



MEDICAL STUDENT AWARENESS AND KNOWLEDGE OF PATIENT SAFETY AT IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

Medicine

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ABSTRACT

Patient safety is a fundamental principle in providing quality healthcare. Most studies focus on patient safety education among senior and postgraduate students but limited data are available at the undergraduate level. This study identifies awareness, knowledge, and perceptions of medical students at Imam Abdulrahman Bin Faisal University in Saudi Arabia toward patient safety.

A cross-sectional study examining patient safety among 246 fifth- and sixth-year medical students was conducted. Fifth-year students reported more confidence in addressing broader patient safety issues in health education, while sixth-year students reported more comfort in speaking up about patient safety. "Culture of safety" and "communicating effectively" were the only two dimensions that differed significantly by gender ($p < 0.05$). Findings indicated that there is a gap in student knowledge regarding many safety concepts that should be filled. Future research is needed to identify areas where development is required in the undergraduate medical curricula among Saudi Universities.

KEYWORDS

Patient Safety, Medical Students, Imam Abdulrahman Bin Faisal University

INTRODUCTION

Patient safety is a fundamental principle in providing quality healthcare(1). The World Health Organization's (WHO) 2011 statement defined patient safety as "the reduction of the risk of unnecessary harm associated with healthcare to an acceptable minimum"(1-3). Medical errors account for a significant proportion of morbidity and mortality causes(4-6). Furthermore, a report released by the United States-based Institute of Medicine (IOM) in 2000 indicated that more people have died in the US from medical errors than from traffic accidents(1, 3, 5-9).

Coincident with improvements in healthcare technologies and modalities, there are increasing risks to patient safety(2, 4, 10). Therefore, a need for development of patient safety organizations, programs, and curricula has emerged(1, 2, 6-11).

Traditionally, medical school curricula focused on medical knowledge, technical skills, and clinical decision-making, while non-technical competencies including communication skills, teamwork, and recognition of unsafe practices were not explicitly taught. However, the introduction of non-technical and patient safety competencies in undergraduate medical schools has recently gained the attention of healthcare organizations, experts, and political leaders(8, 12-14). The IOM, WHO, and the American Association of Medical Colleges encourage the incorporation of patient safety education throughout the learning process(6, 8, 12-14).

Medical students are future healthcare providers and leaders. Therefore, they must be exposed to patient safety concepts and principles before starting professional practice in direct contact with patients. The early introduction of safety concepts in medical education increases students' ability to recognize unsafe work environments, address challenges in safety practice, name causal factors, and prevent, respond to, and disclose errors and near misses(12, 14-16). Therefore, students should be exposed to an environment of safety concepts and practices prior to starting their professional careers(15).

Most studies focus on safety education for senior and postgraduate healthcare providers rather than undergraduate students. Studies addressing attitudes and knowledge regarding patient safety at an undergraduate level are limited(6, 12).

In Saudi Arabia (SA), the academic quality of medical schools has grown progressively. More advanced curricula and clinical education strategies have been launched to match the 2030 vision: implementing new technologies and expanding healthcare services. Recently, some

academic settings in SA have been working to improve their curricula and develop policies to promote patient safety. However, there are few published studies that address the level of awareness regarding patient safety at the undergraduate level. One report by Almaramhy et al. (2011)(13) studied undergraduate medical students in two medical colleges—Taibah and Qassim medical colleges. Another study by Colet et al. (2015)(14) measured patient safety competence among nursing students at Shaqra University.

This study aims to gain insight into medical students' perceptions of patient safety at Imam Abdulrahman Bin Faisal University (IAU), SA. Addressing perception, knowledge, and awareness of students is essential for identifying curricular development areas and curricular implementation, helping to fill gaps in knowledge, and evaluate the impact of the currently used curriculum(12, 13, 17, 18).

METHODOLOGY

Study Design

A cross-sectional prospective study design was used.

