Original Article :

Improving the Teaching of Patient Safety in Medical School: Perspectives from Medical Students

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Abstract

Background and Aims:
Patient safety is a critical aspect of healthcare delivery. The inclusion of patient safety education in medical school curricula is, therefore, considered essential in shaping competent healthcare professionals. Al Baha University Faculty of Medicine introduced the patient safety education module into its medical program for the fourth-year students.
This study aims to assess the impact of the program on the overall experience of fifth and sixth-year students who have studied the module and are currently in their clinical years.

Methods:
An electronic questionnaire comprising 10 questions was distributed to the students, with response options of yes, no, or not sure. In case of a "no" response, students were required to select one of the three available options. The questionnaire, ensuring anonymity, covered topics that are covered in the module such as patient safety discipline, medical errors, communication skills, teamwork, risk assessment, infection prevention and control, patient falls and medication safety.

Result:
Out of 162 students, 143 (88%) responded, revealing varying levels of satisfaction within different sections of the module ranging from 54% to 73% and overall satisfaction exceeded 50%. Other concerns were expressed regarding integration with other modules and the need for more practical sessions. Recommendations were made for the module to be presented as a standalone course and to introduce more hands-on activities for enhanced engagement.

Conclusion:
Feedback from students highlighted the necessity for adjustments, including delivering the module independently and enhancing practical sessions. These findings emphasize the importance of evolving curriculum structures to ensure optimal learning experiences and ultimately improve patient care outcomes.

Key words:
Patient Safety, Medical Curriculum, Clinical Skills Training, Hospital Safety Management

Introduction

Patient safety is a critical concern in the healthcare industry, yet it has historically been undervalued in medical education. According to a report that was published in the year 2000 by the Institute of Medicine,[1] medical error cause over 98,000 deaths annually in the United States, ranking it as the third leading cause of death. Subsequent studies have only reinforced this alarming statistic, with estimates suggesting that up to 400,000 preventable patient deaths occur each year.[1] Additionally, a study conducted by James and John[2] estimated that the number of preventable patient deaths per year is over 400,000. Furthermore, Anderson and Abrahamson's[3] research shed light on the magnitude of this issue, confirming that about 251,000 annual records of deaths in the US are associated with medical errors. To address this issue and prevent more harm, it is essential to integrate patient safety principles into medical education from the start.[4] Teaching patient safety to medical students is crucial for several reasons. ensures that future healthcare providers are equipped with the right skills to prevent errors and adverse events,[5] and instilling a culture of safety early on prioritizes patient well-being throughout their careers.[6] Despite its importance, many medical schools struggle to effectively incorporate patient safety into their curricula due to time constraints and competing priorities.[7] Fortunately, various strategies can be employed to overcome these challenges, such as integrating patient safety principles into existing courses or providing hands-on training through simulation exercises or workshops. This approach, as suggested by the World Health Organization (WHO 2009),[8] is effectively used by different schools around the world,[9] including Al Baha University, Faculty of Medicine.

Al Baha Experience

At Al-Baha University, Faculty of Medicine, the patient safety module is taught to medical students during their fourth year as part of the six-year curriculum. This module was introduced in the year 2013, starting with the first batch of medical students. (Table 1 displays the Medical Curriculum Program Plan of Al Baha University).

Table 1: the Medical Curriculum Program Plan of Patient Safety Module Al Baha University

Modules				
	TOPICS	Activity	TOPICS	ACTIVITY
Clinical Module 1	1. What is patient safety?	LECTURE-1		
	2. Human factor	LECTURE-2		
	3. Systems: the effect of complexity on patient care	LECTURE-3		
Clinical Module 2	1. Effective teamwork	LECTURE-4		
	2. Learning from errors to prevent harm	LECTURE-5		
	3. Managing clinical risk	LECTURE-6		
Clinical Module 3	1. Using quality-improvement methods to improve care	LECTURE-7	Medical Errors: Opportunities for improvement	DSL-1
	2. Lab. Safety	LECTURE-8		

