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Article abstract

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Patient safety incident analysis in healthcare: a novel curricular session for medical students

L'analyse des incidents liés à la sécurité des patients dans le domaine de la santé: une séance de formation novatrice pour les étudiants en médecine

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Implication Statement

Patient safety incident analysis is a tool which allows for the identification of and learning from patient safety incidents, which are common in healthcare settings. The University of Toronto introduced a patient safety incident analysis session for graduating medical students in the form of a lecture and subsequent student presentations of incident analyses. Student respondents to evaluation rated the session highly and felt that feedback on their presentations was helpful to reinforce material. Medical schools can incorporate this innovative session as an interactive addition to quality improvement and patient safety curricula to provide students with hands-on experience in incident analysis.

Énoncé des implications de la recherche

L'analyse des incidents liés à la sécurité des patients permet de repérer et d'apprendre de tels incidents qui sont fréquents dans les établissements de santé. L'Université de Toronto a introduit une séance d'analyse des incidents liés à la sécurité des patients pour les étudiants en médecine en fin de cursus, sous la forme d'un cours magistral suivi de présentations d'analyses d'incidents par les étudiants. Les étudiants qui ont évalué la formation ont rapporté un haut taux de satisfaction par rapport à la séance et ont trouvé que les commentaires reçus sur leurs présentations étaient utiles pour mieux assimiler le contenu du cours. Les facultés de médecine peuvent intégrer cette formation innovante et interactive comme complément aux programmes d'amélioration de la qualité et à ceux axés sur la sécurité des patients afin de fournir aux étudiants une expérience pratique en ce qui concerne l'analyse des incidents.

Introduction

Patient safety incidents are common and costly for patients and healthcare systems, generating an additional \$2.75 billion in healthcare treatment costs every year in Canada.¹ Some Canadian medical schools have introduced continuous quality improvement, root cause analysis, and systems thinking into medical curricula.^{2,3} There have been international efforts to create patient safety curricula for medical schools.⁴ However, patient safety incident analysis has not been reported in Canadian medical schools.

Patient safety incident analysis is a practical tool that allows for identification of and learning from patient safety incidents. The University of Toronto Temerty Faculty of Medicine introduced a novel patient safety incident analysis session for graduating medical students in 2020. The primary learning objectives were for students to gain an appreciation for patient safety incident analysis and the importance of a "no-blame culture" with a greater focus on systems-level factors that culminate in patient safety incidents. This study was granted exemption from ethics review by the University of Toronto Health Sciences Research Ethics Board.

Description of innovation

A two-hour online lecture provided the introduction to types of patient safety incidents (harmful, no harm and near miss incidents),⁵ incident analysis components, and a walkthrough of a case example. Students were then divided into small groups and tasked with analyzing one of ten patient safety incident cases from different specialties including Obstetrics and Gynecology, Psychiatry, Family Medicine, Internal Medicine, and Surgery (Table 1). Groups worked together to understand contributing factors to each patient safety incident, assignment of impact (significant, moderate, or low) of each contributing factor to the incident, and complete patient safety incident templates which were newly created for this session and have not been validated (Appendix A). Each group presented their analysis in an interactive online session with a faculty facilitator. Students emailed their reports in advance to faculty facilitators who used a standardized rubric, developed *de novo*, to score presentations (Appendix B).

Faculty facilitators were required to attend or watch a recording of a faculty development session one month prior to the small group sessions, and were provided a tutor guide with detailed instructions on moderating sessions, answer keys for the patient safety incident analysis templates, and a document on effectively facilitating virtual sessions. There was no direct cost to administer this session; faculty facilitators volunteered approximately 4-5 hours each: one hour for the faculty development session, two hours for the small group session, and 1-2 hours before or after the session to review materials and grade student presentations. Eleven facilitators were recruited and each facilitated sessions with 18-24 students (consisting of 3-4 groups presenting their incident analysis).

Enabling factors were having a Quality and Safety curriculum lead within the MD program to oversee the planning and administration of this novel session, and dedicated time in each year towards quality improvement and patient safety as part of our MD program structure.

