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Improving service delivery using the self-reporting of errors by midwives and midwifery student

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Abstract:

INTRODUCTION: Reporting medical errors is one of the common methods for identifying and preventing mistakes in-hospital care. This study was conducted to identify the status of reporting and related factors in two groups of midwives and midwifery students.

METHODOLOGY: This research was analytic correlational; it was conducted among all the midwives working in the midwifery and labor departments and midwifery students in Isfahan University of Medical Sciences. The data collection tool included a checklist of errors and the researcher-construed questionnaires of awareness and attitude toward reporting errors. The results were examined using descriptive and inferential statistics (ANOVA, Pearson and Spearman correlation coefficient, and independent *t*-test) by SPSS software version 20.

RESULTS: In this research, the error reporting in midwifery staff was 79.1% and the most frequent error was related to the patient's process of testing; the error reporting among the students was 90% and the most frequent error occurred in the labor processes. The present study also showed that there was a direct relationship between awareness and attitude toward reporting medical errors ($P < 0.001$), while there was not a significant relationship between the midwifery students' awareness and attitude toward reporting the medical errors ($P = 0.31$).

CONCLUSION: According to the study, hospital midwives reporting is less than midwifery students. Accordingly, it is recommended to focus on the error and risk management committee to strengthen the reporting system.

Keywords:

Attitude, awareness, medical error, midwife, midwifery students, reporting

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Introduction

A medical error is defined as a failure in a planned operation or using a wrong plan to achieve a specified goal.[1] The American Medical Institute has defined adverse events and medical error as a failure in the full implementation of planned measures and/or the use of a wrong method to achieve a goal[2] whose causes, in most cases, are very complicated and yet completely unknown. Accordingly, the reduction of medical errors as one of the main pillars of clinical governance is important in risk management and should be included in the list of the most important causes of mortality in the world.[3]

The results of the studies have shown that various factors such as human (knowledge and performance), technical and equipment factors, conditions of care environment, factors related to patients, organizational factors (policies and regulations), and the noncoordination of the care team are effective in creating Medical errors.[4] Among these causes, human factors or medical personnel errors are one of the most common factors in causing errors in the health systems;[5] they are examples of human error and safety

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threats as some human causes, medication mistakes as the result of job fatigue.[6]

Midwifery services have been also complicated by the increasing complexity of the reproductive health care process that results from the advancement of knowledge and technology; in fact, the best and most appropriate care, based on the professional definition and standard, has become more difficult. This has caused one of the problems of midwives in occupational activities and provided the basis for irreparable mistakes,[7] which like other medical errors, are one of the major challenges of the health system in all countries.[8]

The most important mistakes made by women doctors and midwives, causing complaints proposed by patients and their families, are those which lead to deaths or complications in pregnant mothers or children; they are always considered by the managers of the health system. Health indices related to the death of mothers and children are regarded as one of the most important indices of development in the society so that its reduction is an important obligation of the countries.[9]

Director-General of the Family Health and Population Department of the Ministry of Health has announced that 78% of the death of mothers occur in the first 24–48 h of childbirth, and 60% of these deaths have occurred due to medical and obstetric errors; this indicates the creation of this type of death due to the agents of health services.

In addition to irreparable damage to families, the death of mothers can also cause many difficulties for the midwives and doctors.[10] It is noted that, even if it is established in the court that the doctor or midwife is not guilty, the patient's litigation process makes a degree of stress and emotional trauma that causes their difficulty to return to their usual treatment.[11] In some cases, these midwives and doctors have defensive performances, like changes in patient screening, reduction of services to endangered patients, adoption of a high-risk management criterion, frequent counseling, and subsequently, the creation of high costs for patients and ultimately therapeutic constraints. Therefore, the consequences of failures subsequent complaints can affect the providers and recipients of the service, and thus expose the health system to a change.[12]

Because of the high sensitivity of service provision in the profession, the midwifery errors can lead midwifery administrators, even from the postgraduate course, to work-related stress. During the period of studies, the midwifery students will be responsible for providing services to the patient from the beginning. These people, in addition to identifying high-risk cases, carry out childbirth processes, provide care of pregnant mothers before, during and after pregnancy, and record the reports of these processes,[13] so it is possible the occurrence of risk or error due to their direct exposure to the relevant processes. However, according to what has been said, the healthcare is unavoidably associated with an increased risk for the patient, since, based on the belief that man is fallible, no one has been found innocent and no absolute immunity is possible. However on the contrary, the patients also have the right to receive services with the best possible conditions and standards and achieve their satisfaction during treatment processes, so coping strategies to minimize errors should be identified to reduce the errors of the owners of the medical profession.[14]

