



## The Relationship between Professional Identity, Performance and Attitude to Medical Errors Self-reporting among Medical Students

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### Abstract

**Introduction:** Medical errors are a serious problem in providing medical care and ensuring the health of society, and discovering the causes of errors to minimize the possibility of their occurrence is one of the main challenges in the field of treating patients. This study aimed to determine the relationship between professional identity, performance and attitude to self-reported medical errors among medical interns of Ardabil University of Medical Sciences.

**Methods:** This cross-sectional analytical study was conducted on 187 medical interns with census method in five Ardabil educational hospitals in the second semester of 2020-2021. Data collection tool was a questionnaire consisting of 3 parts (demographic, self-reported attitude towards medical errors and professional identity). The validity of the questionnaire was evaluated using Content validity index (CVI) and Content validity ratio (CVR). The reliability of the attitude section was 0.78 and 0.86 for professional identity section. Data analyses were performed using the IBM SPSS Statistics, version 21 by descriptive statistics, such as mean and standard deviation and independent T-test, chi-square and one-way ANOVA. P-values<0.05 were considered statistically significant.

**Results:** The mean scores of students' attitudes towards self-report and professional identity were 55.6±8.8 and 60.4±9.8. Less than 50% of the students declared the possibility of reporting their medical errors. There were no significant differences in the mean scores of self-reported attitude, medical error and professional identity according to grade point average, type of faculty and students' gender (P>0.05).

**Conclusion:** The attitude and performance of students regarding the self-disclosure of medical errors was not satisfactory, and it seems that the analysis of the educational programs in the education of medical errors and the legal and ethical aspects of errors needs serious attention.

**Keywords:** Professional identity, Medical errors, Medical students, Attitudes

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### Introduction

One of the most important aspects in the provision of healthcare is the patient safety, but the medical errors have made the health

care system insecure (1). Medical errors in any health system are recognized as an unavoidable event which can have a negative effect on the patient safety (2). Today, regarding the high prevalence of medication errors and its potential

risks for patients, it is used as an indicator to determine the safety of the patients in hospitals (3). According to the studies conducted in the United States, about 7,000 people in the United States die each year due to medication errors, and the financial cost associated with this problem is close to \$ 77 million per year. Evidence shows that in European countries, 19% to 28% of hospitalized patients fall victim to medication errors (4). Unfortunately, Iran lacks reliable information on the frequency of medication mistakes (5). According to a study from Iran's Ministry of Health and Medical Education, the cost of maintaining and caring for patients owing to pharmaceutical mistakes and the effects of extended hospitalization is billions of Rials each year. One indication of this assertion is the rise in patient complaints (6). Reporting the error and sharing it with the patient, family and medical staff is essential to plan the targeted interventions to prevent the error or its recurrence (7). Unfortunately, many mistakes are not reported (8). There are many reasons for the lack of reporting or reporting less than the actual error rate. Fear, the difficulty of the reporting process and management barriers (9), job burnout (10), professional commitment (11, 12) and characteristics of the senior staff (13) are among these cases. Commitment is defined as a belief in the professional goals and values and striving to achieve these goals (14), and as honesty and conscientiousness that can be generalized to other health care professionals such as physicians (15). In this regard, many medical teachers believe that achieving professional identity depends on supporting the development of qualifications and the formation of the desired professional identity of health science graduates (16, 17). Many measures have been taken in the medical education to enhance this commitment, but the desired and expected results, which are the manifestation of professional behavior in the performance of graduates, are not observed yet (18).

Despite the importance of medical errors and professional identity, few studies are conducted to evaluate the medical errors and their relationship with professional identity in the world. In fact, no study has been conducted in this regard among Iranian medical students yet. Such studies can be used in status assessment and education planning. This research was carried out to ascertain the association between professional identity, practice, and medical interns' attitudes to self-reported medical mistakes in teaching hospitals of Ardabil University of Medical Science.

## Methods

### *Research Sample*

This cross-sectional analytical study was performed on 187 medical interns with census method studying in 5 teaching hospitals of Ardabil University of Medical Sciences in 2021.

