



Teaching Medical Error Apologies: Development of a Multi-component Intervention

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BACKGROUND AND OBJECTIVES: Apologizing is an important component in addressing medical errors; yet, offering apologies continues to challenge physicians. To address limitations of prior educational interventions, a multi-faceted, apologies intervention was developed to provide medical students with increasingly applied learning opportunities.

METHODS: First-year medical students taking a professionalism course at the authors' Southeastern medical school in 2008 or 2009 were eligible for the study. Data from their assigned activities and a post-intervention survey were analyzed.

RESULTS: A total of 384 students contributed study data; 57.8% were male, 58.6% white, 10.9% Asian-Indian, 10.9% Asian-Other, and 7.6% African-American. Seventy-four percent of students considered tasks as useful or extremely useful. Student confidence in providing effective apologies increased as well as their comfort in disclosing errors to a faculty member or patient. Perceived importance of apology skills similarly increased. Apologies written by female authors were rated higher in effectiveness by peers than apologies written by male authors. Apology evaluators adopting patient perspective were more critical than evaluators adopting peer perspective. No race differences were found.

CONCLUSIONS: This intervention was perceived useful by students and demonstrated medium to large effect size changes in importance, confidence, and comfort around apology errors. The higher evaluations of apologies written by female authors as well as the lower evaluations by evaluators adopting patient perspective warrant further consideration. Additional research is also warranted on streamlining and implementing the intervention for other institutions and ultimately how actual student apology behaviors are later affected.

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Apologizing for a medical error has been recognized as an important component in addressing and minimizing the negative consequences of an error;^{1,2} yet, offering apologies continues to challenge physicians.³⁻⁵ Much of the

previous medical education research has focused on attitudes and experiences of trainees in disclosing medical errors beyond their first year of medical education⁶⁻⁸ and has involved traditional teaching interventions (eg, readings, role plays, case

examples) to teach medical students and physicians the importance of apologizing and suggestions for doing so more effectively.⁹⁻¹⁵ A small number of educational interventions have used standardized patients to teach error disclosure. Halbach and Sullivan¹⁵ had third-year medical students complete videotaped error disclosure with standardized patients along with a lecture, readings, and small-group discussion. Gundersen et al¹⁴ used similar methods plus videos to teach senior health science students in a patient safety elective. These and other prior efforts have offered limited practice opportunities for learners and have not incorporated the potential of online interactive exercises.

To address this need, we developed a multi-faceted intervention for teaching medical students about medical errors and apologies. We provided students with increasingly applied learning opportunities using Miller's clinical competence pyramid as a model (ie, learners move from knowledge to competence, performance, and action).¹⁶ These tasks ranged from online reading and interactive apology tasks to small-group and standardized patient interactions. We anticipate that repeated, increasingly complex opportunities for learners to observe, evaluate, and offer apologies will prove useful to students' confidence

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and perceived importance of apologizing for errors. The details of the teaching intervention are presented here as well as descriptive and evaluative findings of the intervention.

Methods

Curriculum Design

This teaching intervention was part of an overall patient safety curriculum series taught to first-year medical students in a broad-based introductory course called Essentials of Clinical Medicine (ECM). The ECM course included didactic lectures, small discussion groups, and online assignments to teach a breadth of topics (eg, ethics, biostatistics, culture, professionalism, health care access). The intervention

had multiple components, including online content with interactive tasks, small-group tasks and discussion, a standardized patient interview, and anonymous feedback by peers on written apologies. See Table 1 for a chronological summary of all of the tasks.

Briefly, students completed an online training module that provided them with general introductory information on errors and apologies as well as initial practice tasks. In the practice tasks, students first observed four videotapes of faculty mentors apologizing for an error. Second, students evaluated a written apology and used a checklist based on Halbach and Sullivan's curriculum guide for more effective

apologies (Table 2).⁹ Third, students evaluated two sample written apologies. For the first evaluation, students were instructed to assume they were a patient receiving the apology. For the second evaluation, they assumed a peer was sharing the apology with them for feedback. Fourth, students wrote apologies for medical errors in which they were hypothetically involved. To promote realism, the errors were drafted on events that might actually happen to a first-year medical student and (eg, (1) used wrong-sized blood pressure cuff, resulting in incorrect increase in hypertension medication and unnecessary side effects, (2) incorrectly reported CBC results, resulting in unnecessary additional testing, arm

Table 1: Chronological Summary of Curriculum for Apologies Education Intervention

