Derleme |Review Article

The Role and Importance of the Use of Simulation in Midwifery Education / *Ebelik Eğitiminde Simülasyon Kullanımının Rolü ve Önemi*

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Öz

Günümüz teknoloji çağında tıp eğitimi içerisinde önemli bir yeri olan simülasyon uygulaması, ebelik eğitiminin de vazgeçilmez unsuru haline gelmiştir. Günümüzde simülasyon eğitimi; servikal dilatasyonun değerlendirilmesi, amniosentez, doğum, makat doğum ve omuz distosisinin yönetimi, umbilikal kord prolapsusu, eklampsi, postpartum kanama, yenidoğanın ilk bakımı ve maternal kardiyak arrest gibi obstetride pek çok durumda yaygın olarak kullanılmaktadır. Önemli bir eğitim stratejisi haline gelmiş olan simülasyon uygulaması; bir duruma ait gerçek koşulları oluşturarak, karşılaşılacak olası riskleri almadan, sanal ya da yapay ortamda kişiye o duruma ait deneyim kazandırarak multidisipliner bir yaklaşımla sağlık becerisini ortaya koymayı amaçlar. Simülasyon uygulamasının; anne ve yenidoğan sağlığının yükseltilmesi, morbidite ve mortalite oranlarının azaltılması ve obstetri alanındaki sağlık profesyonellerinin bilgi ve becerilerinin arttırılması konusundaki yeri ve önemi tartışılmaz bir gerçektir. Simülasyon uygulaması, ebelik eğitiminin daha kapsamlı hale dönüşmesini sağlayarak hasta bakımının gelişmesine ve hasta güvenliğinin artmasına katkı sağlar. Bu yönüyle simülasyon uygulaması, teori ve pratik arasında öğrencilerin öğrenme yeteneklerini kolaylaştırarak ebelik becerilerinin gelişimini destekler. Eğitimde geleneksel yöntemlerin aksine simülasyon uygulaması; ebelik öğrencilerinin multidisipliner ekip anlayışıyla hareket eden, donanımlı, alanında yetkin ve özgüveni yüksek bireyler olarak mezun olmalarına olanak sağlar. Bu derlemenin amacı, ilgili literatür incelenerek ebelik eğitiminde simülasyon kullanımın rolünü ve önemini ortaya koymaktır.

Anahtar kelimeler: Ebelik, Sağlık eğitimi, Simülasyon eğitimi

Abstract

Having an important place in medical education in today's technology age, the practice of simulation has become an indispensable element of midwifery education. Simulation education today is widely applied in many cases such as in obstetrics as evaluation of cervical dilatation, amniocentesis, delivery, breech delivery and management of shoulder dystocia, umbilical cord prolapse, eclampsia, postpartum hemorrhage, first care of the newborn, and maternal cardiac arrest. The simulation application has become an important educational strategy which aims to reveal the health skills with a multidisciplinary approach by creating the real conditions of a situation without taking the possible risks to be encountered, and by providing the person with the experience of that situation in the virtual or artificial environment. The simulation application helps to increase the knowledge and skills of health professionals in the field of obstetrics in order to improve maternal and newborn health and reduce morbidity and mortality rates. The simulation application enables midwifery education to become more comprehensive, resulting in improved patient care and increased patient safety and supports the development of midwifery skills by facilitating students' learning abilities in the intersection of theory and practice. Contrary to traditional methods in education, the application of simulation enables

midwifery students to graduate as individuals who act with the approach of a multidisciplinary team, and who are equipped, competent in their field have high self-confidence. The aim of this review is to examine the relevant literature and to reveal the role and importance of the use of simulation in midwifery education.

