1 ve 3 ay sonra testin tekrarlanıp tekrarlanmayacağı konusunda katılımcılara bilgi verilmedi. Son test 1 ve 3 ay sonra tekrarlandı. İkiden çok bağımlı grupların ortalamalarının karşılaştırılmasında veriler parametrik özellikleri sağlamadığından Friedman testi, ikili grup karşılaştırmasında Kruskall-Wallis testi kullanıldı. Tüm veriler için istatistiksel anlamlılık düzeyi $p<0.05$ olarak alındı.

Bulgular: Çalışmaya dahil edilen ebelerin yaş ortalaması 37.23±6.19 (dağılım: 25–51), %52.9'u lisans mezunu, %88.2'si evli, toplam mesleki deneyim süresi 15.88±6.90 ve aynı birimde ortalama 7.5 (dağılım: 1–26) yıldır görev yaptığı saptandı. Katılımcıların ön test puanı ortalaması 12.88±2.15, 1 ay sonraki son test puanı ortalaması 21.61±1.75 ve 3 ay sonraki son test puanı ortalaması 23.23±0.85 olarak bulundu.

Sonuç: Plasenta ve umbilikal kordon hakkında verilen interaktif katılımlı eğitim, ebelerin bilgi puanını yükseltmede olumlu yönde katkı sağlamaktadır. Kurumda hizmet içi eğitimlerde düzenli olarak tekrarlanması önerilebilir.

Anahtar sözcükler: Plasenta, umbilikal kordon, ebe, interaktif eğitim.

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Introduction

Placenta starts to develop 13–15 days after the ovulation. Normal implantation of the placenta is necessary for the success of pregnancy. Cytokines, steroid hormones, immunological factors, prostaglandins and some other mediators are necessary for a successful placentation.[1] Placenta is the greatest endocrine organ in human body responsible for the intrauterine development of fetus.[2] The delivery of placenta occurs at the third phase of labor.[3]

All placentas should be examined by clinician. In the examination, the integrity of maternal surface of membranes, presence of retroplacental hematoma, and the presence of hematoma on the cord and rupture on membranous vessels should be checked. In placenta, the presence of 15–40 cotyledons and lobules up to 200 is reported.[4]

Umbilical cord, which carries out the duties of transferring all substances necessary for fetal development from placenta to fetus and carrying waste materials back to placenta,[5] consists of two arteries (two similar vessels with thick wall and narrow internal orifice) and one vein (with thin wall and wide internal orifice). In a non-twisted umbilicus, the arteries are seen on 4 and 7 o'clock positions, and the vein is seen on 12 o'clock position.[6]

During delivery, placenta should be evaluated generally by observation. Midwives and nurses should inform physician immediately when they observe any abnormality in placenta and cord. Therefore, the awareness of midwives and nurses should be raised for adopting evidence-based practices.[3,4] To that end, we planned the study in order to determine the current knowledge level of midwives on placenta and umbilical cord, who work in delivery room and maternity emergency room, and the contribution of training provided for this purpose on the knowledge level.

Methods

The study was planned between September 31 and December 31, 2016 in prospective and definitive correlational type with the design of single group pre-test and repeating final test in order to assess the knowledge of midwives on placenta and umbilical cord who work in the delivery room and maternity emergency room of a training and research hospital.

Following questions were answered in the research:

- What level of knowledge do midwives have on placenta and umbilical cord?
- Does the knowledge level of midwives differ at first and third months after the training provided?

The population and sample of the study

All midwives in 2 campuses of a university training and research hospital in the city center of Sakarya were the population of the study (n=34), and 34 volunteer midwives who were informed orally were the study sample (100% participation).

Exercising the research

We started to collect the data after obtaining necessary institutional and ethics committee approvals. A pre-test was applied to the midwives included in the research in groups of 10, 11 and 13 individuals in 3 sessions without informing in advance about the training and Powerpoint presentation including the answers of the questions was made. The same individuals were contacted 1 and 3 months after the study and final test with questions used in the pre-test was carried out. The study was conducted with 100% (n=34) participation of the volunteer participants. The questionnaire form consisting of 24 questions and definitive demographic characteristics based on literature were prepared by the researchers. Right answers were scored "1" while wrong answers were scored "0". Mean scores were obtained according to the answers given to the questions. Increase of the scores showed that knowledge level increased and it was evaluated as a positive condition.

