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Professional experience of midwives is not sufficient to accurately assess the amount of blood loss during labor

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ABSTRACT

Introduction. Postpartum hemorrhage is still one of the causes of maternal mortality and morbidity. The purpose of investigation was an examination of practical skills in blood loss assessment during labor by midwives.

Aim. To examine the practical skills of midwives that have different professional experience in blood loss assessment during labor.

Materials and methods. A case-control prospective study of labour blood loss volume assessment with the use of a birthing simulator was conducted among midwives from 1 September 2016 to 30 May 2017. Midwives were divided into 2 groups: Group I consisted of midwives who were recent university graduates without professional experience. Group II consisted of midwives with a minimum of two years of professional practice and assistance at more than 1000 births. This was a multicenter study. Outcome measures included visual evaluation of blood loss during simulation scenario.

Results. Average evaluation of blood loss: Group I – 737 ml, Group II – 610 ml ($p = 0.0002$). There were no statistically significant differences between the groups in terms of diagnosing the cause of hemorrhage in the third stage of labor ($p = 0.1503$) neither in terms of identification of hemorrhage after perineal injury ($p = 0.1503$). The examined midwives underestimated blood loss, however the midwives in Group I assessed blood loss statistically better.

Conclusions. Subjective assessment of the amount of blood loss during labor is underestimated. Professional experience does not improve the accuracy of assessment of blood loss volume during labor.

Keywords. delivery, education, postpartum hemorrhage

Introduction

Postpartum hemorrhage is still one of the main causes of maternal mortality and morbidity. It is often the cause of loss of the ovarian reserve and preterm menopause. Development of an action plan and strategy based on rapid assessment of obstetric situation is crucial for the improvement of obstetric outcomes.¹⁻⁵ The practical skill

of identification of changes occurring during labor is the basis for early risk identification. Accurate evaluation of blood loss during labor constitutes the basis for perinatal care model. This type of care is recommended by World Health Organisation (WHO).⁶⁻¹⁵ The problem of validating the practical skills of midwives makes simulation training a tool that is increasingly used for teaching and

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analysing the operations of an obstetric team. Trainings with simulators allow for gaining practical skills and improve the results of perinatal care.¹⁻⁵ Currently, obstetric staff are required to participate in projects aimed at ensuring a normal and safe pregnancy and childbirth. It is only possible when the education and training process is based on the latest medical standards adopted in the world.^{1,3-5,16,17} Nowadays, training with simulators is an important part of medical education, thus it is essential to carry out research and organize thematic workshops in this field. Birthing scenarios including elements of labor pathology are often used in simulation team trainings. Simulation training that mirrors real situations allows for gaining the practical skills required to make quick decisions and undertake specific actions.^{1,3,11,15,18,19}

Aim of the study

The aim of this study was to examine the practical skills of midwives having different professional experience in blood loss assessment during labor.

Materials and methods

This is a case- control prospective study. The study was carried out from 1 September 2016 to 30 May 2017. The study was carried out with the use of the SimMom birthing simulator (ADM 377-02050). It was attended by midwives divided into two groups (Group I and Group II). This was a multicenter study. Participants were recruited from all 4 provincial hospitals in the Podkarpackie province. The number of births in each of these 4 hospitals exceeds 2000 every year.

Inclusion criteria for the groups:

- Group I: Midwives with recent university graduates without professional experience.
- Group II: Midwives with a minimum of two years of professional practice and assistance at more than 1000 births.

We included midwives who were first to respond to an invitation letter. The invitation letter was sent to all 126 midwives in the Podkarpackie province who just graduated with a university diploma without professional practice and to all 187 midwives employed for a minimum of 2 years as a full time employees in those 4 provincial hospitals. The number of births in each of those hospitals exceeds 2000 every year. After years of employment in these hospitals each of the recruited midwives assisted at more than 1000 births.

Exclusion criteria for the groups:

- Previous experience in workshops or training with birthing simulators.