### *Data Collection*

Data collection tool was a questionnaire consisting of 3 parts, the first part included the demographic characteristics of students (grade point average, basic science scores, pre-internship scores, gender, college (Azad University, State University, and Pardis (tuition fee)). The academic performance average was defined as a qualitative variable: fewer than 14, 14-15, 15-17 and 17-19. The second part of the questionnaire was 15 questions of professional identity. The main version of this standard questionnaire was in English, designed by Tagawa (2019). Self-control, medical status awareness, physician rethinking, societal obligation fulfilment, and external and internal self-adjustment are the 5 criteria measured by this test. Each item was given a score between 1 and 7, with a minimum score of 15 and a maximum score of 105 for each area. The reliability of the tool with Cronbach's alpha coefficient is 0.72 (19). The validity of the questionnaire was evaluated and confirmed using Content Validity Index (CVI) and Content Validity Ratio (CVR). The reliability of the Persian version of instrument was obtained 0.86 using the Alpha Cronbach coefficient.

Another standard questionnaire was used to measure the self-reported attitude of medical errors. This was the questionnaire used in the study of Kaldjian (2007) with a reported reliability of 0.9. This tool consists of 15 questions with a 5-choice Likert scale (strongly disagree to completely agree). The reliability of the tool, using Cronbach's alpha coefficient, was 0.9 (16). In this instrument, each item was scored from 1 to 5 and the minimum and maximum score can be obtained from 15 to 75. Using the Content Validity Index (CVI) and the Content Validity Ratio, the questionnaire's validity was assessed and validated (CVR). Using the Alpha Cronbach coefficient, the reliability of the instrument in Persian was calculated to be 0.78. To evaluate students' performance in the medical error, the Kaldjian (2007) standard 4-item questionnaire is used, which assesses medical error experiences with 4 questions, assessed each item with a Yes/No Answer (20).

### *Statistical Analysis*

Data Analyses were performed using the

IBM SPSS Statistics, version 21 by descriptive statistics, such as mean and standard deviation and using independent T-test, chi-square and one-way ANOVA. P-values<0.05 were considered statistically significant.

#### Ethical considerations

To observe the ethical considerations, the study plan and objectives were explained to the participants. Participants gave their verbal agreement after being told that the research would keep their personal data private. This study was published in the University Ethics Committee on Research No. IR. ARUMS. REC. 1399. 529 have been approved. At the beginning of this activity, students were clearly informed that the voluntary submission of the online questionnaire indicated their consent to participate in the anonymized survey. Throughout the study, anonymity was maintained by treating the data with strict confidentiality, and participants' identifying information was not used in reporting the research.

#### Results

107 persons (57.2%) were women, 107 persons (57.2%) from free government college and 101 persons (54.01%) were with the Academic average B (Table 1).

The mean scores of professional identity and the attitude towards medical self-report were  $55.6\pm 8.8$  and  $60.4\pm 9.8$ , respectively with and no significant difference was found between two

genders due to the mean score of attitude towards self-report of medical error and professional identity. Furthermore, the results of ANOVA test showed that there was no significant difference in the mean scores of attitude and professional identity among the students due to the colleges (Table 2).

Moreover, the results showed that there is no significant difference in the mean scores of attitude and professional identity among the students based on grade point average,  $P=0.19$  and  $0.91$ , respectively. But, the mean score of attitude between the participants with high probability to report medical errors was significantly higher than that of others ( $P<0.001$ ), and thus, the mean score of professional identity among the participants with very low level of probability for medical error reporting was significantly higher than that of others ( $P<0.001$ ) (Table 3).

There was no significant difference among the medical students in the probability of self-reported medical errors ( $P=0.56$ ) and 31.8% of national students (governmental), 32.4% of campus students and 37.3% of free students reported very high probability in medical errors. There was no significant difference in the probability of self-reported medical errors in terms of the gender ( $P=0.44$ ) and grade point average ( $P=0.28$ ) (Table 4).

There was no significant relationship between the mean score of attitude towards self-reporting of medical errors with that of performance and professional identity (Table 5).

**Table 1:** Demographic variables of students participating in the study

Variable		Numbers	Percent
Gender	Man	80	42.8
	Woman	107	7.2
Academic average	14-15	65	34.8
	15-17	101	54
	17-19	21	1.2
College	Free government	107	57.2
	Azad university	43	23
	Pardis (tuition fee)	37	19.8
Total		187	100

**Table 2:** The comparison of the mean score of attitude towards self-declaration of medical errors and professional identity due to the gender of the students

		Numbers	Attitude		Identity	
			Mean±SD	P	Mean±SD	P
Gender	Man	80	55.47±7.18	0.24	59.43±9.38	0.21
	Woman	107	56.28±9.83		61.26±10.10	
Type of college	Free government	107	54.31±7.88	0.05	60.70±11.46	0.55
	Azad university	43	57.65±11.18		59.9±7.63	
	Pardis (tuition fee)	37	57.13±7.74		61.24±6.32	
Total		187	55.64±8.81		60.48±6.48	