Study Area

The study was conducted in the College of Medicine at IAU (formerly University of Dammam) in Dammam, SA. IAU is one of the original leaders in medicine in SA. It has more than 45,000 students in twenty-one colleges scattered throughout the Eastern Province. The mission of the College of Medicine is to train physicians who are committed to Islamic and professional ethical practices, providing excellent healthcare, and promoting community health(19).

Study Population

Fifth and sixth-year undergraduate medical students participated.

Sample Size

Potential respondents included 481 undergraduate medical students in their fifth- and sixth-years.

Data Collection

The self-reported Health Professional Education in Patient Safety Survey (H-PEPSS) was used in this study. H-PEPSS is a valid survey developed at York University in Toronto, Canada designed to measure healthcare professionals' perspectives regarding patient safety. It contains items on sociocultural dimensions of patient safety, clinical skills, broader aspects of patient safety, and comfort speaking out about safety. All items are scored on a Likert scale of 1-5, with 1=strongly disagree, and 5=strongly agree(20).

DATA MANAGEMENT AND ANALYSIS PLAN

Hard copies were collected by the Principal Investigator and individually revised immediately following collection. The Statistical Package for Social Sciences v. 25 was used to perform all analyses. A reliability test indicated that the data were reliable.

Frequency tables explored the findings (frequencies, percentages, measures of central tendency, and dispersion). Cross-tabulations examined the association between demographics and medical student awareness and knowledge of patient safety. *T*-tests compared the mean H-PEPSS dimensions between fifth and sixth-year levels. Cut-off for significance levels was $p < .05$.

ETHICAL CONSIDERATIONS

- 1) A form explaining the purpose of the study was attached to each questionnaire. Respondents were asked to sign a consent form indicating their voluntary participation in the study.
- 2) Participant anonymity was assured.
- 3) Participants were not offered incentives for their participation.

Table 1: Self-reported patient safety confidence scores of 5th and 6th year medical students at IAU regarding sociocultural patient safety dimensions

| H- PEPSS dimensions | Mean (SD) | | | p-value |
|---|-----------------------|-----------------------|------------------|---------|
| | Fifth-year n = 120 | Sixth-year n = 126 | Total n = 246 | |
| Clinical safety | 15.21 (3.72) | 15.41 (3.40) | 15.31 (3.55) | 0.65 |
| Culture of safety | 14.96 (3.12) | 14.92 (3.13) | 14.94 (3.11) | 0.93 |
| Working in teams with other health professionals | 21.98 (4.89) | 21.51 (4.41) | 21.74 (4.65) | 0.42 |
| Communicating effectively | 7.97 (2.40) | 7.91 (1.50) | 7.94 (1.49) | 0.78 |
| Managing safety risks | 7.34 (1.59) | 7.29 (2.31) | 7.32 (1.58) | 0.83 |
| Understanding human and environmental factors | 11.46 (2.34) | 11.01 (1.59) | 11.23 (2.42) | 0.15 |
| Recognizing, responding to, and disclosing adverse events | 14.23 (2.53) | 14.40 (2.98) | 14.32 (2.76) | 0.63 |

Table 2 reflects the percentage of medical students who “agreed” or “strongly agreed” with what they learned for each item of the sociocultural patient safety dimensions. In other words, the responses “strongly agree” and “agree” indicated student confidence in each item. As seen in Table 3, students were most confident regarding what they had learned about hand hygiene, with 87% of students confident regarding this topic. Additionally, the fifth-year students were more confident in the majority of the items except one: cultural safety. The asterisk in the table indicates statistically significant differences in self-reported confidence between the two academic levels.