Data collection tools

The data was collected by applying face-to-face interview technique through "Information Form" and "Question Form on Placenta and Umbilical Cord Knowledge" (**Appendix**).

The Information Form has been developed according to the related literature by researchers and it includes the questions for age, gender, marital status, educational status and year in profession of the midwives.

Question Form on Placenta and Umbilical Cord Knowledge includes the questions such as placental abnormalities, placenta delivery maneuvers during term, structure and anomalies of umbilical cord and approach to umbilical cord in term and preterm infants.

The analysis of data

The analysis of the data was done by SPSS 20.0 (SPSS Inc., Chicago, IL, USA). While mean value and standard deviation (mean±SD) and lowest and highest values were expressed in the numeric data, numbers and percentages were used in categorical data. Normal distribution of the

data was checked by Kolmogorov-Smirnov test, it was seen that there was no normal distribution. Friedman test was used in the comparison of the mean values of more than two dependent groups as the data did not provide parametric characteristics, and Kruskall-Wallis test was used for the comparison of two groups. Statistically significant level was considered $p<0.05$ for all the data.

Limitations of the research

The research population consisted of only the midwives working in 2 hospitals in the city center of Sakarya. Therefore, we believe that research results cannot be generalized.

Results

The mean age of nurses included in the study was 37.23±6.19 (range: 25 to 51) years, 52.9% of them had bachelor's degree, 88.2% of them were married, their total experience in their profession was 15.88±6.90 years and they were working in the same unit for 7.5 (range: 1 to 26) years (**Table 1**).

For the questions to assess the knowledge of midwives on placenta, it was found that 70.6% of them provided wrong answer for the question that delivery of placenta occurs at fourth phase, 26.5% of them for the question that closure of cervical opening by placenta is called ablatio placentae, %73.5% of them for the question that it is called placenta increta if villi enter into myometrium, and 52.9% of them for the question that remaining placenta pieces accelerate uterine involution by increasing uterine contractions.

It was found that 74.9% of the participants provided wrong answer for the knowledge that umbilical cord has both maternal and fetal surfaces, 55.9% of them for the knowledge that there are two arteries and one vein, 38.2% of them for the interpretation that the presence of one artery and one vein is not a problem, 35.3% of them for the knowledge that meconium staining umbilical cord is an indicator of fetal distress, 20.6% of them for the knowledge that newborn blood transfusion is carried out through the umbilicus, 52.9% of them for the definition of omphalocele, and 55.9% of them for the definition of gastroschisis.

It was seen that 35.3% of the participants provided correct answer for the knowledge that umbilicus should be clamped at pelvis level, 35.3% of them for the knowledge that clamping duration should be approximately 30–60 seconds, 14.7% of them for the knowledge that umbilical cord should not be stroked towards baby in problem-free term deliveries, 64.7% of them for the knowledge that umbilical cord should be stroked towards baby in premature deliveries, 91.2% of them for the knowledge that the average period for dropping of umbilical cord after delivery was 7–10 days, 35.3% of them for the knowledge that there is a difference between term and premature infants in terms of the period for dropping of umbilical cord, and 35.3% of them for the knowledge that sterile approach is required for cord prolapse. It was found that 44.1% of the midwives provided correct answer for the fact that pregnant women with pregestational diabetes may have small for gestational age (SGA) babies, and 91.2% of them for the fact that pregnant women with gestational diabetes may have large for gestational age (LGA) babies.

There was a significant increase in pre-test, and 1-month and 3-month final test scores of the participants (**Fig. 1**).