Keywords: Health education, Midwifery, Simulation training

1. Introduction

Simulation is described as the imitation of actually existing tasks, intercourses, equipment, attitudes, and a lot of cognitive activities (Göriş, Bilgi & Bayındır, 2014). The simulation is used to provide competence and qualification, in other words, it is a technique or tool designed to create the features of the real world (Edeer & Sarıkaya, 2015). On the other hand, the practice of simulation is defined as an accepted training method in various fields of health with a multidisciplinary approach by reflecting the real events and where one gains experience of that situation virtually or artificially without taking the possible risks to be encountered (Körükcü & Kabukcuoğlu, 2016; Gündoğdu & Dikmen, 2017). The degree of accuracy of the simulators assumes a qualified identity with its psychological structure in addition to its physical structure according to the responses it gives to events, tasks, and the possible ways that are fictionalized in possible situations (Göriş et al., 2014). There is strong evidence that simulators can help practitioners increase group collaboration and communication, critical decision-making skills, and healthcare abilities. Traditional practices are less influential in teaching and assessing the abilities obligatory for multidisciplinary coordination during an emergency. Simulators ensure the team the opportunity to acquire skills and learn through well-designed scenarios involving complex clinical situations (Bracco et al., 2017). The importance of education with simulation for an effective and efficient learning process is undeniable.

The midwifery profession, which has been known since the existence of humanity, has continued its development in parallel with the scientific developments in health and has become a professional discipline that includes science, art, and ethical values (Yıldırım, Koçkanat & Duran, 2014). The midwifery profession aims to protect and increase the health of the whole society, especially women and children, by providing qualified care to women during pregnancy, childbirth, and the postpartum period (Mumcu & Özer, 2020). In Türkiye, midwifery is among the oldest women's professions and became one of the first women's professions acquired through education (Yılmaz & Karanisoğlu, 2016; Karaçam, 2016). Midwifery education in Türkiye started first at the primary school level in the 1800s and continued with health schools, high school, associate degree programs, and undergraduate education from 1996. Today, midwifery education continues to develop with master's (2003) and doctorate (2013) programs (Koçak, Can, Yücel, Akyüz & Turfan, 2017). Midwifery education consists of two parts, theoretical and clinical, which complement each other. Clinical education enables the student to learn by practicing in a real environment. Clinical experiences provide the transformation of theoretical knowledge into practice, psychomotor development, and professional socialization of the student. The active use of simulation in midwifery education provides an environment where students can develop their practice skills before going to the clinic and creates links between theory and practice that facilitate the student's learning ability (Hazar & Gültekin, 2019).

The aim of this review is to examine the relevant literature and to reveal the role and importance of the use of simulation in midwifery education

2. Importance of Simulation in Midwifery Education

Reducing maternal and neonatal mortality has been a global priority for two decades. Efforts in this area have focused on improving infrastructure, training healthcare professionals in the field of obstetrics, and improving emergency obstetric care in settings with limited resources (Fritz, Walker, Cohen, Angeles & Lamadrid-Figueroa, 2017). Obstetrical health services are carried out by a multidisciplinary team

understanding, and decisions are taken jointly under time pressure. Multidisciplinary group education will reduce a lot of errors in obstetric situations (Merién, Van de Ven, Mol, Houterman & Oei, 2010). Birth is generally very safe in the developed world, but not without risk. One in six women in the UK is faced with a potentially life-threatening intrapartum emergency, and one in twelve mothers may experience adverse maternal and neonatal problems. Obstetric complications are conditions that require rapid action by skilled health care providers and obstetricians. Every problem in health care may lead to maternal or fetal mortality and morbidity (Ameh & Broek, 2015). For this reason, simulation-based education for those working in obstetrics is important in terms of allowing rare events to be experienced, learning and applying new procedures, testing skills, and increasing the speed of practice (Fanning & Gaba, 2007).