Participation in the research was voluntary. The consent of the Local Bioethics Committee was obtained. The brand validated labor simulation scenario which summarized the case of natural delivery complicated with hemorrhage was used in the study. The participants

were familiarized neither with the scenario nor the clinical diagnosis. The scenario included 3 stages of labor. It contained the following risk factors and disorders:

1. First stage of labor: PROM, secondary uterine adynamia.
2. Second stage of labor: haemorrhage after perineal injury.
3. Third stage of labor: incomplete afterbirth.

In both groups the midwives were supposed to:

1. actively participate in patient care according to the prepared scenario,
2. identify and specify the risk factors of bleeding in the presented case,
3. identify the clinical situation and assess intranatal blood loss.

The assessment of risk factors consisted in the analysis of the presented case study as well as observation and participation in the labor according to the simulation scenario. 800 ml of artificial blood was used to carry out the assessment of blood loss during each simulation. The tool for data collection was SimMom birthing simulator computer system and the procedure was arranged by a brand original birth simulation scenario.

Statistical analysis was performed based on STATISTICA 10.0. The following tests were applied: T-Student test for independent variables or an alternative Mann-Whitney test, which were used to evaluate the differences in the average level of measurable characteristics in two populations, and the Pearson's chi-squared test when variables having qualitative characteristics were used in the analysis. The value of $p < 0.05$ was assumed as the statistical limit level of significance.

Results

The number of recruited subjects to the groups was equal: Group I - 30 midwives and Group II - 30 midwives. The age of the examined midwives in Group I and Group II was statistically significantly different. The midwives with active professional practice over 2 years (Group II) were older ($p=0.0000$).

Table 1. Sociodemographic characteristics of the Groups

Criteria	Group I n. 30	Group II n. 30	p
Average age (years)	23.5	44.5	0.000
Minimum age	21	30	0.001
Maximum age	38	56	0.001
Age standard deviation	3.38	6.9	0.043
Race	white	white	n/a
Sex	female	female	n/a
Education status	University Diploma	University Diploma	n/a

Hemorrhage after perineal injury as a disorder of second stage of labor was well diagnosed by the exam-

ined midwives. The differences between the groups were statistically insignificant ($p = 0.1503$).

Table 2. Identification of second stage of labor disorders

Second stage of labor disorders	Group I	Group II	P
Hemorrhage after perineal injury	30 (100%)	29 (93.3%)	= 0.1503

Table 3. Identification of third stage of labor disorders

Third stage of labor disorders	Group I	Group II	P
Incomplete afterbirth	30 (100%)	30 (100%)	= 0.1503

There were no statistically significant differences ($p = 0.1503$) between the groups in terms of diagnosing the cause of hemorrhage in the third stage of labor. All of the examined midwives stated that the most likely cause of the hemorrhage in the third stage of labor was an incomplete afterbirth.

Table 4. Evaluation of intranatal blood loss

Criteria	Average blood loss (ml)	Minimum blood loss (ml)	Maximum blood loss (ml)	S standard deviation
Group I	737	550	1100	1104
Group I	610	300	850	1138

$p = 0.0002$

Both in Group I and in Group II, the midwives underestimated intranatal blood loss, however, midwives in group I assessed blood loss statistically significantly better ($p = 0.0002$).

Discussion

The presented study shows that assessment of the amount of blood loss during labor is underestimated by midwives. Equally important is the fact that the professional experience of midwives does not improve the accuracy of that assessment. This is a novel finding. Similar works like Dunlop et al. demonstrate low accuracy of visual estimation of intrapartum blood loss.²⁰ The authors conclude that methods that accurately and objectively quantify intrapartum blood loss are needed for clinical and research purposes, but they do not realize that professional experience of medical staff is not one of these methods. It may be surprising that the midwives who had only academic knowledge assess blood loss during labor better than midwives with professional experience (Table 4). Midwives with many years of professional experience underestimated blood loss significantly. It may result from job “routine” that occurs from time to time, and thus from a dangerous underestimation of frequently observed clinical symptoms. This shows a real problem of lack of validat-