Clinical Module 4	1. Engaging with patients and careers	LECTURE-9	A system failure resulting in death	DSL-2
	2. Patient safety and invasive procedures	LECTURE-10		
Clinical Module 5	1. Infection prevention and control	LECTURE-11	Infection control Practical (Hand (Hygiene	SKILL LAB
	2. Improving medication safety	LECTURE-12	Infection control (Clinical (Auditing	Field Visit

The program is already accredited by the National Commission for Academic Accreditation & Assessment (NCAAA). The patient safety module was developed based on World Health Organization guidelines (WHO, 2009) and is taught longitudinally in the second semester of the fourth-year medical studies, as part of five different modules therefore, it is not structured as a traditional stand-alone module. Due to semester shifts over the years, the patient safety module has been moved between various clinical modules. However, all the modules were in the fourth year, ensuring their inclusion in the curriculum. The Course learning outcomes (CLOs) of the patient safety module align with the Saudi MED framework and devided into three major elements: knowledge & under standing, skills, and values.

The patient safety module covers key aspects such as defining safety, understanding errors, and applying risk management principles. It also emphasizes teamwork, human factors, and systems thinking in healthcare settings, as well as infection prevention, medication safety, and laboratory safety to promote patient recovery and minimize adverse events. The module comprises 15 hours of coursework, including lectures, field visits, directed self-learning (DSL), and skill labs (Table 1). Students are assessed based on a final exam (40 marks) and continuous assessment through activities such as quizzes, field visits, and skill labs (60 marks). The Faculty of Medicine regularly gathers student feedback to evaluate the module's impact and identify areas for improvement. This feedback helps refine and enhance the module annually, ensuring its effectiveness in preparing medical students for their future careers. For this research, students were asked to provide detailed feedback through a specifically designed questionnaire. The aim of this study, therefore, is to assess the impact of the program on the overall experience of the students who have already embarked on their clinical years and completed the module during their fourth year.

Methods

The study employed an electronic dichotomous survey scale questionnaire comprising 10 questions, which was distributed to students. Each question offered three response options: yes, no, or not sure. In the event of

selecting "no," students were required to select one of three options provided. However, the questionnaire did not require any personal or identifying information and it could be completed in just three minutes. This electronic questionnaire underwent a step-by-step validation method. First, a medical education expert reviewed the questions for relevance. Next, the questionnaire was tested on a small sample of participants, with adjustments made based on their feedback. The same participants were then asked to complete the questionnaire at two different time points to assess response consistency. Cronbach's Alpha value was used to measure the reliability of a set of questions, where Cronbach's Alpha value for this study was 0.85.

The questionnaire was then distributed to all the participants. Factor analysis was used to investigate the relationships between questionnaire items and uncover the underlying constructs. Using principal component analysis (PCA), I explored the relationships between questionnaire items and identified the underlying constructs that explain the variance in the data. SPSS IBM software was used, version 26.0, in this matter to analyze the relationships between multiple variables and simplify the complex relationships. By rotating the factors to achieve a simple structure, I identified the key drivers or themes that underpin the responses. This approach allowed to identify the key drivers or themes that underpin the responses, rather than just looking at individual items.

The resulting factors were then used to simplify the complex relationships between the variables. The questionnaire was then updated accordingly providing a more interpretable and meaningful representation of the data. Face validity was confirmed by ensuring that questions measured the intended aspects and were easily comprehensible. Ethical guidelines were strictly followed, including obtaining informed consent, maintaining participant anonymity, and upholding confidentiality throughout the study (REC/MIC/BU-FM/2024/39). It is worth noting that before the questionnaire was developed for this study, students were engaged in several discussions throughout the previous years. This information was very useful in designing the final questionnaire for this study.