The results of a study conducted by Waters *et al*. showed that most of the mistakes made in the health care system are not recognized because they are not reported, and this is one of the greatest health system concerns.[15] Recently the management of clinical errors has been considered an important component of hospital management. Reducing errors in hospitals is regarded as a necessity to improve the quality of healthcare, improve communication between hospital staff and patients, and reduce patient complaints.[16] Reporting medical error has been known as one of the important factors in controlling and managing the prevention of medical errors.

Researches show that the disclosure of errors is unusual, and from between four errors, only one error revealed. Many providers who have made mistakes remain silent due to fear of litigation; despite being silent and not exposing the error, they acknowledge the error reporting and improvement of the treatment process as a result of reporting because they believe that the concealment and silence reduce the awareness of future generations of error.[1] Factors affecting the lack of reporting in our country are fear of management factors or fear of reporting consequences due to inadequate awareness of these processes.[17] As in most cases after the error report, the first step is to punish the faulty person as the most obvious consequence of the fear of being punished and subsequently not reporting errors; while if a system is designed to change the nonreporting mode to the volunteer reporting culture, we can improve the prevention of errors.[18]

The results of the study done by Hesari *et al*. regarding the reporting of drug mistakes showed that in the area of fear of management factors, the option of (the focus of the authorities only on the mistaking person, regardless of other factors involved in the mistakes) and in the field of fear of consequences of reporting, the option of (fear of judicial issues), lead to a negative attitude of employees towards reporting the error.[17] In a study conducted in the United States, the five factors were also identified as

effective factors in reporting medical errors, including the consequences of reporting, damage to the nature of the job, lack of information and knowledge in this regard, organizational factors, and fear.[19] Finally, Chianng *et al*. have also shown that reporting errors can be increased with the support of managers from the persons who report the error and training to personnel about the objectives of the error report.[20]

Currently, the assessment and accreditation system in health centers again has emphasized on reporting the failure and sharing errors or lessons learned from the errors, and has known this as an integral part of the therapeutic activities; but it seems that still it has remained unimportant, due to the lack of a systemic approach to problem-solving by the same system.[14] It is also evidenced by a review of maternal deaths. By studying these incidents, we are aware of similar occurrences of errors in the same conditions; one of the main reasons can be the lack of attention to previous mistakes and their refusal by the treatment team or inappropriate analysis of errors by authorities, despite the reports provided by the personnel. It seems that what can make the midwifery's reluctance to report errors is the concern of these individuals about the hospital management system and the likelihood of confronting the unconventional clinical environment after expressing the facts about the occurrence of errors; what causes the lack of interpretation or inappropriate interpretation of the error after reporting is the weakness of the authorities in promoting health services, because reporting errors, in addition to preventing more serious damage to patients suffering from errors, can be considered as a valuable source of information that leads to an increase in people's awareness and avoidance of similar errors.

Identifying the culture of reporting errors is mandatory, even for college students. As previously mentioned, the midwifery students are experiencing major concerns, particularly during childbirth, due to their continued exposure to pregnant mothers who are considered as the health indices; sometimes, this makes them prone to emotional disturbances and, subsequently to failure. Promotion of this approach, which institutionalizes it during the study, can increase the sense of responsibility in addition to strengthening critical thinking, self-confidence and readiness to confront incidents; because the universities are the source of changes in the society in different fields, and the students are the main pillars of the university, the main body of organizations and various organs of society. These people will be responsible for providing, maintaining, and improving the health of the society, and hence, they must be scientifically trained to be able to play their role as an educated and specialist force throughout their years of work.

In this study, the status of error reporting is identified between two groups of midwives and midwifery students who conduct the initial screening for maternal health. By presenting these results to the two deputies of treatment and education, the improvement of maternal health decisions should be made by these policymakers. The comparison of self-reporting of errors and types of errors due to the greater focus on the relevant deputy for correction.