The majority of obstetric problems cannot be determined previously. It is very important to detect complications in the earliest period and apply the appropriate interventions in the fastest way because it is life-saving (Göncü & Yazıcı, 2016). The obstetric simulation application does not only aim to teach one procedure, but also the etiopathogenesis of the incident and the effectiveness of the techniques used in the management of complications that may develop. Evaluation of cervical dilatation is widely used in simulation training in some obstetric conditions such as amniocentesis, management of delivery, breech delivery, shoulder dystocia, umbilical cord prolapse, eclampsia, preeclampsia, hemorrhage, sepsis, and management of obstetric conditions such as preventing or managing abortion (Göktolga & Demir, 2010; Deering & Rowland, 2013; Ameh & Broek, 2015). Unforeseen, life-threatening incidents in obstetrics can happen at any time, and obstetric care groups may have to make decisions quickly. This may result in medical mistakes. A significant portion of medical errors is related to lack of non-technical abilities such as communication and teamwork. An effective simulation application also allows to reduce of medical errors. In addition, by increasing patient safety, students gain an individual-centered approach suitable for patient rights (Van de Ven et al, 2017; Hazar & Gültekin, 2019).

3. The Place of Simulation in Midwifery Education

Simulation is frequently used and accepted as a very valuable educational tool in the education of healthcare professional students. The use of simulation has been used with various materials and methods from the early periods of history to the present day. Stone carvings from the Fertile Crescent during the Paleolithic period indicate that prehistoric humans placed a special interest in childbirth. The archaeological record shows that the ancestors to the Siberian Mansai people produced scale leather birth models of women. Presumably these were used in rituals and to teach the maneuvers of assisted birth (Macedonia, Gherman & Satin, 2003). Use of simulation was the use of small wax or wooden figures to illustrate reproductive processes of childbirth dates back to the 9th century (Gardner & Raemer, 2008). The simulation was used in obstetrics in the 16th century on plastic models called 'phantoms' to improve obstetric skills in order to reduce maternal and infant mortality. Madame de Coudray (1712-1789), a royal midwife, was the first to use the detailed and instructive birth simulator (Edeer & Sarıkaya, 2015; Güven & Akyol, 2015; Maskálová, Urbanová, Bašková & Kvaltínyová, 2018).

In early 18th century in Paris, Gregoire was an influential chirurgien-accoucheur (surgeon-midwife), simulated deliveries using a human pelvis, a leather and basketwork uterus, and a real foetus, often in some state of decay (Nott & Harris, 2020). Explaining the birth process with wax and wooden figures was first applied in the 19th century (Göktolga & Demir, 2010). Use of obstetric simulators increased in the 19th century, and an industry developed in Europe to produce them. The earliest simulators had been made around actual pelvic bones, but the more modern versions had wood or iron frames. The fetal part of these simulators was frequently a preserved cadaver (Owen & Pelosi, 2013). The first reported computer-controlled patient simulator, SimOne, was created by Denson and Abrahamson in the late 1960s. The transition to the use of realistic, full-size interactive birthing simulators took place in the 1970s, but a commercially-viable option was not available until the 1990s, when a mechanical female birthing system was created (Clark, Fisher, Arafeh & Druzin, 2010). In the last ten years, simulation has

become an important educational strategy in the developing of midwifery abilities (Durmaz, Elem, Unutkan & Keskin, 2017).

Figure 1: Simulator of Madame de Coudray (Lepage, Cosson, Mayeur, Brieu & Rubod, 2016).

Simulation practice in obstetrics is developing, and has become an important element of medical education (Kurupa, Matei & Rayb, 2017). The diversity of personnel in the obstetrics field makes multidisciplinary teamwork and training a necessity (Goffman, Lee & Bernstein, 2013). Simulation application is supplementary component of midwifery education and an indispensable factor in order to improve students' information and capability, ensuring patient safety, and experiencing different cases that seldom occur in clinical situations (Tavşanlı et al., 2018). Contrary to standard clinical training, simulation-based learning contributes to midwifery students accepting a leadership role in emergencies (Öztürk, Sayıner & Çelik, 2018).

Figure 2: Postpartum hemorrhage simulation-based team training (Clark et al., 2010).