ed methods of practical skills training of midwives in blood loss estimation. According to Mbachu et al. periodic education by simulation using clinical scenarios could improve the accuracy of visual blood loss estimation.²¹ The examination presented in this study on the practical skills of midwives with the use of a birthing simulator revealed a significant problem, that is a general underestimation of perinatal blood loss by obstetric staff. This phenomenon seems to increase with years of working in the profession. This is consistent with the studies of Hancock et al.²¹ The authors noted that common underestimation of blood loss during childbirth results in the fact that medical actions are undertaken not as a reaction to blood loss but as a reaction to clinical symptoms caused by blood loss, and thus with a delay. Moreover, the authors emphasize that there is no possibility to teach how to properly evaluate blood loss during labor because it is a function of not only bleeding intensity but also the function of time. It makes this skill one of the most difficult to master by midwives. In an integrative review of literature Hancock et al. concluded that there is little evidence that improvement of maternal outcomes can be achieved through improving the accuracy of blood loss volume measurements.²² The authors request a need for change in the direction of future research to explore these in more detail. Our study is a small part of such research and reveals that professional experience, like years of employment and number of assistance at birthing procedures is not the means to improve the accuracy of blood loss volume measurements during labor. Delayed reaction to excessive blood loss is associated with a higher ratio of complications, including maternal deaths as well as higher treatment costs. According to Lertbunnaphong et al. visual estimation is not optimal for measurement of blood loss during labor and should be withdrawn from standard obstetric practice.²³ Nowadays, training with medical simulators seems to be the best method of learning how to evaluate intranatal blood loss because it is the only way to verify and correct our own errors and mistakes retrospectively. In the long run, the cost of training with birthing simulators can be compensated by lowering the expenses related to the treatment of women who suffered from perinatal bleeding, and what is most important, the safety of those in labor can be increased. Criteria for the diagnosis of hemorrhage are very well known.^{6-12,14-16} Regardless of the definition, we should remember that the actual blood loss assessed visually and subjectively is very difficult and not precise. Frequently, it depends on one’s experience and according to other authors, it accounts for only 30 - 50% of the actual blood loss, which in confrontation with an objective assessment carried out in this study with the use of a birthing simulator allows to conclude that the assessment of the amount of blood lost by women giv-

ing birth with excessive bleeding and perinatal hemorrhage is underestimated.^{10,15,16,24,25} The use of a birthing simulator in the subject study for the assessment of practical professional skills has highlighted the parts of the training that can be mastered during academic education, and those that require many years of practical training. The main limitation of presented study was a small number of participants in the groups, however, their homogeneity allows to present the obtained results. The strength of the study was multicenter recruitment of participants from four different hospitals with different training programs. The advantages of training with the use of simulators are emphasized in the available literature.¹⁷⁻¹⁹ It is noteworthy that all participants were interested in team training with a birthing simulator, both the graduates without professional experience and midwives with many years of work experience. According to Joint Commission on Accreditation of Healthcare Organizations (JCAHO) report, it is recommended to carry out team trainings in cases involving high risk to mothers and fetuses. These actions and activities are aimed at teaching professionals more effective cooperation under stress and time pressure. During the workshops with a simulator, it is possible to analyse the strengths and weaknesses of participants, deepen the knowledge, develop skills and communication in the team. Due to the increasing number of evidence proving that simulation improves teamwork, optimizes care and improves treatment results, American College of Obstetricians and Gynaecologists (ACOG) recommends simulation team trainings. In the opinion of the participants, simulation allows to verify knowledge and skills, and it is undoubtedly the future of medical education. It is consistent with the conclusions of other authors.^{2,3,17-19} Support of superiors, management and academics or favourable conditions for learning are just some of the factors that encourage to implement new educational methods and tools, such as simulation trainings, in the workplace and training centers.

Conclusions

1. Subjective assessment by midwives of the amount of blood loss during labor is underestimated.
2. Professional experience of midwives does not improve the accuracy of assessment of the amount of blood loss during labor.

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