Therefore, this study was conducted to identify the status of reporting and related factors in two groups of midwives and midwifery students.

Methodology

The present research was a descriptive-correlational study. The data collection was done to be cross-sectional, with the number 394,271 approved by Isfahan University of Medical Sciences in Iran. It was also a single-step, two-group, and multivariate research. Data were collected in the field from among two groups of midwives working in hospitals affiliated to Isfahan University of Medical Sciences and midwifery students. Regarding that, the data have been gathered only once from the units understudy, our research is a one-step study. The population of this study included all midwives working in educational and therapeutic hospitals affiliated to Isfahan University of Medical Sciences (Hospitals of Isa Bin Maryam, Beheshti, Alzahra, Amin) and the undergraduate students in the field affiliated to Azad Universities (Khorasgan, Najaf Abad and Falavarjan) and Isfahan University of Medical Sciences. The sampling method was census; some samples were selected at convenience. Approximate size of midwives was estimated to be 110 people, based on the report of the staffing of these hospitals and the conditions for participating in the study (willingness and informed consent to participate in the research, work experience of midwifery personnel over 1 year). According to the exclusion criteria (unwillingness to participate in the study), 86 samples were selected. Furthermore, according to the report of the educational assistants of the faculties of nursing and midwifery of the Islamic Azad and public universities of medical sciences of Isfahan, all midwifery students were 115 people in the field, of which 100 people completed questionnaires. After providing a questionnaire and confirming their scientific validity and credibility and with taking permission from the Nursing and Midwifery Faculty, the researcher referred to the management of selected hospitals and educational departments of nursing and midwifery faculties of Isfahan University of Medical Sciences and explained the research goals to the deputies, managers, and authorities of the research environment and obtained a permit to conduct sampling. The researcher specified in each

center the number of midwives and in universities the number of midwifery students in the field who had the conditions for participating in the study; after obtaining permission from them, completing the informed consent form by them and explaining the research objectives, the researcher assessed through a checklist the occurrence of Errors in midwives and midwifery students, the attitudes and awareness questionnaires on medical errors reporting. It should be noted that all questionnaires were put into the closed envelope for trusting the units under research and their collaboration with the researcher. He handed the envelopes containing the questionnaire personally to midwives and students and took over personally after completing them. In this regard, all the inquiry process was carried out by the researcher, and the researcher referred to the designated sites on different days to reach the research samples.

The data collection tool comprised a standard checklist and two researcher-construed questionnaires**.** Furthermore, it is worth mentioning that midwifery personnel are responsible for the care and treatment process; whereas, students perform these processes under the supervision of the instructor or relevant shift staff. Therefore, the staff's questionnaire and students' questionnaire differ in several items.

The checklist was based on the medical error's occurrence in personnel and midwifery students; they were adjusted using a checklist of job mistakes related to the clinical headquarters of Mashhad University of Medical Sciences. To carry out this study, some quantitative and qualitative changes were made to this checklist.

It should be noted that in this checklist, the reporting or nonreporting of the research samples was also measured.

Error checklist in midwives was constituted of 70 questions and 7 error classifications under the title 1-Diagnostic errors 2-Drug errors 3-Errors associated with infection control standards 4-Errors in the process of documentation 5-Errors during the acceptance, removal, and transfer of the pregnant 6. Laboratory errors. Errors were diagnosed during childbirth processes, and the error check list for midwifery students was constituted of 56 questions and 5-Error categories under the title 1-Medicinal errors 2-Errors associated with infection control standards 3-Incidence of errors during admission, discharge and transfer of the pregnant 4. Laboratory errors 5. Errors were formed during childbirth processes.

Midwives and midwifery students responded as never, once and more than once, on the error experience reported for the past year, according to the list of errors in the checklist that reminded them. For the option never, the score zero was given, score one for the option once, and for the option more than once the score two. In midwives, the minimum score earned for the error score is 0 and the maximum 140 and in students 0 and 112.

The first questionnaire was to assess midwives and midwifery students' awareness about reporting medical errors and included 15 questions and 16 scores (Question 7 was considered to be of two parts). The answer to the correct option was score 1 and the wrong option, the score 0. To assess this awareness, the scores were classified as <20 (very weak awareness), 20–40 (weak), 40–60 (moderate), 60–80 (good), and 80–100 (very good).