Purpose	Task	Modality
Increase knowledge of impact of medical errors on patients and physicians.	Read background information on the emotional and cognitive impact of errors and apologies on patients, physicians, and teams; read specific suggestions for offering effective apologies.	Online
Reinforce belief that apologizing is an appropriate response to an error; note effective and ineffective behaviors in mentors' apologies.	View four brief videos of physicians apologizing for errors; use checklist* to note specific behaviors.	Online
Critically evaluate an apology; develop empathy for a patient receiving an apology; practice responding to and discussing errors and apologies with peers.	Evaluate a sample apology* (1) Assess a written apology from peer perspective. (2) Assess another apology from patient perspective.	Online
Practice using suggestions for effective apologies in a setting without time or interpersonal factors.	Write an apology for an assigned error scenario in which the student was hypothetically involved; use suggestions from earlier reading content.	Online
Additional exposure to suggestions for effective apologies and additional opportunity to assume patient or peer perspective.	(1) From peer perspective, assess a peer's written apology. (2) From patient perspective, assess another apology.	Small group
Reinforce importance of effective apologies.	Discuss apologies in general. Note observations from apology evaluation task.	Small group
Practice apologizing strategies in a "live" setting.	Apologize in a simulated medical encounter with a standardized patient for a medical error.	Clinical Skills Center
Practice accepting and considering feedback from peers about apologies.**	Receive anonymous feedback from peers on student's apology as rated from peer and patient perspective.	E-mail
Identify and retain useful aspects of teaching intervention.	Survey student perception of utility of various aspects of apologies intervention.	Online

* See Table 2 for evaluation rating form.

** Half of students (intervention group) received peer feedback summary of their written apologies prior to evaluation survey; remaining control students received their feedback after survey was collected.

bruising, and out-of-pocket expenses, (3) failed to inform attending physician of patient symptom (rash) that was unrelated to presenting problem and resulted in a missed diagnosis (bug bite) and increased scarring, (4) recommended alcohol abstinence to a patient abusing alcohol, resulting in severe alcohol withdrawal symptoms and exacerbated posttraumatic stress symptoms) and on topics that students have already received specific training for (ie, reading lab results, use of vitals equipment, behavioral counseling, summarizing interview with attending).

Written apologies were included so that students could practice what they considered to be important aspects of an apology before practicing with a standardized patient. Anonymous written apologies also enabled students to more honestly evaluate and provide feedback to their peers than would be likely provided in person. In addition to these online tasks, students completed small-group tasks and a standardized patient encounter in which they offered an apology. After the standardized encounter, the patient completed an evaluation form (Table 2).

Participants

Data were collected from 384 first-year medical students attending the Medical College of Georgia in academic years 2008 and 2009 and completing an ECM course. These students completed assigned tasks, and their data were analyzed in this study. Evaluations of the tasks were not part of the students' grades. The authors' Institutional Review Board approved the study. For all portions of the study, the students' identity was kept de-identified for evaluation and analysis purposes.

Curriculum Evaluation

In addition to the course data collected, students completed an evaluation survey at the conclusion of the intervention. The survey included the following items: (1) perceived utility of specific educational tasks, (2) importance and confidence in

Table 2: Apology Evaluation Form

Select the steps used in this apology: (circle all the apply)
a. Express regret.
b. Describe what happened.
c. Describe consequences of error and action to be taken.
d. Restate regret and apologize.
e. Ask patient or family about questions they may have.
f. Ask if there is anyone else with whom you should speak.
Provide specific feedback to the writer of the apology as a patient (or peer on the peer rating form, including your initial reactions, what was helpful in the apology, and what can be improved. (If you need more room, continue on the back).
Rate the overall effectiveness of this apology (Scale from 1–10, where 1 is not effective, and 10 is highly effective).

offering apologies, and (3) comfort with disclosing errors. For each of these items, students rated their current levels as well as their pre-intervention levels of comfort, confidence, and importance. The comfort items were based on a previously validated instrument¹⁷ that was developed to discern student perception of the importance of offering apologies for medical errors and to detect any changes in students' confidence with offering apologies and comfort disclosing errors. Perceived utility of specific tasks was included to determine which tasks to amend or consider eliminating in

future versions of the intervention. Students accessed the survey via an online site managed by school personnel. Survey data were collected anonymously and could not be linked to demographics or specific student task data.