Table 1. Demographic data of the participants.

		n=34	%
Age		$\bar{x}$: 37.23±6.1	
Marital status	Single	4	11.8
	Married	30	88.2
Educational level	High school/Associate's degree	11	32.4
	Bachelor's degree	18	52.9
	Master's degree	5	14.7
Years in profession		$\bar{x}$: 15.88	

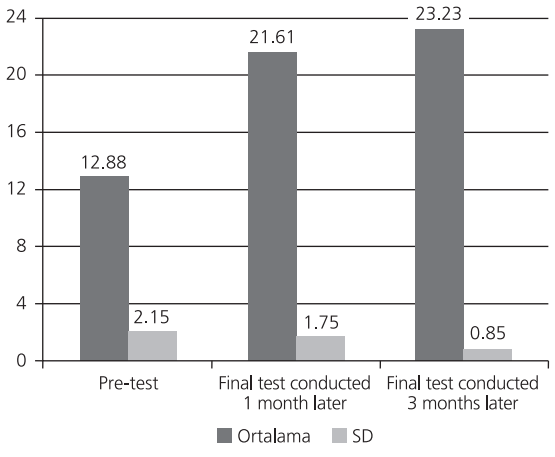

Fig. 1. Mean knowledge score at three different periods.

Table 2. Knowledge comparison of midwives in 3 different time periods (Friedman test).

	n	Mean±SS	p; χ^2
Knowledge before training	34	12.88±2.15	<0.001; 65.786
Knowledge 1 month after training		21.61±1.75	
Knowledge 3 months after training		23.23±0.85	

Table 3. Knowledge comparison of midwives in 3 different time periods (Wilcoxon test with Bonferroni correction).

	Mean±SS	p; Z
Knowledge before training Knowledge 1 month after training	12.88±2.15 21.61±1.75	<0.001; -5.098
Knowledge before training Knowledge 3 months after training	12.88±2.15 23.23±0.85	<0.001; -5.102
Knowledge 1 month after training Knowledge 3 months after training	21.61±1.75 23.23±0.85	<0.001; -4.779

It was assessed by Friedman test whether there is any difference among the knowledge levels of midwives evaluated in 3 different time period as shown in **Table 2**, and it was found that there was a statistically significant difference among the groups (c2=65.786, p=0.000).

Wilcoxon test with Bonferroni correction was used to see which groups have significant difference. As the study had 3 comparisons, the value 0.05/3=0.017 was considered significance level with 95% confidence in paired comparisons.

According to the **Table 3**, mean score of the participants before the training (12.88±2.15) was lower than the mean score 1 month later (21.61±1.75), and the difference of mean knowledge scores before and after the training was statistically significant (p<0.001). Mean score of the participants included in the study before the training (12.88±2.15) was lower than the mean score 3 months after the training (23.61±1.75), and the difference of mean knowledge scores before and after the training was statistically significant (p<0.001). Similarly, mean score 1 month before the training (21.61±1.75) was lower than the mean score 3 months after the training (23.23±0.85), and the difference of mean knowledge scores before and after the training was statistically significant (p<0.001).

The interquartile range data were presented in **Table 4** to determine the direction of differences, and it can be seen in the table that knowledge score value increases as the assessments advance.

Discussion

The structure and function of placenta is important for mother and fetus during pregnancy and in future life of newborn.[7] The transfer of blood from placenta to baby during the period between the delivery of baby and clamping of umbilical cord is defined as "placental transfusion". There are two placental transfusion methods defined to prevent premature anemia. These methods are the delayed cord clamping (DCC) and umbilical cord milking (UCM). Although transfusion volumes by DCC after delivery differ greatly and significantly higher hemoglobin values cannot be reached in many studies, it is recommended to refer DCC method for placental transfusion in premature babies. It was shown that DCC method is applicable, provides improvement in blood pressure at early period and protects against intraventricular hemorrhage and late-onset sepsis at further periods although it does not make a significant hemoglobin or hematocrit difference in premature babies between 24 and 32 weeks.[8]

American Pediatric Association (APA) recommends DCC method during delivery[9] but it reported that DCC method should not be used in all deliveries. If clinical condition of newborn is not appropriate or if urgent resuscitation is needed, UCM is recommended instead of DCC.[10] In recent years, it has been reported by various studies that delaying umbilical cord clamping for 30–45 seconds compared to 2–3 minutes may yield better results. In cases requiring urgent resuscitation, milking the cord towards the baby was tested and found effective.[11] Oliveira et al. highlighted in their study performed with premature babies born less than 2500 g and under 37 weeks (n=555) that umbilical cord clamping at 60th second decreases anemia risk.[12]

The presence of single artery may coexist with some anomalies such as Potter syndrome.[13] Knowing

Table 4. Interquartile range of midwives' knowledge in 3 different time periods.