The second questionnaire examined the attitude of midwives and midwifery students toward medical error reporting, which included 16 questions and questions were classified in three dimensions of behavior (questions 3-4-6-12-13-16), cognitive Questions (1-2-7-8-9-15) and emotional Questions (5-10-11-14). Personnel and midwifery students in the field declared their attitude by answering one of the options based on Likert scale and in the form of I totally disagree, I disagree, I agree, I completely agree, I have no idea. The right answer (the correct attitude) that could be I fully agree or I completely disagree, was given the score 4 and the wrong answer (wrong attitude) the score 0. After determining the total score of the attitude, the 20-option classification, such as awareness, was carried out, and at last, the attitude was evaluated.

To assess the validity of the questionnaire: first, the experts' judgment (department of midwifery and legal medicine) was used; it means that the questionnaire was distributed among ten faculty members of the university and they were asked to describe their opinions about the content, structure, appearance, and the questionnaire text.

To calculate the reliability of the questionnaire, the internal consistency index (Cronbach's alpha) was used. Cronbach's alpha coefficient for both the questionnaires of awareness and attitude was considered to be >0.8 (awareness: 0.83 and attitude: 88/0).

The obtained data were analyzed using the descriptive and inferential statistics (ANOVA, Pearson and Spearman correlation coefficient, and independent *t*-test) and SPSS software version 20.

Results

The results of the demographic characteristics of the units under research showed that the age range of most students (88%) was between 20 and 25 years old; 63% of them were single and their place of residence of 81% of them was home, while the age range of most

personnel (46.5%) was 26 up to 35-year-old, of which 74.1% were married, 90.7% had a bachelor degree, most of them were occupied officially (62.8%); their job-shifting status (by 86%) was as working-day shift, the service area of 81.4% Of them was labor department, they reported in the Labor Department, and most of them had <5 years of service experience.

The results of the independent *t*-test showed that the mean score of awareness ($P < 0.05$) and the score of attitude ($P < 0.05$) toward reporting medical errors was significantly in midwifery personnel higher than that of midwifery students [Table 1].

Discussion and Conclusion

A comparison of the mean score of awareness and attitude of midwives and midwifery students toward reporting medical errors showed that the mean score of awareness and attitude of midwifery students were 45.3, 64.8 (moderate and good) and awareness and attitude in midwifery personnel were, respectively, 79.1 and 70.4 (good). The mean score of awareness ($P < 0.001$) and attitude score ($P = 0.003$) was significantly higher than those in midwifery personnel [Table 1]. According to the results, it seems that the reason for the high awareness and attitude of midwifery personnel compared to students is to pass through courses on the clinical governance system and their familiarity with the reporting system processes. The emphasis on these topics in recent years and the strengthening of this process after the implementation of the health system reform plan has been a double cause for increasing this knowledge and attitude; while students are not familiar with the system of reporting errors or even other Protocols have less awareness about their lack of design in the content of the curriculum. A good attitude of students opposed to their moderate awareness can also be due to the ethical and worthwhile reporting of errors because it seems that even the students who did not have a proper awareness of reporting did regard it as a worthwhile process. The results of this study are in line with the results of Beyranvand *et al*. (2015)[21] and Azimi *et al*.[22]

Another finding of the present research showed that the mean score of the occurrence of errors in the students was 19.2 and in the midwives was 20.1; there was no significant difference between the two groups ($P > 0.05$) Table 2. In this regard, Musazadeh *et al*. (2014) revealed inconsistently that the score of the occurrence of errors by physicians and nurses on the patients admitted to the educational centers during the 1 year was 62.3. The result of this study is contradictory to the study mentioned.

Table 1: Mean score of awareness and attitude of students and midwifery personnel towards reporting medical errors

Variable	Midwifery students		Midwifery personnel		Independent *t*-test	
	Mean	SD	Mean	SD	*t*	*P*
Awareness score	45.3	14.6	79.1	12.5	16.76	<0.001
Attitude score	64.8	13.7	70.4	10.6	3.05	0.003

SD=Standard deviation

As a matter of principle, we have accepted the fact that no one is found innocent and that no specialty has absolute immunity. The root of errors should be searched not only in human power, but in the system and environment that the policymakers and process owners design for human force; in situations of error and risk, we should follow the reason.[14] According to this fact, the error rate obtained from students and midwives in this study and even other studies is acceptable to us. The reason for making more mistakes among midwives compared to students (although this difference is not significant) can also be taking responsibility by the midwifery personnel for medical care, while the students take these processes supervised by the instructor or the relevant shift personnel. A greater variety of activities in the personnel, such as recording and documenting activities or performing diagnostic processes, is another reason for more errors in personnel, despite their greater skill over students.