Table 2: Student responses to each item of sociocultural patient safety dimensions by 5th and 6th year medical students, IAU

| H-PEPSS items | Strongly agree/agree n (%) | H-PEPSS items | Strongly agree/agree n (%) |
|---|----------------------------|--|----------------------------|
| Clinical safety | | Culture of safety | |
| Safe clinical practice in general | 170 (69.1) | The ways in which health care is complex and has many vulnerabilities | 148 (60.2) |
| Hand hygiene | 214 (87.0) | The importance of having a questioning attitude and speaking up when you see practices that may be unsafe | 165 (67.1)* |
| Infection control | 173 (70.3) | The importance of a supportive environment that encourages patients and providers to speak up when they have safety concerns | 167 (67.9) |
| Safe medication practices | 117 (47.6)* | The nature of systems and system failures and their role in adverse events | 139 (56.5) |
| Working in Teams with Other Health Professionals | | Communicating Effectively | |
| Team dynamics and authority/power differences | 144 (58.5) | Enhancing patient safety through clear and consistent communication with patients | 187 (76.0) |
| Managing inter-professional conflict | 121 (49.2) | Enhancing patient safety through effective communication with other health care providers | 174 (70.7) |
| Debriefing and supporting team members after an adverse event or close call | 137 (55.7) | Effective verbal and nonverbal communication abilities to prevent adverse events | 172 (69.9) |
| Engaging patients as a central participant in the health care team | 181 (73.6) | | |
| Sharing authority, leadership, and decision-making | 163 (66.3) | | |
| Encouraging team members to speak up, question, challenge, advocate, and be accountable as appropriate to address safety issues | 148 (60.2)* | | |
| Managing Safety Risks | | Understanding Human and Environmental Factors | |
| Recognizing routine situations and settings in which safety problems may arise | 138 (56.1) | The role of human factors such as fatigue and competence that affect patient safety | 176 (71.5) |
| Identifying and implementing safety solutions | 131 (53.3) | Safe application of health technology | 155 (63.0) |

- 4) Institutional review board approval was obtained for this study before execution by the College of Medicine at IAU.

RESULTS

Approximately 481 undergraduate medical students in fifth- and sixth-year at IAU were invited to answer H-PEPSS. A total of 246 surveys were completed. The respondents were 120 (48.8%) and 126 (51.2%) fifth- and sixth-year students, respectively. Among them, 43.1% were male and 56.9% were female. Ninety-four percent of the respondents were between 21 and 25 years of age.

Table 1 presents the mean scores of the students regarding self-reported confidence in sociocultural dimensions. Confidence was similar for both fifth and sixth-year students. Students reported the highest confidence score on “working in teams with other health professionals” (21.74). They indicated least confidence in “communicating effectively” and “managing safety risks” (7.94 and 7.32, respectively).

| | | | |
|--|-------------|--|------------|
| Anticipating and managing high risk situations | 136 (55.3) | The role of environmental factors such as work flow, ergonomics and resources that affect patient safety | 153 (62.2) |
| Recognizing, Responding to, and Disclosing Adverse Events | | | |
| Recognizing an adverse event or close call | 137 (55.7) | | |
| Reducing harm by addressing immediate risks for patients and others involved | 145 (58.9) | | |
| Disclosing the adverse event to the patient | 126 (51.2) | | |
| Participating in timely event analysis, reflective practice, and planning in order to prevent recurrence | 134 (54.5)* | | |

* p<.05

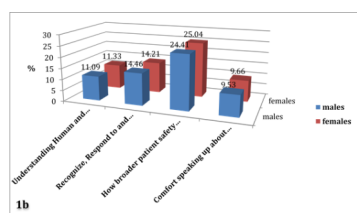
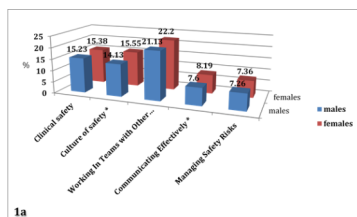
The fifth-year students reported higher competence regarding broader patient safety issues addressed in professional health education compared to the sixth-year students (25.12 versus 24.44, respectively), while the latter reported more comfort speaking up about patient safety (10.04 versus 9.15). More than half of the sixth-year medical students agreed or strongly agreed on feeling comfortable approaching someone they perceived as engaging in unsafe practices, compared to approximately one third of the fifth-year medical students (Table 3). The difference on the dimension “comfort in speaking up about patient safety” between the fifth and sixth-year students was statistically significant (p<.05).