Analysis

Descriptive analyses included participant demographics, effectiveness ratings of written apologies, average total scores of standardized patient encounters, and perceptions of the utility of each intervention task. Non-parametric tests were completed to consider if student sex or race

Table 3: Checklist Used by Standardized Patient in Simulated Medical Encounter

1. Examinee entered the room and sat down in a professional manner.	Yes	No
2. Examinee maintained good eye contact.	Yes	No
3. Examinee displayed an open, receptive body posture.	Yes	No
4. Examinee starts with a statement explaining the situation: "I need to tell you about a mistake I made." "I need to apologize."	Yes	No
5. Examinee expresses regret.	Yes	No
6. Examinee explains what happened.	Yes	No
7. Examinee explains what will happen to you next.	Yes	No
8. Examinee explains how they will avoid the error in the future.	Yes	No
9. Examinee apologizes.	Yes	No
10. Examinee gives you the opportunity to ask questions	Yes	No

impacted survey ratings, apology evaluations, and standardized encounter scores. Also, differences in course evaluations by students receiving their apology feedback prior to or after completing the survey were also examined. SPSS Statistical Package Version 18 was used for analyses.

Results

The evaluation survey was completed anonymously, so no analyses based on demographics, except year of study, could be completed. Respondents from the 2 study years did not differ on any evaluations or assignments and thus the 2 years of data were collapsed in analyses. Overall, this intervention was highly rated by students. On the curriculum evaluation survey, about 66%

of the students found the activities useful or extremely useful while only 6% of students did not find the tasks useful. The mean rating for the intervention was 3.6 (on a scale, 1=extremely not useful, 5=extremely useful). In contrast, this cohort of students rated the overall ECM course much lower using the same scale (M=2.3 for 2008–2009 and M=3.2 for 2009–2010).

Participant Demographics

All of the 384 eligible students completed at least one assigned task in the intervention. There were 194 students in 2008 and 190 students in 2009; 57.8% of the students were male, 59.4% white, 11.1% Asian-Indian, 11% Asian-Other, 7.7% African American, 2.6% multiracial, 1.6% Hispanic, and 6.6% not declared.

Eighty-eight percent (337) of the eligible students completed the evaluation survey.

Written Apology (Online)

An online, written apology for an error scenario was assigned to all students, and submissions were received by 357 students (93%). Students rated the utility of this task as 4.31 (SD=1.00) on a scale of 1–5, with 5 being extremely useful. Seventy-four percent of the students reported the apology evaluation exercise as useful or extremely useful; 4.9% considered the task not useful. See Table 4 for summary of all survey data.

Evaluate Peer's Written Apology

Student peers evaluated 337 de-identified written apologies. Each apology

Table 4: Results from Apologies Intervention Evaluation Survey

Categories	Results		
	Before intervention (n=334)	Currently (n=331)	Change (+/-) (n=331)
Importance of offering effective apologies ¹	4.38 (SD=0.73)	4.63 (SD=0.60)	+0.25 (SD=0.53)*
Confidence in offering effective apologies ²	3.28 (SD=0.93)	3.95 (SD=0.66)	+0.67 (SD=0.76) ⁵ *
% of items completed ³	Patient safety course (n=312) 96.21 (SD=12.93)	Apologies module (n=310) 96.42 (SD=13.26)	
Perceived utility of course and module	Patient safety course (n=299) 4.26 (SD=0.92)	Apologies module (n=291) 4.35 (SD=0.89)	
Perceived utility of apology evaluations ⁴	Peer perspective (n=286) 4.28 (SD=0.97)	Patient perspective (n=285) 4.24 (SD=0.96)	Small-group discussion (n=266) 4.41 (0.89)
Perceived utility of standardized patient interview	Individual interview (n=129) 4.38 (SD=0.89)	Receiving informal feedback on SP interview from peers (n=115) 4.57 (0.74)	
Comfort disclosing error to faculty ^{5,6}	Before intervention (n=186) 3.02 (SD=1.06)	Currently (n=148) 3.51 (SD=0.98)	Change (+/-) (n=146)* +0.49 (SD=1.08)
Comfort disclosing error to patient ⁵	Before intervention (n=186) 2.20(SD=0.95)	Currently (n=148) 3.36 (SD=1.06)	Change (+/-) (n=146)* +1.14 (SD=1.10)

¹ 5-point Likert scale (1=extremely unimportant to 5=extremely important)

² 5-point Likert scale (1=extremely unconfident to 5=extremely confident)

³ Percentage (0%–100%); note: all items on this survey are self-report.

⁴ 5-point Likert scale (1=extremely not useful to 5=extremely useful) plus additional option “Did not complete activity.”

⁵ 5-point Likert scale (1=very uncomfortable to 5=very comfortable)

⁶ Disclosure comfort was only obtained from students in the year 2009.