The results also showed that the occurrence of errors during labor processes in students with an average of 22.5% of the errors was higher than other areas and the occurrence of laboratory errors with an average of 23.5 and the infection standards control errors with an average of 23.02 Tables 2 and 5 was the most reported errors among Midwives; they are consistent with the results of the study of Sotoudezadeh *et al*. (2011), and are not consistent with the results of Kazem Khanloo[23] and Didoghad and Hemati.[24]

The headquarters of clinical governance of Mashhad University of Medical Sciences (2012), collecting information on voluntary reports of unwanted incidents, declared that in the hospitals of Mashhad University of Medical Sciences, the most unwanted incidents according to this classification were related to therapeutic incidents (36%). They include drug-related cases (46%), procedures, and related surgical procedures. The most common mistakes in medications include mistakes in the choice of dosage or type of drug and mistakes in the frequency of use. The population of this study is all hospital health personnel, but the population of the present study is midwives and midwifery students. Therefore, the outcome of the occurrence of errors in the two studies can be different.

As it was mentioned, in the present study, the cause of the most occurrence of errors in midwives is related

Table 2: Average score of medical errors and its domains between two groups of students and midwifery personnel

Variable	Midwifery students		Midwifery personnel		Independent *t*-test	
	Mean	SD	Mean	SD	*t*	*P*
Total score of errors	19.2	11.8	20.1	15.9	0.46	0.65
Drug errors	13.7	15.6	12.6	13.4	0.51	0.61
Errors related to infection control standards	20.8	19.5	23.02	20.6	0.76	0.45
Laboratory errors	17.7	19.1	23.5	25.1	1.78	0.08
Error while admission, discharge and transfer of the pregnant	17.8	15.3	18.6	20.8	0.30	0.76
Error while childbirth processes	22.5	16.7	19.7	19.9	1.30	0.30

SD=Standard deviation

Table 3: Pearson correlation coefficients between awareness score and attitude of students and midwifery personnel toward reporting medical errors

Attitude score			
Midwifery students Awareness score		Midwifery students Awareness score	
r	*P*	*r*	*P*
0.102	0.31	0.407	<0.001

Table 4: Frequency distribution of error reporting status in two groups of students and midwifery personnel

Reporting errors	Midwifery students, *n* (%)	Midwifery personnel, *n* (%)
Lack of reporting	10 (10)	18 (20.9)
Rarely	14 (14)	17 (19.8)
Sometimes	36 (36)	118 (20.9)
Often	34 (34)	22 (25.6)
Always	6 (6)	11 (12.8)
Total	100 (100)	86 (100)
Mann-Witney test (*Z*, *P*)	1.14, 0.26	

to the laboratory area and infection control standards, which can also be due to the type of obstetric personnel activities in this study. Among the four hospitals selected in this study, the two hospitals are educational; in these hospitals, most of the deliveries are performed by midwifery students and women's interns, and midwifery personnel are often in the process of admissions, hospitalization and care at the top of which is sending and replicating the requested tests for pregnant mothers, especially high-risk pregnant women. Therefore, in addition to the possibility of further error in this area, the infection standard control error is also possible sought after posting repeated tests. Interestingly, the most common mistakes of midwives are related to the shift in the morning, in which the acceptance of patients and the demand for tests are more than ever. Furthermore, the cause of the most occurrence of errors in students is related to the processes of delivery, which can be explained by the fact that they are more likely to encounter labor during education, and since the childbirth and its care are skills that are completed with repetition, it is logical that the students experience mistakes in various childbirth situations.