Table 3: Comparison of the self-reported confidence levels on each item of the “comfort speaking up about patient safety” dimension between 5th and 6th year medical students, IAU

| Comfort speaking up about patient safety | 5th year students | 6th year students | Total |
|--|-------------------|-------------------|-------------|
| | n (%) | | |
| In clinical settings, discussion around adverse events focuses mainly on system-related issues, rather than focusing on the individual(s) most responsible for the event | 60 (50.0) | 61 (48.4) | 121 (49.2) |
| In clinical settings, reporting a patient safety problem will result in negative repercussions for the person reporting it | 39 (32.5) | 50 (39.7) | 89 (36.2) |
| If I see someone engaging in unsafe care practices in the clinical setting, I feel safe approaching them | 39 (32.5) | 70 (55.6) | 109 (44.3)* |

* p<.05

Figures 1a and 1b present self-reported competence on H-PEPSS dimensions by males and females. “Culture of safety” and “communicating effectively” are the only two dimensions that showed a statistically significant difference between males and females (p<.05).



Figures 1a and 1b: Comparison of self-reported patient safety confidence scores between male and female medical students, IAU

DISCUSSION

When examining SA's 2030 vision for healthcare, it is clear that providing high-quality healthcare to citizens and residents in SA is a priority(21). Patient safety is a fundamental principle when providing quality healthcare. The Ministry of Health (MoH) has made great strides towards reducing instances of medical harm and improving patient safety throughout the years, which culminated this year in the announcement of establishment of the Saudi Patient Safety Center(22).

However, while the MoH has made tremendous progress regarding the quality of healthcare, multidisciplinary efforts are needed to

accomplish the 2030 healthcare vision. Universities are an integral part of this process, given that they help train and prepare health professionals. At the postgraduate training level, The Saudi Commission for Health Specialists has taken a step towards this goal by releasing the Essentials of Patient Safety notebook and adding patient safety concepts in the postgraduate training curriculum. However, at the undergraduate level, the effectiveness of medical education and student preparation regarding patient safety care should be evaluated(23).

Understanding the perspectives and confidence of future health professionals regarding safety is the key measurement in assessing the effectiveness of the current curriculum. Therefore, this study evaluated self-reported patient safety confidence of medical students across two medical years and gender at IAU. The two academic levels employ different educational models. Sixth-year students follow the traditional lecture-based learning model, while fifth-year students follow the MONASH program; problem-based learning began in 2014 in the IAU medical school.

The results of this study differed in many respects from previous literature, including a Canadian study with medical students and postgraduate trainees, and one conducted in a Saudi university among nursing students. In our study, medical students generally reported being more comfortable working in teams with other health professionals, while Canadian students were less comfortable with teamwork as were Saudi nursing students in a clinical setting(20). However, participants in this study reported the least confidence in managing safety risks, similar to Canadian students(14, 20).

After comparing the scores of confidence in sociocultural patient safety dimensions between fifth- and sixth-year medical students, results showed both academic levels reported nearly equal scores for all six dimensions. However, due to the importance of assessing student competency in the six main dimensions of patient safety, further analysis for each item of these dimensions was performed. The analysis showed that fifth-year students were more confident except when dealing with cultural safety. This result contrasts with previous findings. For example, the Canadian study showed that confidence about most aspects of patient safety increased with training years(20). Furthermore, a Harvard Medical School study found that there was a

significant association between medical student and trainee scores between the test instrument used for patient safety and their year of training (24). Also, research with nursing students showed a negative correlation between competence and academic level (14).