A simulator that shows students the procedures, decision-making processes and critical thinking that mimics the reality of the clinical environment is an important component of midwifery education (Jeffries, 2005). Using simulation in midwifery practices allows students to practice and improve themselves many times before encountering pregnant, puerperal and newborn in real life (Çalım & Öztürk, 2018). In obstetric simulation training, it is aimed to improve the abilities of service providers by focusing on a high-risk situation (Phipps et al., 2012). In the last 5 years, with the addition of computer-based birth simulators to the simulation techniques used in the development of psychomotor and cognitive abilities of midwifery students, the quality of abilities training, students' satisfaction with education, and their self-confidence have increased considerably (Çalım & Öztürk, 2018).

Acquisition of abilities in midwifery has evolved from the incidental or traditional 'apprenticeship' learning method to an approach that encompasses highly authentic learning experiences using simulation (Catling et al., 2016). While simulation was used only for skill training of students in the early days, today it also contributes to the development of skills in the affective field (Karabacak & Uğur, 2019). In this respect, simulation causes both the improvement of health care and patient safety, leading to a more comprehensive midwifery education (Uslusoy, 2018). Learning with simulation enables midwifery students to increase their sense of self-efficacy, confidence and satisfaction, allowing them to practice in a safe environment without fear of making mistakes on patients (Lendahls & Oscarsson, 2017).

When we evaluate midwifery in terms of both mother's and baby's life, the contribution of birth simulators in ensuring the safety of pregnant women, newborns and midwives is undeniable (Öztürk et al., 2018). In addition, studies have shown that simulation training raises awareness about the importance of teamwork and communication. Simulation practice creates connections between theory and practice that facilitate students' learning abilities by supporting the development of midwifery skills (Lendahls & Oscarsson, 2017). As an education method, simulation is interactive and based on learning by doing, and can be used in the education of students with all simulation types from simple to complex (Akalın & Şahin, 2019). Midwifery students can both make critical observations and learn clinical reasoning and decision-making processes by developing their technical, communication and behavioral skills with simulation applications (Fonseca et al., 2020).

4. The Effect of the Use of Simulation on Midwifery Students

Simulation education, which is a strong and evidence-based learning method in the field of health care, is one of the most common teaching methods in teaching midwifery skills (Bingöl, Bal, Karakoç & Aslan, 2020). Simulation-based training has proved to be an effective teaching and learning approach in midwifery education (Cooper et al., 2012). Simulation applications have important educational feature in improving the performance of students in practice environments, as it allows the implementation of mistakes that can be made before they are subjected to the maintenance application, without harming themselves and others, to think deeply about the mistake and to determine new strategies for success (Fonseca et al., 2020).

Figure 3: Vaginal delivery simulation in the Obstetrics (Nitsche, Morris, Shumard & Akoma, 2015).

Training is provided for the development of midwifery students in many subjects such as shoulder dystocia, vaginal examination, postpartum hemorrhage, vaginal delivery, newborn and maternal resuscitation, newborn first care, breastfeeding, umbilical cord prolapse, preeclampsia, eclampsia, episiotomy. In Türkiye interventions for various obstetric conditions, especially delivery, are explained to students with various simulation applications including innovative applications such as patient models reflecting high-level reality from simple models, computer-aided simulation, virtual reality, standardized patients, simulation training packages prepared based on patient scenarios. Today delivery simulators can use for various scenarios such as umbilical cord prolapse, shoulder dystocia, vaginal tapping, clamping of the umbilical cord, vaginal breech delivery, vaginal twin birth, as well as vaginal birth with the developing technology (Uslusoy, 2018; Satin, 2018; Frenken, Wit-Zuurendonk, Easter, Goossens & Oei, 2020; Kahraman, Aytekin & Çetin, 2022).

Figure 4: Simulation of posterior arm delivery during shoulder dystocia (Shaddeau & Deering, 2016).