Results

Out of 162 students in their 5th and 6th years, a total of 143 students from both genders participated in the survey, resulting in an 88% response rate. Among the respondents, 51% were female. The initial question posed to the participants was whether the patient safety module had provided them with a comprehensive understanding of the importance of patient safety in healthcare. The results showed that approximately 91(64%) of students answered positively, 7(5%) were unsure, and 49(34%) responded negatively. Further analysis focused on the negative responses, categorizing them based on the three options provided.

Among the 49 (34%) who responded negatively:

- 28 (57%) mentioned that the module inter-

fered with other demanding courses.

- 14 (29%) criticized the lectures for being too theoretical.
- 7 (14%) found the course content difficult to grasp.

Only responses with a frequency of 50% or higher will be discussed in detail in the following section (Table 2).

The second question inquired about the module's effectiveness in teaching strategies and techniques to identify and prevent medical errors. Of the respondents, 99 (69%) expressed a positive view, 12 (8%) were unsure, and 32 (22%) responded negatively, and among them:

- 18 (56%) mentioned that heavy involvement in other modules made it challenging to follow the patient safety module.
- 3 (9%) found the topic itself difficult to understand.
- 1(3%) suggested that the topic should be presented more practically.

The third question evaluated whether the module enhanced students' communication and teamwork skills in advocating for patient safety. A significant majority 89(62%) of the students responded positively, while 46(32%) were uncertain, and 9 (6%) were negative about it. Among the 6% who answered negatively:

- 4(44%) expressed a need for more case scenario lectures.
- 3(33%) felt that the topic lacked clinical relevance.
- 2 (22%) found it difficult to understand the subject matter.

The fourth question delved into specific components of the patient safety module that students found particularly challenging. A around 57(40%) of respondents admitted to facing challenges, while an almost equal percentage expressed uncertainty 57(40%), with only 29 (20%) asserting otherwise. The rationale behind the negative responses varied, with the majority of written responses attributing the difficulties to the module's longitudinal nature, which required integration with other concurrent modules. Consequently, students found their attention being disproportionately diverted towards the extended duration of certain modules that they were concurrently studying.

Among the 57 (40%) who admitted that the module was challenging of which:

- 33 (58%) expressed that the course needs to be independent and not intertwined with other courses.
- 15 (26%) mentioned that the course is condensed and is placed between challenging courses.
- 9 (16%) suggested that the course needs more hospital visits and fewer theoretical lectures.

The fifth question explored whether integrating the module with other coursework improved students' understanding. Only 77(54%) responded positively, while the remaining respondents were divided, with 40 (28%) expressing uncertainty and 27 (19%) rejecting the idea. Among those who didn't support the positive response:

- 19 (70%) mentioned that more attention is

directed towards other modules because they are longer and more demanding.

-5 (19%) found the blend of modules confusing.

- 3 (11%) stated that integration was not beneficial in this particular module.

The sixth question asked if the module adequately covers strategies for managing clinical risks. About 85 (59%) of students answered "yes," 50 (35%) were unsure, and 8(6%) said "no." Among those who responded negatively:

- 5(62%) requested more practical scenarios to enhance their understanding of the topic.

- 2 (25%) felt that clinical risks were explained too theoretically.

- 1 (13%) found the topic challenging to follow.

The seventh question examined how well the module addressed the importance of ensuring safety with invasive procedures. Around 95 (66%) responded positively, 44 (31%) were unsure, and 8 (6%) answered negatively. Among the smaller proportion who responded negatively:

-5 (63%) suggested a more practical approach to the topic.

-2 (25%) felt that the topic was inadequately covered.

-1 (13%) believed that the module did not adequately emphasize the importance of patient safety in invasive procedures.

The eighth question inquired whether the module provided comprehensive information on infection prevention and control programs in hospitals. A majority of the students 105 (73.4%) answered yes, 33(23%) were unsure, and 7(5%) said no. Among the smaller group who responded negatively:

- 3(57%) commented that the module did not cover the topic in sufficient detail.

- 2 (29%) suggested that more topics should be included.