Assessments	Median	Interquartile range
Pre-test	13.000	3.25
Repeating test 1 month later	22.000	2.25
Repeating test 3 months later	23.000	1

the number of vein and artery in umbilical cord by midwife managing the delivery, establishing early diagnosis on a newborn with single artery and directing to a podiatrist for necessary examinations are very important in terms of baby.

Those who are diagnosed with diabetes during pregestational period are defined as pregestational diabetes mellitus and diabetes developing during pregnancy for the first time is defined as gestational diabetes mellitus. In pregestational diabetes, there is the risk of premature and SGA baby delivery. In gestational diabetes, the number of LGA baby is three times more.[14–16] Knowing the characteristics of baby to be delivered during pregestational and gestational diabetes is significant to identify newborns with risk.

As the part of active management of third phase, two simple maneuvers are performed to help the birth of placenta.[17,18] These maneuvers are fundal pressure (Crede) or controlled traction of cord (Brandt-Andrews). In Crede's maneuver, one hand is placed on the fundus of uterus and fundus is pressed with thumb and other fingers to separate placenta and help the delivery. In Brandt-Andrews maneuver, one hand is placed on lower abdomen and umbilical cord is pulled upwards by maintaining opposite pressure or one hand applies a slight traction on the cord while other hand strokes uterus upwards through symphysis pubis.[19] The midwives had difficulties when matching the definitions of maneuvers and only 41.2% of the midwives defined both maneuvers correctly.

In anomalies such as ablatio placentae, placenta previa and placental attachment, pregnancy process can be managed by antenatal care.[20,21] Gastroschisis and omphalocele are the most common (3/10,000) fetal abdominal wall defects. In gastroschisis, intestines may extend outside of the body on the right of umbilical cord and on the left rarely, and sometimes other intraabdominal organs may extend outside of the body. In omphalocele, there is a herniated sac developing outwards within umbilical cord.[22] Half of the participants could not define these anomalies properly. Midwives who have active roles during delivery should know these anomalies and be able to perform appropriate approach.

The first feces of newborn is called as meconium and defecation is expected within 24–48 hours after delivery.[23] Intrauterine meconium outflow may occur in cases such as placental failure, preeclampsia, oligohydramnios and maternal drug use.[24] Amniotic fluid stained by meconium is seen in 5–24% of normal pregnancies (mean: 13%) (5.1% in preterm, 16.5% in term and 27.1% in postterm), and it is a potential fetal distress indicator.[25] Choi et al. found that the rate of babies born with meconium stain was 10.6% (71/671).[26] Mechanical occlusion in the airways associated with meconium aspiration, surfactant inactivation and respiratory distress syndrome associated with pulmonary hypertension develop.[27] One third of these babies need intubation.[28] The midwives who have a key role in delivery should have sufficient knowledge on newborn resuscitation and first care of baby in delivery room, and should be able to initiate the process effectively and rapidly.

Conclusion

In our study shows that the knowledge of midwives on placenta and umbilical cord is insufficient, and therefore the knowledge of midwives who provide care for pregnant women and newborns should be reinforced. It is possible to reinforce their professional knowledge by in-service and on-the-job trainings after graduation. By the feedbacks received, the midwives stated that they carried out their routine duties by being more aware with the help of training and they updated their current knowledge. We concluded that such trainings can be used to remedy the professional deficiencies.

Conflicts of Interest: No conflicts declared.

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Appendix. Question and information forms

Question Form

Dear participant, the questions below will set light to our practices in delivery rooms and will help us to see theoretical deficiencies in the practices. Thank you for contributing to the reliability and validity of the result obtained by providing individual answers.