As previously mentioned, earlier findings regarding student confidence in connection with academic level contrast with findings in this study. For example, fifth-year students reported higher confidence in how broader patient safety issues are addressed in health education than sixth-year students. These results potentially explain the differences between the MONASH education model and the traditional lecture-based model. The MONASH model involves some aspects of patient safety and quality improvement concepts in the curriculum more consistently than the lecture-based model. Therefore, it improves fifth-year student confidence regarding most aspects of patient safety, resulting in their confidence levels matching or even exceeding sixth-year students who have more clinical training.

However, given that sixth-year students feel more comfortable speaking up about patient safety, and that they reported high value in questioning attitudes and speaking up when they see practices that threaten patient safety, this illustrates that more clinical experience positively influences their development. It increases confidence in discussing adverse events, reporting patient safety problems, and increases comfort approaching someone engaging in unsafe practices. This is in contrast to the Canadian study, in which third-year medical students reported lower levels of comfort in approaching colleagues engaging in unsafe practices compared to first and second-year students (20). Our study also contrasts with a US study which surveyed fourth-year medical students about safety culture perceptions at the University of California. That study reported that more than half of the students indicated fear of asking a question or speaking up if they noticed something that might negatively affect patients (18).

As reflected in comparing patient safety competency across gender, the outcome is consistent with results in the previous study among nursing students, in which female students reported more competence in communicating effectively than males. This variation might be a result of differences in communication styles between males and females. Females are usually expressive and tentative in conversations and use them as a means to create bonds and relationships with others, which facilitates better communication among healthcare members. Conversely, males are more assertive and goal-oriented in conversations, and usually aim to create dominance, power, and achieve tangible outcomes that are potential obstacles to effective communication (14, 25, 26). Unlike the previous study among nursing students, our results showed no differences in managing safety risk and understanding human and environmental factors (14). This is due to increased female interest in leadership and management rules over time, which has improved female ability and confidence to anticipate, recognize potential, and facilitate effective management of situations that place patients or groups at risk.

STRENGTHS AND LIMITATIONS

To our knowledge, this is the first study that evaluated self-reported patient safety confidence among medical students at IAU. Our findings contribute to the limited knowledge about patient safety confidence among medical students in Saudi Arabia.

Also, our study provides comparison between two academic levels following two different educational models. Therefore, it shows the effectiveness of lecture-based learning models versus problem-based learning models in the improvement of medical students' comfort level about patient safety competencies.

One limitation of this study is that it used a sample from one medical school in Saudi Arabia. Using a sample from different medical schools in future research would allow comparison between medical student confidence and provide a chance to examine an ideal curriculum in terms of starting patient safety education in undergraduate training. Another limitation is that this study was cross-sectional, and cannot identify improvement in confidence among medical students of each educational style over time.

CONCLUSION AND RECOMMENDATION

The results of this study revealed that self-reported confidence in patient safety domains in H-PEPSS were almost similar for both academic levels, with a few exceptions. This indicates the potential

effectiveness of the MONASH model. Including patient safety concepts in medical school curricula might increase the knowledge and perceptions of fifth-year medical students to match or exceed those of sixth-year medical students who have more clinical training.

However, there is a gap in student knowledge regarding many patient safety concepts that should be filled. Future research to identify areas for development and improvement in undergraduate medical curricula among Saudi universities is needed.

When comparing patient safety confidence levels across gender, both in this study as well as previous studies, female students reported more confidence in communicating effectively than males. Therefore, including communication skills in medical school curricula would be beneficial for undergraduate students.

Furthermore, to decrease safety incidents in healthcare services, undergraduate medical students should be trained to speak up confidently when they notice unsafe practices, and to report adverse events or near-miss events before they become professionals in their field. Future studies are needed to evaluate self-reported patient safety confidence among medical students in Saudi Arabia. More research will overcome the limitations of this study. This is important in identifying gaps in patient safety knowledge among future health professionals and to integrate patient safety concepts in the undergraduate curriculum to match the 2030 vision of Saudi Arabia.

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