- 1 (14%) felt that the topic was covered too quickly.The ninth question investigated whether the module emphasized the importance of medication safety for patients. A significant majority of the students 98(69%) answered yes, 39 (27%) were unsure, and 7 (5%) said no. Among those who responded negatively:

-3 (43%) suggested that more in-depth coverage of the topic is necessary.

- 2 (29%) felt that other aspects were prioritized over medication safety in the module.

- 1(14%) recommended more lectures specifically focused on this topic.

The tenth and final question queried if the module covered the importance of risks associated with patient falls. Around 93 (65%) of respondents answered yes, 46 (32%) were unsure, and only 7 (5%) said no. Among the small group who responded negatively:

- 2 (29%) felt that the topic was not explained sufficiently.

- 2 (29%) suggested that practical scenarios were needed.

- 3(42%) said more details about the topic are required.

Table2: Students feedback (n=143)

Questions	Yes (%)	Not Sure (%)	No (%)	Comments	n=49(%)
1) Did the patient safety module provide you with a comprehensive understanding of the importance of patient safety in healthcare?	91(64)	7(5)	49(34)	The module comes between other difficult modules	(57)
				The lectures were more theoretical than practical	(29)
				The module is hard to follow	(14)
2) Did the module effectively teach you strategies and techniques to identify and prevent medical errors?	99(69)	12(8)	32(22)		n=32(%)
				The heavy involvement of other modules made it hard to follow.	(56)
				The topic itself was hard to understand	(9)
				This topic needs to be presented as a practical	(3)
3) Did the module enhance your communication and teamwork skills in promoting patient safety?	89(62)	46(32)	9(6)		n=9(%)
				There is a need for more case-scenario lectures	(44)
				This topic is not clinical	(33)
				It was hard to understand this subject	(22)
4) Were there any aspects of the patient safety module that you found particularly challenging?	57(40)	57(40)	29(20)		n=57(%)
				The module needs to be independent and not between other courses.	(58)
				The module is condensed and comes between hard modules	(26)
				The module needs more hospital visits and less theoretical lectures	(16)
5) Did the way in which the module was integrated with other modules enhance your understanding?	77(54)	40(28)	27(19)		n= 27(%)
				The concentration is given to the other because they are longer and more difficult	(70)
				Being between other courses is confusing	(19)
				Integration was not helpful in this course	(11)

6) Does the module adequately cover strategies for managing clinical risks?	85(59)	50(35)	8(6)		n=8(%)
				More practical scenarios are required to explain this topic deeper.	(62)
				The clinical risk explains as theoretical	(25)
				The topic was hard to follow.	(13)
7) Did the module address the importance of ensuring the safety required with invasive procedures?	95(66)	44(31)	8(6)		n=8(%)
				This topic should be more practical.	(63)
				Insufficient coverage of the topic.	(25)
				The module has not outlined the importance of patient safety in relation to invasive procedures.	(13)
8) Did the module provide comprehensive information on infection prevention and control programs in hospitals?	105(73)	33(23)	7(5)		n=7(%)
				The module did not cover the topic in enough detail.	(57)
				More topics were needed to cover	(29)
				The topic was covered fast	(14)
9) Did the module emphasize the significance of medication safety for patients?	98(69)	39(27)	7(5)		n=7(%)
				More depth in the topic is needed	(43)
				The module has prioritized other aspects over medication safety	(29)
				More lectures about topics are needed.	(14)
10) Does the module cover the importance of the risks associated with patient falls?	93(65)	46(32)	7(5)	The topic was not explained enough	n=7(%)
					(29)
				Practical scenarios are needed.	(29)
				More details about the topic are required.	(42)

Discussion

The findings of this study suggest that the integration of the patient safety module alongside clinical modules was met with a negative response from students. This outcome may be attributed to the disparity in workload and perceived importance between the patient safety module and the other clinical modules. Our results echo previous studies that highlight the importance of acknowledging the academic demands and expectations of students when introducing new modules.[10] Overall, the findings suggest that the patient safety module has a positive impact on medical students (64%), but there is a need for further refinement to ensure that students are equipped with practical skills and knowledge to effectively advocate for patient safety. The discrepancy in workload and perceived importance may have contributed to the students' negative feedback, which is a common issue in medical education.