Outcomes

Fifty-four of 253 student participants (21% response rate) and 8/11 (73%) faculty evaluators completed a standardized post-session evaluation for facilitated workshops designed by the MD Program's Office of Evaluation. Student respondents rated the facilitators highly, averaging 4.4/5.0 for *"the preceptor had a positive*

impact on my learning experience." Written comments revealed that students appreciated when facilitators were knowledgeable in quality improvement, asked thought-provoking questions, built on points raised by students, provided feedback that was thought out in advance, and fostered a non-judgmental environment for student presentations. All facilitator respondents (8/8) felt the session gave medical students an appreciation for patient safety incidents and that students were engaged in presentations. Most responding facilitators (7/8, 87.5%) felt the session prepared students to understand that patient safety is a multilayered issue, not an individual performance issue. Written comments revealed that facilitators felt student presentations increased engagement with the material, and recommended providing students with a better sense of the structure of the healthcare system and levels of accountability to aid them in providing realistic recommendations for the management of quality issues. Students identified a desire for more real-life examples of quality improvement efforts. Challenges were identified regarding the online nature of the session, where some students may not engage in discussion.

Suggestions for next steps

Feedback from faculty indicates this innovation contributed positively to students' ability to perform patient safety incident analyses and appreciate the concept of a "no blame" culture. We plan to continue this session in future years with more robust data collection to evaluate student perspectives and whether learning objectives were met. In-person delivery of the session will be trialed in coming years. The end of the fourth year may be an opportune time given students have adequate clinical experience to contextualize patient safety issues, and might allow the introduction of CanMEDS competencies pertaining to patient safety at an undergraduate level to assist with the achievement of associated postgraduate milestones.⁶ Introducing patient safety incident analysis session in earlier years may allow for reinforcement and application of these concepts throughout medical school, and there may also be benefit to introducing these sessions in interdisciplinary environments where students may collaborate with allied health peers to appreciate multiple perspectives.

Table 1. Examples of patient safety incident cases provided to medical students for analysis

Case 1	<p>A 35-year-old man with a history of schizophrenia is found by bystanders with bizarre behavior. Police are called and apprehend the individual and bring him to the hospital. He tells triage nurses that he has active suicidal ideations. Nurses read through his medical history and discover that he has not attended his psychiatry follow up appointments during the COVID pandemic. When asked the patient tells nurses that he did not receive a call to follow up on his appointment. He also does not own a cell phone presently and has lost a few over the last years.</p> <p>In the Emergency Department he is seen by the Emergency Physician who places him under a Form 1. Security is contacted and remains outside the patient's room in the Emergency Department. The Emergency Physician discovers that the patient has not refilled his antipsychotic medications in the past six months. The physician asks the patient why, and he describes that he lost his prescription given to him by his psychiatrist.</p> <p>During his stay in the Emergency Department the patient becomes calmer and is seen by the Psychiatrist on call. He is admitted to the Psychiatry ward for further assessment and management. He is kept under a Form 1. He is seen daily by nursing staff and the Psychiatrist with frequent checks. After his Form expires, he remained admitted to the psychiatry ward with a day pass privilege. In the evening after returning from a day pass, he is found in his room bleeding from his wrists, secondary to self-inflicted wounds, and he is found to have a knife in the room with him. He is transferred to the ICU for blood transfusions and surgical management.</p>
Case 2	<p>A 50-year-old man with a history of type 2 diabetes, hypertension, and atrial fibrillation presents to the emergency department with diffuse abdominal pain. His medications include metformin, ramipril, atorvastatin, and apixaban (a blood thinner). He has a CT scan of his abdomen given his presentation. This shows a large obstructing mass in his descending colon.</p> <p>He has bloodwork done in the Emergency Department:</p> <p>White blood cell count: 7 (normal 4-12) Platelets: 155 (normal 150 – 400) Hemoglobin: 60 (normal 120 – 155) Creatinine: 160 (normal 70 – 100)</p> <p>In the Emergency Department he has a bowel movement with a large amount of rectal bleeding. Accordingly, he is admitted to hospital. His admission orders are done, and his home medications are continued and he is placed on enoxaparin 40mg subcutaneous daily (a medication given to prevent deep vein thrombosis).</p> <p>That night, on rounds he is found unresponsive – a code blue is called by nurses, and CPR is started with multiple rounds of epinephrine administered. Bloodwork is sent off during the code blue and his Hemoglobin is found to be 20. He is pronounced dead, with the cause of death being a gastrointestinal bleed.</p>

Conflicts of Interest: The authors have no conflicts of interest to disclose.