* P<.001

received two evaluations, one from a peer adopting a peer perspective and another peer adopting a patient perspective. The overall mean score for both perspectives of evaluations was 7.74 (SD=1.31) on a scale where 1 is not effective, and 10 is very effective. In the curriculum evaluation survey, students rated the utility of this task (ie, evaluating a peer's apology) as 4.28 (SD=0.97) on a scale of 1–5, with 5 being extremely useful. Sixty-eight percent of the students reported the apology evaluation exercise as useful or extremely useful, whereas 7.2% considered the task not useful. See Table 5 for six examples of apologies written by students.

Students adopting a peer perspective when evaluating apologies were less critical of apologies than students adopting a patient perspective (7.87 versus 7.62, $P=.014$, Related Samples Wilcoxon Signed Ranks Test). Apologies written by female authors were rated significantly higher overall in effectiveness than apologies written by male authors (7.92 versus 7.63, respectively, $P=.015$; Independent Samples

Mann-Whitney U Test). This difference was slightly greater when the evaluator adopted the perspective of a peer evaluating the apology (8.09 female versus 7.72 male, $P=.004$, Independent Samples Mann-Whitney-U Test).

Apologize in Medical Encounter

The mandatory standardized patient apology encounter was only offered to students in the second year of the study ($n=193$). Based on the checklist of items developed by Halbach and Sullivan⁶ and completed by the 11 standardized patients, the mean score for the standardized patient encounter was 9.58 (SD=0.80) on a 10-point scale, with 89.4% of the students receiving a 9 or 10 on the checklist. Students rated overall usefulness of this standardized patient encounter as 4.38 (SD=0.89) on a scale of 1–5, with 5 being extremely useful. Sixty-two percent of students perceived the standardized patient apology encounter as useful or extremely useful, and 4.5% considered the task not useful or extremely not useful.

Overall

The online portion of the apologies intervention received a usefulness rating of 4.35 (SD=0.89). Seventy-four percent of students reported that the online material and tasks were useful or extremely useful whereas 4.9% considered the online module not useful.

Students reported an increase in their confidence in apologizing for an error and comfort disclosing an error; they also indicated greater perceived importance of doing so effectively. Student confidence in providing an effective apology increased +0.68 (on a 5-point scale) ($P<.001$) (Related Samples Wilcoxon Signed Ranks Test) and perceived importance of offering effective apologies increased +0.27 ($P<.001$). Only 1.2% ($n=4$) of the students demonstrated a decrease in their confidence.

Similarly, student comfort with disclosing an error to a faculty member or patient increased from before to after the intervention +0.49 ($P<.001$) (Related Samples Wilcoxon Signed Ranks Test) to a faculty member and +1.14 ($P<.001$) to a

Table 5: Examples of Student Written Apologies

Apology	Peer Score (1=worst, 10=best)	Patient Score (1=worst, 10=best)
Bug Bite Scenario		
It looks like you're going to have some scarring in that area. We will be able to take care of it now so that it doesn't get worse, but I regret so much not having focused on it when you came in last week about your concerns about having the flu. Do you have any questions?	1	3
I first want to apologize for the error that occurred here. It should not have happened, and I understand if you are angry or upset. I assumed that the bite you complained of was harmless and did not mention it to the attending physician who probably would have realized its significance. I should have included all information from the exam even if I did not consider it relevant. Again, I am sorry. It was my responsibility to report this to my attending and I failed to do so.	5	6
Mr X, I regret that I omitted a key detail from your report, adversely affecting your care. A week ago, while taking the history of your illness we discussed the presence of a bug bite on your arm. When I relayed the information to my attending I failed to mention the bug bite. What seemed an incidental finding to me at the time turned out to be crucial to your well-being, and you have suffered the consequences. I regret my mistake, and want to sincerely apologize to you for it occurring. I want to inform you also that I have put in place a process that will reduce chances of this happening again. Do you have any more questions I may answer regarding the episode? And is there anyone else with whom I should be speaking?	10	10

patient. Fifteen percent of students had a 2- or 3-point increase in comfort disclosing to a faculty, and another 29% of students had a 1-point increase in comfort. Twelve percent (n=17) had a decrease in comfort. For comfort disclosing an error to a patient, nearly 10% of students indicated a 3-point increase in comfort; 27.4% had a 2-point increase, and 28.8% had a 1-point increase, whereas 3.4% (n=5) had a 1-point decrease.

Discussion

Students rated the overall intervention and associated tasks (eg, draft apology, evaluate apology) as useful in learning about apologizing for medical errors. These findings are encouraging to educators considering using a medical error apology intervention for teaching students about specific topics.