The study findings suggest that the effectiveness of the patient safety module in teaching strategies and techniques to identify and prevent medical errors is a complex issue. While the majority of students responded positively (64%), a minority reported difficulties in following the module due to the heavy workload and demands of other modules. This theme is consistent with previous research that highlights the importance of considering the curriculum design and student workload when introducing patient safety education.[11] The study's findings emphasize the need to balance the demands of different modules and ensure that students have sufficient time and resources to devote to learning about patient safety.

The discussion of the patient safety module's impact on medical students' communication and teamwork skills reveals a significant theme of its effectiveness in promoting patient safety advocacy. The majority of students (64%) reported a positive impact on their abilities, which is consistent with previous research highlighting the importance of integrating patient safety principles into medical education to foster collaborative practices.[12] This finding underscores the significance of incorporating patient safety modules into medical curricula to cultivate a culture of safety among healthcare professionals. However, a minority of students (6%) expressed concerns regarding the module's effectiveness, suggesting that there is a need for more practical experiences to enhance learning outcomes. This theme is echoed in previous literature, which emphasizes the importance of bridging the gap between theory and practice.[13] The suggestion that hands-on, case scenario lectures could be beneficial in addressing this concern is a valuable insight for future improvements.

The discussion of the challenges faced by medical students in engaging with the patient safety module reveals a theme of complexity and difficulty in integrating the module into their existing curriculum. Despite the efforts to make the module manageable, a significant percentage of students (40%)

reported facing difficulties, while only a smaller proportion (23%) found it manageable. This discrepancy highlights the importance of understanding the factors contributing to student challenges in engaging with the content.

One major theme that emerged from the students' responses was the impact of the longitudinal nature of the module on their ability to effectively engage with the content. The requirement for integration with other concurrent modules created a complex and overwhelming environment, which is consistent with previous literature highlighting the potential complexities associated with longitudinal educational interventions.[14] The overlap of content and competing demands from other modules may have contributed to students feeling overwhelmed and unable to dedicate sufficient attention to the patient safety component.

This finding underscores the importance of careful coordination and alignment with the overall curriculum to ensure that students can successfully integrate new knowledge and skills into their existing educational framework. By addressing these challenges, educators can work to create a more supportive and effective learning environment for students. The discussion of the challenges faced by medical students in engaging with the patient safety module reveals a theme of the importance of autonomy and independence in learning. The majority of students who reported difficulties with the module emphasized the need for it to be separate and distinct from other modules, rather than tangled with concurrent coursework. This desire for clarity and focus on their educational experience is a key insight that highlights the importance of balancing interdisciplinary content to optimize learning outcomes.[15]

This finding suggests that students value having a clear and distinct learning experience, free from competing demands and overlapping content. By acknowledging this need for autonomy and independence, the module team can work to create a more tailored and effective learning environment that meets the diverse needs of students. This may involve designing modules that are more self-contained and less dependent on concurrent coursework, allowing students to focus on specific topics and skills without feeling overwhelmed.

The discussion of the integration of the patient safety module with other coursework reveals a theme of the importance of balance and coordination in optimizing student learning experiences. The findings suggest that students have mixed opinions on the impact of integration on their comprehension, with a significant proportion (19%) rejecting the notion that integration enhances their understanding.

The feedback from students who did not endorse the positive impact of integration highlights concerns about attention allocation, with many students feeling that other modules receive more focus and attention. This finding underscores the importance of

considering the balance and coordination of curriculum components to ensure that students are able to effectively engage with integrated modules.

Previous research has emphasized the importance of effective integration across courses for deep learning,[16] but it is also recognized that students' ability to engage with integrated modules can be hindered by prioritization and workload challenges.[17] Therefore, the module academic team may need to review coursework structure, and sequencing to ensure that patient safety modules align with students' learning needs and preferences.

