

Perspective of midwives working at hospitals affiliated to the Isfahan University of Medical Sciences regarding medical errors

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ABSTRACT

Background: Committing an error is part of the human nature. No health care provider, despite the mastery of their skills, is immune from committing it. Medical error in the labor and obstetrics wards as well as other health units is inevitable and reduces the quality of health care, leading to accident. Sometimes these events, like the death of mother, fetus, and newborn, would be beyond repair. The purpose of this study was to investigate the perspective of gynecological ward providers about medical errors.

Materials and Methods: This was a descriptive–analytical study. Sample size was 94 participants selected using census sampling. The study population included all midwives of four hospitals (Al-Zahra, Beheshti, Isa Ben Maryam, and Amin). Data were collected by a self-administered questionnaire and analyzed using SPSS software.

Results: This study shows that three factors (human, structural, and managerial) have affected medical errors in the labor and obstetrics wards. From the midwifery perspective, human factors were the most important factors with an average score of 73.26% and the lowest score was related to structural factors with an average score of 65.36%. Intervention strategies to reduce errors, service training program tailored to the needs of the service provider, distribution of the tasks at different levels, and attempts to reform the system instead of punishing the wrongdoer were set in priority list.

Conclusions: Based on the results of this study on the perspectives of participants, among the three factors of medical errors (human factors, structural factors, and management factors), human factors are the biggest threat in committing medical errors. Modification in the pattern of teaching by the midwifery professors and their presence in the hospitals, creating a no-blame culture, and sharing of alerts in medical errors are among appropriate actions in the dimensions of human, structural, and managerial factors.

Key words: Health services, Iran, medical errors, midwives

INTRODUCTION

Error is an inevitable and constant threat in working with patients.^[1] It is harmful and in some cases, non-repairable for patient safety.^[2] Healthcare system involves numerous individuals, equipments, and various hardware and software. These vast interactions

make the healthcare systems vulnerable against occurrence of medical errors.^[3] This shows that medical error is an important challenge in the healthcare system of every country in the world.^[4]

Like other healthcare units, errors are inevitable in obstetrics and gynecology as well. It leads to accidents, by reducing the quality of health care. Events such as death of the mother, fetus, or the baby would be irrecoverable. According to WHO statistics, every day, about 800 women die from preventable causes related to pregnancy. A further 99% of all maternal deaths occur in developing countries.^[5]

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When an event occurs, no matter who is at fault, it is important to know how the events occur in the system. We should look for weaknesses in the system that provide the setting for the occurrence of error.^[6] So, the first way to reduce medical errors is assessment of the predisposing causes.^[7] Also, identification of the causes of medical errors is of particular importance.^[8] Therefore, approaches to prevent medical errors are among the main items in creating, deploying, and applying management systems in organizations. This approach increases patient safety and efficacy in clinical services. In other words, it reduces the morbidity and mortality due to error. Also, by preventing the occurrence of error, we can expect less hospitalization, less medication and medical intervention due to medical complications, and less treatment costs.^[6]

Health system error is multi-factorial in nature. Humanistic, systemic, instrumental, and process factors contribute to the errors. Management of these factors can reduce the occurrence of errors in the system.^[3] In his research, Delphan states that multiple types of tasks, long working hours, poor working conditions, similarity in appearance of medications, and working in the night shift are the reasons for professional errors. Improper use of tools and equipment for medical treatment by the medical team including physician or other medical team members accounts for health costs in most of the medical centers. Research shows that 20–30% of medical errors are caused by improper use of medical equipment.^[9] Factors related to the medical team are among other influencing factors in medical errors. Delphan identified the best way to prevent medical errors as coordinated activity of a health system, including doctors, pharmacists, nurses, and midwives.^[9]