**Table 3:** The comparison of the mean score of attitude toward self- declaration medical error and the professional identity due to grade point average and probability of error reporting

		Numbers	Attitude Mean±SD	Identity Mean±SD
Academic average	14-15	65	54.10±8.20	60.53±8.28
	15-17	101	56.26±9.41	60.62±11.19
	17-19	21	57.38±7.13	59.61±7.03
P			0.19	0.91
Probability of error reporting	Very low	15	46.9±11.1	70.06±18.2
	Low	37	54.1±12.2	58.3±7.1
	Perhaps	73	56.2±7.01	61.2±8.1
	Very high	51	57.4±6.1	58.8±8.2
	High	11	60.09±4.8	57.3±11.7
Total		187	55.64±8.81	60.48±9.82
P			0.001	0.001

**Table 4:** Comparison of the frequency of the medical error reporting among male and female students

		Very low	Low	Perhaps	High	Very High	P
Gender	Male	4 (5%)	15 (18.8%)	31 (38.8%)	23 (28.7%)	7 (8.8%)	0.44
	Female	11 (10.3%)	22 (20.6%)	42 (3.3%)	28 (26.2%)	4 (7.3%)	
College	Free Government	11 (10.3%)	18 (6.8%)	44 (41.1%)	26 (24.33%)	8 (7.5%)	0.56
	Azad University	2 (4.7%)	12 (9.12%)	13 (30.2%)	14 (32.6%)	2 (4.7%)	
	Pardis (tuition fee)	2 (5.4%)	7 (9.85%)	16 (43.2%)	11 (29.11%)	1 (2.7%)	
Average	14-15	6 (9.2%)	14 (21.5%)	13 (20%)	14 (21.5%)	5 (7.7%)	0.28
	15-17	9 (8.9%)	26 (25.7%)	22 (21.8%)	26 (25.7%)	5 (5%)	
	17-19	0 (0%)	11 (52.4%)	2 (9.5%)	11 (52.4%)	1 (4.8%)	
Total		15 (8%)	37 (19.8%)	73 (39%)	51 (27.3%)	11 (5.9%)	

**Table 5:** Correlation coefficient between attitudes, professional identity and performance scores in reporting the medical errors among students

	Attitude	Performance	Identity
Performance	0.129	1	
Identity	-0.005	0.16	1

**Table 6:** Frequency of performance of the student's status regarding medical error reporting

Titles		Variables	Numbers	Percent
Minor errors	Have you ever made a mistake that prolonged treatment or caused discomfort and told the patient (or the patient's family) that a mistake was made?	Yes	55	29.4
		No	132	70.6
	Have you ever made a mistake that prolonged treatment or caused discomfort and not told the patient (or the patient's family) that a mistake was made?	Yes	40	21.4
		No	147	78.6
Major errors	Have you ever made a mistake that caused disability or death and told the patient (or the patient's family) that a mistake was made?	Yes	25	13.4
		No	162	86.6
	Have you ever made a mistake that caused disability or death and not told the patient (or the patient's family) that a mistake was made?	Yes	19	10.2
		No	168	89.8

The findings indicated that students were less likely than the general population to disclose medical errors, with 10.2% of students reporting no errors that resulted in death or disability and 21.4% reporting no errors that resulted in delayed treatment or patient suffering (Table 6).

## Discussion

The mean scores of attitudes toward self-declaration of medical errors and professional identity were on average above the maximum

achievable score. Consistent with this study, in the Kuhpayehzadeh, et al. study (21) in 2013 in Tehran University of Medical Sciences, the average score of most students was lower than average. Inconsistent with the present study, Alsulami, et al. (2019) showed that 90% of students in Saudi Arabia had a favorable attitude towards self-reported medical errors (22). Additionally, students in a recent study conducted in South Korea showed a good attitude toward reporting medical errors, as did participants in the Samsiah,

et al. (2020) study conducted in Malaysia (23). Considering the similar results in three Iranian studies, it seems that in the clinical education of general medical courses in Iran, there is no specific plan to teach the medical errors and their legal and professional issues, as well as professional identity, so it is necessary to pay more attention to these areas.