The results of this research showed that there was no significant relationship between the awareness and attitude of midwifery students toward the reporting of medical errors ($P = 0.31$), while there was a direct relationship between the awareness and attitude of midwives regarding the reporting of medical errors ($P < 0.001$) Table 3. In other words, the midwives with more knowledge had a more positive attitude toward reporting medical errors. In this regard, the study of Amir Esmaeili *et al*. and Amiri *et al*.[25,26] are consistent with the findings of this research. In the above studies, there is a positive and significant relationship between the level of knowledge and attitude of personnel, indicating that by increasing the level of awareness in any process, it can be provided a positive attitude and as a result of changing attitudes, behavior change is also achieved. It seems that the midwifery personnel of this research, having gained awareness in the reporting of errors, have obtained an adequate attitude toward the reporting process, and it was inconsistent with the results of Ghasemian *et al*.[27]

The results of our research showed that 79.1% of midwives and 90% of students had error reporting during their period of activity. Furthermore, the results showed that in all units under research, the occurrence of errors and its areas are associated directly with error reporting, in other words, those individuals who had more errors had more reportings. The results of this study were consistent with the study of Shams *et al*.[28] and with the findings of the study Julayi *et al*.[29] and Yaghoub *et al*.[30] they were inconsistent. The findings of the present study can be explained by the fact that a 79.1% report of mistakes occurring by midwives (although, sometimes, rarely or occasionally mentioned [Table 4]) is a very good number indicating adequate awareness and consequently, their positive attitude toward the hospital reporting system. Although the midwifery personnel appears to have concerns with regard to the hospital management system, despite good awareness of reporting errors, the students have reported more. The reason for the significant correlation between the error rate score and reporting error can also be the change in the behavior that was created as a result of

Table 5: Spearman correlation coefficients between the error rate score and its domains and reporting the medical error

	Reporting errors			
	Midwifery students		Midwifery personnel	
	r	*P*	*r*	*P*
Total score of errors	0.541	<0.001	0.795	<0.001
Errors related to infection control standards	0.306	0.002	0.539	<0.001
Laboratory errors	0.249	0.01	0.296	0.004
Error while admission, discharge, and transfer of the pregnant	0.302	0.002	0.648	<0.001
Error while childbirth processes	0.275	0.006	0.677	<0.001
Drug errors	0.453	<0.001	0.703	<0.001

Table 6: Spearman correlation coefficients between awareness and attitude scores of students and midwifery personnel in relation to reporting medical errors with the status of reporting errors

	Status of reporting errors			
	Midwifery students		Midwifery personnel	
	r	*P*	*r*	*P*
Awareness score	0.15	0.14	0.25	0.02
Attitude score	0.33	0.001	0.37	<0.001

the change in attitude, and the 90% error rate reported by the students in the present study could be due to the lack of dependency among students on the management system of the hospital and their lack of concern about the punishment and reprimand of the system administrators because their justification is that they are students and are learning. Furthermore, the instructors are aware of the benefits of reporting errors and justify the students to do it, so with reporting, the deduction of the apprenticeship score is not considered. Students' positive attitude towards reporting the occurrence of errors, which were previously discussed as one of the findings of the study, can be another reason for this issue, and hence, 90% of the students reported the occurrence of errors during their studies.

The results of this research showed that there was a significant correlation between students' attitude and reporting errors (P = 0.001, midwifery personnel's awareness and reporting errors (P = 0.02), and the attitude of midwifery personnel and reporting errors P<0.001 [Table 6]. However, there was no statistically significant correlation between the awareness of midwifery students and reporting errors (P = 0/14) [Table 6]. The results were inconsistent with the study conducted by Sarsangi *et al*.[31] and consistent with Beyranvand *et al*. (2014).[21] In this study, the reason for the relation of awareness and attitude with reporting errors, can be the proper and optimal performance of the evaluation system and accreditation of the deputy of treatment regarding the implementation of effective laws in the process of treatment. This system follows a suitable awareness, superior attitude, and subsequently behavior change among health system staff.

Conclusion

According to the study, hospital midwives reporting is less than midwifery students. Due to the high knowledge and attitude of midwifery toward the importance of reporting errors, this may be due to fears and concerns about the management system. Accordingly, it is recommended to focus on the error and risk management committee to strengthen the reporting system.

Regarding the types of errors in midwives and midwifery students, a suitable environment is proposed to improve job and educational performance to minimize these errors.

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Conflicts of interest

There are no conflicts of interest.

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