Millennium Development Goals consist of eight goals, two of them aimed at reducing child mortality rate and improvement in maternal health. Maternal and child mortality is a most important health indicator and is among the most important community development indicators. Its reduction is a major commitment of most of the countries.^[5] As a member of the healthcare team, midwives are effective factors to reduce maternal and infant mortality. The healthcare system duties of midwives include: Holding labor and postpartum classes in accordance with the protocol of the Ministry of Health and Medical Education, monthly and weekly assessment of fetal and maternal health care, screening for high-risk pregnancies, consultation with other physicians or obstetricians when necessary, postnatal care for normal and high-risk pregnancies or abortions, and referral to a specialist in emergency cases. Perspectives of midwives could be effective in examining the factors associated with medical errors in the above-mentioned wards since

these are people who run these wards and provide medical care for both mothers and babies. Given the importance of the medical errors in obstetrics and gynecology department and their impact on maternal and infant mortality, as well as the high cost of these errors on the healthcare system, and due to the psychological damage caused by errors to the patients and medical staff, it is necessary to examine the factors associated with these errors. Therefore, the main objective of this study was to determine the views of midwives of obstetrics and gynecology department of Isfahan hospital related to the underlying causes of medical errors and identifying the best methods for reducing and eliminating these errors.

MATERIALS AND METHODS

In this descriptive–analytical study, three kinds of factors associated with medical errors and midwifery, including structural, managerial, and human factors, were checked to determine the relationship of these factors with the occurrence of the error specified in the obstetrics and gynecology department. The study population consisted of midwives working in the following Isfahan hospitals: Al-Zahra, Shahid Beheshti, Amin, and Isa ben Maryam.

These hospitals have obstetrics and gynecology and postpartum wards. Due to the limited number of samples, we used census sampling method. The study population comprised all midwives in the maternity wards, and postnatal, labor, and hospital emergency rooms in the above-mentioned hospitals. A self-made questionnaire was used for data collection, which had two sections. The first section collected data on demographic and occupational information including age, sex, education, shift work, employment, work experience, and place of employment. The second part was related to the factors associated with medical errors, which consisted of 40 questions, including 15 questions related to human factors, 8 questions related to structural factors, and 17 questions related to managerial factors associated with failure from the perspective of employees. Questions were scored based on Likert scale from very high (score 5) to very low (score 1). To assess the validity of the method, we called for expert judgment. After applying the ideas of the professors to determine the reliability of the revised questionnaire, it was handed to 10 people from the study population in two hospitals of Al-Zahra and Amin. Then the questionnaires were handed to them 1 week later. Correlations between the two questionnaires were 80% and reliability of the questionnaire was confirmed. Before offering questionnaires to the subjects, the questionnaire was explained in detail. After obtaining verbal informed consent to participate in the study from qualified personnel, demographic characteristics of the

participants were recorded. Data were entered into SPSS Version 16. The *t*-test (one-sample statistics) was used to find the mean scores of medical errors from the perspective of the studied population. Then we used analysis of variance (ANOVA) for comparison of quantitative variables with more than two modes affecting errors, as well as for comparison of the three factors associated with errors and for examining the relationship between these factors.

Ethical considerations

The study was approved by the Ethics Committee, Isfahan University of Medical Sciences, Isfahan, Iran.

RESULTS

Of the 100 questionnaires distributed in this study, 94 questionnaires were completed and analyzed. Based on the results of the analysis of data collected from 94 research units, 94.44% of the subjects had bachelor's degree. All participants in this study were female.

The average work experience of the subjects was 13.6 years and most of the subjects had less than 15 years of working experience. In terms of employment, nearly half of them were regular employees. The level of education of the study subjects is shown in Table 1.

Table 2 shows the underlying causes of error. The findings showed that from the perspective of the study participants, the mean score of factors affecting the incidence of medical errors in all areas of intermediate (50) was significantly greater than others ($P < 0.001$). From the perspective of participants, 73.105% of medical errors were due to human factors.