There was no significant difference in the attitude score and professional identity of the two genders. Moreover, there was no significant difference in the mean score of professional identity and attitude among students with the GPA levels of students and separately for private, free-government-government-paid medical schools. To our knowledge, there was no study comparing the attitudes and professional identities of medical students by type of faculty (tuition-paying or government-free).

Consistent with the present study, in another study conducted in 2015 at Ahvaz Jundishapur University among 40 fourth year medical students in the field of knowledge, attitude and practice in the field of familiarity with medical errors, there was a significant relationship among students' knowledge, attitude and practice. There were no participants with demographic characteristics and in line with the present study; medical students had poor knowledge, attitude and practice about medical errors related to prescribing drugs. Students fared badly in comparison to their reports, despite having high understanding and attitudes regarding the negative impacts of drugs. Only 5% of respondents knew how to report medical mistakes that occur in hospitals (24).

Only 33.2% of them fully agreed or agreed with the self-declaration of medical errors, which was much less than the study of Kuhpayehzadeh among medical assistants in Tehran, 66.4% of which agreed with the self-declaration of medical errors and this difference can be in terms of the awareness. Most of the residents attributed the legal and moral consequences of not expressing medical errors to general medicine (21).

There was a significant relationship between the probability of reporting the medical errors and the mean score of professional identity. Consistent with the present study, Gulnar showed that there is a significant relationship between students' moral sensitivity score and medical error reporting (25). Moreover, Lee, et al. (2020) showed that there was a significant relationship between moral sensitivity and attitudes toward patient safety and students' perceptions of medical error reporting (26).

Students in the current research did not fare well when reporting medical mistakes. According

to a comparable study done in 2021, 281 students from the nursing, medical, dental, medical rehabilitation, and pharmacy departments at Obafham University in Oulu, Nigeria, had a 64.1% unfavorable opinion of patient safety. There was a significant relationship between knowledge about medical errors of clinical students and their field of study (27). In the study by Sayed Umer Mohsin (2019), only 8.5% of medical students reported a medical error at least once throughout the year. After holding workshops, they identified and classified the errors, the causes of the errors, and suggested ways not to repeat them in the year-end survey, which was in accordance with official reports (18%). Students' advice to avoid similar errors was weak (28). In a similar study in Saudi Arabia (2019), the performance to report the medical errors was poor despite appropriate knowledge and attitude (22). Another similar study in Germany (29) and South Korea (30) reported functional impairment in medical students.

Despite the importance of the issue, there are few reports of medical errors in the evidence (31) and several reasons were presented as the facilitators of medical error reporting, including the simple reporting form (30, 32), adequate training on the process of reporting (30), anonymity of the report form (31), adequate feedback received on the report (33), understanding the severity of the error, understanding the individual and patient benefit of the report and the supportive work environment (32, 34, 35), self-confidence (29), and burnout and workload (36). A similar study in Germany among the medical students found that students were less likely to report an error when they themselves committed the error and did not expect serious consequences for the error (37).

According to this study's findings, the need for intervention to review the curriculum or hold courses, such as error detection for medical students, communication courses and teamwork is strongly felt. The need to teach medical errors to students in the study was reported in Germany (29). It is advised, in light of the findings, to identify the educational requirements of students in a needs assessment study and to make the appropriate plans to improve professional identity and attitude toward medical mistake reporting in the curriculum and in the form of elective empowerment courses. The effects of organized patient safety education with the emphasis on the hidden curriculum on students' attitudes in a similar study have been shown (1).

#### *Limitations and strengths*

This study, similar to other cross-sectional

studies, has limitations. Among other things, the questionnaires were completed by self-reporting, which may lead to over- or under-declaration. If the performance of students to report the medical errors was collected using the data available in the hospitals, it could better explain the relationship with the professional identity. To our knowledge, this is the first research in Iran to look at the connection between professional identity, attitudes to reporting medical errors, and the likelihood that errors would be reported among medical students.

## Conclusion

The results show the weakness of medical curriculum and educational programs in teaching medical errors, their types, legal and ethical aspects due to lack of medical error reporting. Teaching this subject could make significant differences among the students with higher and lower grades. These results show the need for integrated training courses to be planned and developed within the general medicine curriculum to enhance future doctors' professional competence and alter attitudes and practices that contribute to medical errors in order to have a functional and effective healthcare system.

## Authors' Contribution

A.K developed the study concept and design. M.H collected the data. A.K, A.P analyzed and interpreted the data, and drafted the manuscript. All authors contributed to the discussion, read, and approved the manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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**Conflict of Interest:** None Declared.

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