The student feedback on the clinical risk management strategies covered in the patient safety module reveals a theme of the importance of practical applications and real-world examples in enhancing student understanding. While most students (59%) felt that the module adequately covered these strategies, a significant proportion (6%) were dissatisfied, highlighting the need for more practical scenarios.

These findings suggest that a theoretical lecture format may not be effective for all students, and that incorporating practical applications and real-world examples is crucial for improving student understanding. This is consistent with previous research [18,19], a small but significant proportion (6%) expressed dissat isfaction with the module's coverage, highlighting the need for more practical ap proaches. The findings suggest that students desire a more hands-on approach to learning, with practical demonstrations or simu lations being seen as a way to bridge the gap between theoretical knowledge and clinical practice. This is consistent with previous research, which emphasizes the importance of integrating practical applications into patient safety education, particularly in do mains like invasive procedures.[20]

The infection prevention and control discipline in the module is characterized by a multifaceted approach that combines theoretical knowledge with practical skills. The findings suggest that students appreciate the comprehensive coverage of this topic, with a majority (73%) affirming the adequacy of information. The results support the importance of incorporating hands-on practical experiences in infection control education, as highlighted by Kim et al.[21] Additionally, the value of integrating auditing and field visits to enhance students' application of theoretical knowledge in real-world settings is reinforced by Tomczyk et al.[22] These findings underscore the need for educators to consider a holistic approach to infection prevention and control education, one that combines theoretical knowledge with practical skills and real-world experiences.

The theme of medication safety in the module is characterized by a strong emphasis on patient safety, with the majority of students (around 69%) agreeing that the module covers medication safety for patients. This aligns with the prevailing emphasis on patient safety in healthcare education and is consistent with previous studies that highlight the im-

portance of medication safety in patient care curricula.[23,24] These findings suggest high satisfaction with the module's coverage of medication safety, which is consistent with prior research that emphasizes the central role of medication safety in healthcare education.

Patients fall prevention in the module is characterized by a strong emphasis on educating students about the risks associated with patient falls, with a majority of students (65%) agreeing that the module covers this topic. This aligns with the importance of educational interventions in reducing fall-related incidents, as highlighted by different studies.[25,26] The findings suggest that students appreciate the comprehensive approach to teaching fall prevention strategies, with only 5% expressing dissatisfaction. This positive sentiment is crucial for reinforcing the importance of fall prevention education in healthcare curricula, as supported by previous research emphasizing the impact of comprehensive training on patient safety outcomes.

Conclusion

This study aimed to evaluate the experience of fifth and sixth-year students who completed a patient safety module and are currently in their clinical years. The results of the 10-question electronic survey showed varying levels of student satisfaction, with an overall satisfaction rate ranged from 54% to73%. The module received positive feedback, but certain areas were identified as sources of contention among students.

The study's findings suggest that the patient safety module has had a positive impact on students' knowledge and attitudes. However, the study's exploration of student feedback was limited to a single question, which may not provide a comprehensive understanding of students' perspectives and concerns. Future research could use open-ended questions or focus groups to gain a richer understanding of students' views.

The study was unable to measure whether students who had positive feedback about the module had better academic performance grades, or their internship feedback during clinical rotations was distinctive or were more likely to report near-miss events or participate in quality improvement initiatives. Therefore, future research could investigate the impact of the patient safety module on students' knowledge and attitudes over time, in particular, in their clinical duty. To address these limitations, future research could use mixed-methods approaches, incorporating objective measures, and exploring students' knowledge, attitudes, and behaviors towards patient safety in different contexts. This would provide a more nuanced understanding of the module's long-term effects on students' knowledge and attitudes.

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Author Contributions

The author contributed to the study conception and design. Material preparation, data collection and analysis

Conflict of interest

The author declares that he has no conflicts of interest to disclose.

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