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Appendix A. Critical incident report template

Team Name:

Team Number:

Team Members:

Case Number:

WHAT HAPPENED:			
PATIENT OUTCOME:		SYSTEMIC ROOT CAUSE FACTORS *see definitions below <input type="checkbox"/> Structure <input type="checkbox"/> Policy <input type="checkbox"/> Process <input type="checkbox"/> Communication <input type="checkbox"/> Equipment/Technology <input type="checkbox"/> Practice (Systemic)	
How can we prevent it from happening again			
Why it Happened	Impact on Outcome (Low, Moderate, Significant)	Recommended Actions	Responsibility

*ROOT CAUSE CATEGORY EXAMPLES

Structure:	lack of infrastructure, lack of resources;
Policy:	lack of formal policy, policy outdated, policy not accessible
Process:	no standardized process, gap in current process, process omitted
Communication:	lack of communication, lack of escalation, inaccurate communication
Equipment/Technology:	lack of equipment/technology, equipment/technology malfunction, equipment/technology design issue
Systemic Practice:	unit or program level practice issues identified, not related to individual performance

Appendix B. Scoring rubric for oral presentations

Faculty Evaluator _____ Group #: _____

Case # _____

1 = Does NOT
meet
expectations

5 = EXCEEDS
expectations

PRESENTATION SKILLS (average of all presenters).

	1	2	3	4	5
Was the amount and depth of material suited to the allotted time (10-15 minutes)?...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did the talk maintain the interest of the audience?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did visuals (graphics, videos, slides) enhance the presentation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CONTENT

Was a clear and coherent summary of the case given?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were appropriate contributing factors presented and was rationale provided?.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was reasonable impact on outcome for these factors given?.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did the presenters have a clear understanding of the material presented?.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were appropriate solutions offered?.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CRITICAL THINKING

Was there an appropriate synthesis of the case with appropriate solutions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Did the written case analysis accurately reflect all materials presented?...../20

Did all members of the group appear to make an equal contribution?/10

OVERALL IMPRESSION/15

COMMENTS

TOTAL SCORE _____ / 90

Marking Guide TTR Culminating Oral Presentations.**Presentation Skills:**

Does not meet expectations (1)	Meets expectations (3)	Exceeds Expectations (5)
The amount of material is clearly too much or too little for the allotted time. The presentation lacks interest and creativity. Little evidence of effort to enhance the visual interest of the presentation.	The amount of material is appropriate for the allotted time. The presentation is effective and engaging. There is evidence of creativity and an effort to include visuals which enhance the presentation.	Material is so well-presented that a lot is capably covered in a short time. The presentation interests and engages its audience more than the average. There is ample evidence of a creative approach and thoughtful visuals which both engage and inform the audience.

Content:

Does not meet expectations (1)	Meets expectations (3)	Exceeds Expectations (5)
Insufficient or irrelevant case information provided. Identified contributing factors were not appropriate or rationale was not provided. Impact on outcomes was not explored or were not reasonable. Solutions offered were not appropriate or were not related to contributing factors identified by the group. Presenters show little understanding of their topic.	Case information provided was clear and coherent. Identified the most important contributing factors and provided good rationale. Impact on outcomes was explored and was reasonable. Solutions offered were appropriate and related to the contributing factors identified by the group. All presenters demonstrate a good understanding of the material provided.	The case information provided was clear, coherent and presented in a stimulating fashion... Identified a wide range of contributing factors and provided excellent rationale. Impact on outcomes were explored in depth and showed a deep understanding of the material. Solutions offered were unique and creative. Presenters appear to have a deep understanding of their material and were able to answer questions thoughtfully.

Critical Thinking:

Does not meet expectations (1)	Meets expectations (3)	Exceeds Expectations (5)
Synthesis of case and solutions provided were weak.	Synthesis of case and provided solutions were appropriate.	Synthesis of case was excellent and provided solutions were well thought out.