Studies report that midwifery students' skills and knowledge levels improve with repeated applications, they find the opportunity to review their practices and become stronger with feedback, and accordingly their self-confidence increases and the opportunity to repeat the practice provided by the simulation education supports positively (Bingöl et al., 2020). There are many studies on this subject in the literature in Türkiye. In their research, Öztürk and colleagues found that students considered the computer-based simulator application as "useful, realistic, guiding, fun, good, permanent, funny, educative, constructive, efficient, essential, providing experience, increasing aplomb, marvelous, thrilling, influential education, reducing fears, a different emotion and an excellent chance" (Öztürk et al., 2018). In the study by Bingöl and colleagues conducted with a high-level simulator accompanied by scenarios, it was determined that the students' hand skills improved, their sense of professional belonging and self-confidence increased (Bingöl et al., 2020). In the study of Tavşanlı and colleagues, a statistically important distinction was found between the three classes of responses by which the effectiveness of simulation-based education was evaluated, specifically between the statements "The use of simulation practice helped me understand health care and treatment better" and "Evaluation and team work were valuable" ($p<0.05$) (Tavşanlı et al., 2018). Mete and colleagues found that students' personal control and problem-solving skills increased after the use of simulation practice in the vocational skills laboratory (Mete et al., 2017). According to the study by Karahan and colleagues, the students were satisfied with the training provided with a high-fidelity patient simulator and that the simulation training was effective in the development of aplomb (Karahan, Çelik, Tank & Göğüş, 2019). Özçoban and colleagues in their study found that three-quarters of the students (73.6%) state that they prefer clinical practice skills to be done in a virtual environment using scenario/computer and model (simulation) (Özçoban et al., 2021).

Midwives need to acquire clinical skills and professional standards during their studies so that they will be able to serve in the midwifery profession (Tarrahi, Kianpour, Ghasemi & Mohamadirizi, 2022). There are many international studies that reveal the benefits of use of simulation in the education of midwifery students. According to the study of Vermeulen and colleagues, students were satisfied with the simulation-based training, experiencing it as providing added value to their education. Simulations gave them the opportunity to make and learn from mistakes in a safe learning environment (Vermeulen et al., 2021). In their research, Crowe and colleagues showed that there was a statistically significant increase in the level of aplomb and knowledge in nurses who practiced simulation during the 3 month follow-up term (Crowe, Ewart & Derman, 2018). Simulation application and video teaching techniques were compared and information, aplomb and cortisol levels were evaluated between the two groups by Lee and colleagues in their study. The knowledge and self-confidence points of the students in the experimental group with higher cortisol levels during the simulation application were found to be remarkably higher than those of the control group students. It was also found that the self-confidence of students who had last simulation experience was higher (Lee, Park, Kim & Han, 2016). In their research, Reynolds and colleagues showed that after the simulation application, the knowledge and satisfaction levels of midwifery students about birth and shoulder dystocia were higher than the control group (Reynolds, Ayres-de-Campos, Pereira-Cavaleiro & Ferreira-Bastos, 2010). According to the study of Andrigetti and colleagues, high-quality simulations significantly increased students' self-confidence in managing complications related to shoulder dystocia and postpartum hemorrhage (Andrighetti, Knestrick, Marowitz, Martin & Engstrom, 2012).

5. Conclusion and Recommendations

From the first time it was used in medicine to the present day, the application of simulation has developed, differentiated and become widespread with the development of technology. The simulation application enables midwifery education to become more comprehensive, facilitating students' learning abilities between theory and practice and supporting the development of midwifery skills. Simulation applications play an important role in developing midwifery students to become well-equipped, highly

motivated, experienced and self-confident individuals with a multidisciplinary team approach. It is important to use simulation application intensively in parallel with technological developments to increase patient safety, maternal, and newborn health and improve care with competent midwives, reduce morbidity and mortality rates.

Declarations:

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