Table 1: Level of education in the study subjects

Education	Frequency	Percent
Associate degree	5	5.55
Bachelor's degree	85	94.44
Master of science	4	4.44
	94	100

Table 2: Average score of 100 factors affecting the incidence of medical errors from the perspective of midwives

Factors affecting medical errors	Average	SD	One-way ANOVA	
			F	P value
Midwife				
Human factors	73.105	16.2	0.414	0.66
Structural factors	64.24	19.06	1.362	0.26
Managerial factors	68.78	14.24	1.172	0.314
Total	69.49	13.56	0.868	0.423

SD: Standard deviation, ANOVA: Analysis of variance

Subjects responded to all questions in the field of human factors except Question 11 (status of the person providing the service), for which over 50% had chosen high and very high scores. This view shows the importance of human factors in errors. In response to the impact and importance of "responsibility and accountability" in human factors, 86% of the subjects chose high or very high. The highest average score of 5 (4.30) was related to this question. In the structural factors, the research findings showed that the ratio of gynecologist to the client, proper design of the physical space for the midwives' better supervision, adequate and safe equipment, enough space of the workplace, physical situations (in terms of light, noise, land, etc.), arrangements of equipments, midwife to patient ratio, resident patient ratio, and hospital funding were the most important structural parameters associated with errors in the gynecological ward. The findings also showed that from the perspective of participants, appropriate midwifery workplace, for executive training, intervention strategies to reduce errors, service training program tailored to the needs of the service provider, distribution of the tasks at different levels, and attempts to reform the system instead of punishing the wrongdoer were set in the priority list. Therefore, implementation of the lessons learned by training expert midwives was an important management parameter.

DISCUSSION

In recent years, several studies on medical errors are ongoing due to the effects of these errors on mortality, increased morbidity, and treatment costs and country's economy. This study aims to investigate the views of midwives on the underlying causes of medical errors.

In this study, we presented a comparison of the incidence of medical errors from the perspective of 94 participants. It showed that in the Department of Obstetrics and Gynecology, "human factor" is the most important one. Cong Pham *et al.* consider human factor as the most important factor of medication errors.^[10] Kongnyuy in his study states that human factor is one of the factors leading to maternal mortality.^[11] The results of this study indicate that there was a significant relationship between age and work experience in the perspective of the participants. With an increase in age, their experience increases which reduces the error. The results of the study by Shamsaii *et al.* show that there is no significant difference between age groups and committing a medical error ($P \geq 0.05$).^[12] Dabbagh in his study concluded that health system errors have a multi-factorial nature. In other words, human factors, systemic factors, instrumental factors (equipment), and process variables are effective in committing the error.^[3] Based on the results of this study, human factors,

management factors, and structural factors are effective in committing error in their order of importance.

The average rating of factors affecting the incidence of medical errors in the fields of human factors, structural factors, and management factors are $P = 0.66$, $P = 0.26$, and $P = 0.31$, respectively. The results of the study conducted by Keikavoosi Arani have demonstrated the multi-factorial nature of the errors and that the most important element is related to the service provider.^[13] The viewpoints of the subjects in this study in the field of human factors suggest that apart from the status of the service provider, other variables have a significant effect on errors (over 50%). Lack of knowledge and skills and lack of ability to properly assess the patient's position and to take accurate and timely decisions endangers patient safety. Poor psychological condition, lack of accountability, and the service provider acting emotionally would endanger the recipients. Constant fatigue due to day and night performance of healthcare systems has created a great problem for the service providers. Lack of accountability and lack of coordination with other members of the treatment team have put the patient safety at risk, causing medical errors. This could lead to an accident that is impossible to compensate. Nekoe *et al.* also concluded that sleep deprivation and fatigue have a great effect on the daily events and professional errors such as giving wrong medication to the patients.^[14] Attieh Muhammad in his article reported that errors could be due to poor training of professionals, staff overwork and stress, unbalanced staff patient ratio, and lack of teamwork.^[15] The findings show that serving as a team, from the perspective of employees, is important in the quality of services provided and has a significant effect in preventing errors (over 50%). van de Ven *et al.* in their study showed that if the care is well coordinated, many avoidable deaths and complications can be reduced in the hospitals. Hospital patients are treated by an interdisciplinary team of different disciplines. To avoid communication errors, it is important that the focus of education be on the team. Team training is helpful in order to avoid these errors. Training the team provides a background in which nurses, midwives, obstetricians, and psychiatrists work together.^[16] According to a study by Blickensobrfer, cooperation and mutual understanding between physicians and nurses increases patient satisfaction, reduce costs, improves patient care, enhances productivity, and reduces errors.^[17] The points of view on structural factors showed that the most important factor is "the ratio of obstetrician to client." Results also showed that adequate and safe equipment, equipment layout, physical space, space design, ratio of midwives to patients, and hospital budgets are effective factors in errors. In our study, workplace was a known factor in medical errors. Anousheh *et al.* also refer to the environment as