1. In term babies, how many days do approximately take for umbilical cord to dry and drop?
   A) 1–2 days B) 2–3 days C) 7–10 days D) 10–15 days
2. There is no difference in the duration of dropping of umbilical cord in term and preterm babies.
   A) True B) False
3. Umbilical cord has 2 arteries and one vein.
   A) True B) False
4. Umbilical cord has both maternal and fetal surfaces.
   A) True B) False
5. There is no problem usually in babies born with umbilical cord having 1 artery and 1 vein; what matters is that there should be at least one for each from two different structures (artery and vein).
   A) True B) False
6. What is the average duration of cord clamping in term baby?
   A) 10–15 sec. B) 15–30 sec. C) 30–60 sec. D) 90–120 sec.
7. When cord is being clamped in preterm babies, cord blood should be milked towards the baby.
   A) True B) False

8. When cord is being clamped in term babies, cord blood should be milked towards the baby.
   A) True B) False
9. Which of the following statements is a condition that should be done before clamping?
   A) The baby is hold at maternal pelvis level, so anemia is prevented in baby.
   B) The baby is hold above the maternal pelvis level, so anemia is prevented in mother.
   C) The baby should be hold at the same level with pelvis.
   D) Clamping should be performed when heartbeat is stopped in umbilical cord.
10. Umbilical cord stained by meconium is an indicator for fetal distress.
    A) True B) False
11. The birth of placenta occurs at the 4th phase of delivery.
    A) True B) False
12. Closure of cervical opening by placenta is called ablatio placentae.
    A) True B) False
13. It is called placenta increta if villi enter into myometrium.
    A) True B) False
14. Which of the following options is the herniation of intraabdominal organs associated with the extension of umbilical cord in fetal umbilicus on abdominal wall?
    A) Omphalocele B) Gastroschisis C) Aged placenta D) Short placenta
15. Which of the following options is the extension of intestines outside of the body from an opening on the side of baby's cord?
    A) Omphalocele B) Gastroschisis C) Aged placenta D) Placenta accreta
16. Baby with omphalocele should be evaluated in terms of chromosomal anomaly.
    A) True B) False
17. Blood transfusion of a newborn is carried out through the umbilicus.
    A) True B) False
18. Select the wrong approach in cord prolapse.
    A) Check cord pulsation
    B) Determine the labor phase of pregnant woman
    C) In the first labor phase of pregnant woman, the hand should be placed on vagina by wearing a non-sterile glove and those coming out should be pushed upwards and moved away from the pelvis in order to decrease the pressure on cord.
    D) If pregnant woman is at the second phase of labor, the delivery should be accelerated by episiotomy, and, if possible, vacuum extraction or forceps.
19. If cord has no pulsation during cord prolapse, it means that the fetus is dead; the safest way for pregnant woman is to carry out delivery by section.
    A) True B) False
20. In order to ease the separation and birth of placenta, one hand pulls umbilical cord downward while the other hand on umbilicus is kept on fundus of uterus for the prevention of uterine inversion. Which of the following options is the definition of this maneuver?
    A) Brandt-Andrews maneuver B) Crede's maneuver
21. In order to ease the separation and birth of placenta, upward traction is applied by hand on abdomen and uterus is protected and supported while the hand below fixes the cord. Which of the following options is the definition of this maneuver?
    A) Brandt-Andrews maneuver B) Crede's maneuver
22. Remaining placenta pieces accelerate uterine involution by increasing uterine contractions.
    A) Correct B) False
23. Babies delivered by women with gestational diabetes are usually macrosomic and their umbilical cords are thick.
    A) Correct B) False
24. Babies delivered by women with pregestational diabetes are usually SGA (small gestational age) and their umbilical cords are thin.
    A) Correct B) False

Information Form

1. Your age: _____
2. Your educational status: ☐ High school / Associate's degree ☐ Bachelor's degree ☐ Master's degree
3. Your title: ☐ Nurse ☐ Midwife
4. Years in profession: _____
5. The clinic you currently work: _____
6. For how many years have you been working at this clinic? _____
7. Your marital status: ☐ Single ☐ Married