one of the underlying factors.^[18] Controlling the risks in the workplace where patients are treated and care providers operate requires planning about the space and physical environment. To support effective clinical environment, adequate space away from any noise is required. Dabbagh *et al.* consider medical services consist of numerous people, equipment, and hardware and software knowledge. They think that the extent of its engagement is the underlying cause of damage to health systems due to medical errors.^[3] The results of the study of Darabi indicate that patient overcrowding, lack of expertise, and lack of supervision in hospitals are involved in the occurrence of failures of the medical team.^[2] Inappropriate physical environment also raises the possibility of professional errors, especially errors in medication. Reducing the stress and anxiety of nurses through modification of the physical environment has a significant impact on the health and efficiency of employees.^[15] The results of assessing the perspectives in the field of management showed that appropriate working situations for midwifery personnel could implement the lessons learned and was the most important management parameter. From the perspective of midwives, human resources in this field are not deployed properly.

Based on the findings of this study, to achieve health goals, specialized training is effective and appropriate to the needs of the service provider. Kongnyuy also concluded that adequate trained personnel are an important factor and result in reducing maternal mortality errors.^[11] Valizadeh and Zand showed that errors indicate the need to re-train their staff.^[19,20] The study by Delphan showed that training of medical error topics in their educational courses is necessary for medical groups.^[9] Maternal and neonatal mortality rate is an indicator of development in different countries and hospitals and health centers. In the hospitals and department of obstetrics, women's health is considered as an important task in their development. Thus, the person providing the service should be required to accomplish this mission, as they are directly involved in the care and treatment of mother and infant. Therefore, whatever they are trained for will make them responsible and their knowledge would be transformed into the right decision to take action and the possibility of the errors will be reduced.

CONCLUSION

From the perspective of participants, based on the results of this study, among the three factors of medical errors (human factors, structural factors, and management factors), human factors are the biggest threat in committing medical errors. Caregivers who are not accountable for their actions endanger patient safety. The person who is not fully alert due to fatigue or illness may cause serious harm to the

mother and baby. Failure to identify the correct position, lack of communication skills and interaction with the patient, and lack of motivation and skill may endanger patient safety.

According to the results of a study on the causes of errors in the dimensions of human, structural, and administrative, attention to staff training is recommended, because in this study, from the perspective of midwives, lack of adequate training led to a large proportion of the errors related to the untrained staff. Organizing training courses related to midwifery, encouraging midwives to enhance motivation in them, collection of personal experiences, transfer of knowledge to the young employees in the system, making team cooperation protocols, and identifying a qualified leader or supervisor for the treatment team as well as training teamwork to staff for the purpose of coordination of activities in the medical team are the strategies that could be used to further reduce the medical malpractice and have a positive effect in the clinical environment. Modification in the pattern of teaching by the midwifery professors and their presence in the hospitals, creating a no-blame culture, and sharing of alerts in medical errors are among appropriate actions in the dimensions of human, structural, and managerial factors.

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