Students critically evaluated their peers' written apologies as demonstrated in the mean score of the apologies being a 7.74 on a scale of 1–10. The evaluation task was intended to reinforce the importance of effective apologies in the evaluating students (adopting the perspective of a patient receiving the apology or a peer hearing the apology) as well as to provide concrete feedback to the apologizing students on how their apologies were received. The perspective of the evaluator (patient or peer) impacted how the students evaluated the apology. Adopting a patient perspective increased the students' critical reception of the apology, which is important as educators seek to develop and maintain student empathy.

Apologies written by female authors were generally rated higher than apologies written by male authors. This finding may be a result of the written nature of the apologies task or may be an indication of genuine differences between male and female students in their ability to offer effective apologies. This finding is consistent with literature that has shown that female physicians are better able to communicate

and establish rapport with patients than male physicians.¹⁸ It is important to note that there were no race differences in the written apology evaluations or on any of the apology intervention tasks.

Beyond the students' perceived task utility, students rated the importance, confidence, and comfort disclosing errors within effective apologies higher after the intervention. Perceived importance remained the same for about 75% of the students and increased for 25%. Perceived confidence increased dramatically, with about half of the students remaining the same for in their confidence, more than one third increasing by 1 point on the 5-point scale, and another 15% increasing by 2 or more points. Ideally, these positive changes in importance, confidence, and comfort will translate later to actual increased apology behaviors such as actual disclosures, effective apologies, as well as colleague support and encouragement following an error. The low level of comfort in disclosing errors to faculty could be related to students' increased awareness of the complexity of error disclosure and a lack of practice with disclosing to faculty, in contrast to the practice students had with disclosing to a standardized patient.

The standardized patient apology encounter and follow-up small-group review of videotaped encounter were rated as useful by most students. The discussion following videotaped reviews was one of the highest rated activities. These activities occurred at the end of a series of increasing applied tasks (ie, read content, evaluate an apology, draft an apology, evaluate peer apologies, offer an apology to a standardized patient). Any efforts to eliminate earlier tasks or to simply use the standardized patient encounter as primary intervention may negatively affect perceived utility and confidence.

Another area that warrants further consideration is the lack of variation in standardized patient

ratings of students. With 89% of the students receiving a 9 or 10 on the 10-item checklist, it is unclear whether to attribute results to students actually completing all of the recommended apology behaviors or to standardized patients not discriminating behaviors in their assessment. In future course years, assigning external reviewers to observing a sample of encounters and then comparing reviewer and standardized patient ratings for reliability would address this question.

Limitations

Students demonstrated perception changes and exhibited effective apology skills in a standardized patient encounter, but it is unclear how students will respond to errors in clinical care later. Efforts were made to use hypothetical error scenarios in which students could plausibly be involved in coming clinical years (eg, misreading a lab result, offering inaccurate advice to a patient), but a longitudinal follow-up is needed to assess long-term impact of this intervention. Similarly, written error apologies are a distant approximation to actually offering an apology to a patient, though they still provide good practice for these students who are just beginning to work with patients. The nonverbal aspects of the student and patient during an apology could not be evaluated in the written tasks. For example, written apologies may have been evaluated poorly for being rigidly phrased, but in an actual apology the students may be rated more highly if they used the same rigid phrasing but also leaned forward, nodded with patient, and appeared contrite. This concern has been partially addressed by adding a standardized patient encounter, but the checklist used in the encounter must also include nonverbal assessment items.

Students indicated their comfort and confidence with apologizing as well as the importance of doing so; they also rated what they believed these items were prior to the

intervention. Some investigators¹⁹⁻²⁰ have considered this “post-then-pre” method of self-report evaluation a more accurate assessment strategy because the evaluators are judging the content from the same vantage point, and the method has been used in other academic studies.²¹⁻²⁴ A follow-up study using a pre/post-assessment design is warranted to replicate the findings of this study.

Introducing first-year medical students to the impact of medical errors and apologies provides a foundation for later discussions of errors. Given that most first-year medical students have minimal clinical experience or limited patient encounter opportunities, continuation of this teaching intervention and reinforcement of key concepts are warranted at later years of training. While educators discuss errors in the students’ later years of training, a more in-depth discussion of the potential downsides of apologizing warrants revisiting. As introduced in the online module of this intervention, these may include legal implications of apologies, how attribution of “responsibility” for an error might impact a team, and challenges of emotional responses of patients and their families following an error.

Training students how to respond to patients who react with challenging responses (eg, anger, crying, sadness, threats) is an important component of learning how to apologize to patients. The developers of this apologies intervention consider this learning objective to be more advanced and beyond the introductory series presented here. However, at the authors’ institution, the first-year medical students are provided with training on interacting with patients in challenging situations (eg, breaking bad news, addressing adherence). Issues of error apology responses could be incorporated here or in subsequent years of training.

Conclusions

This apologies intervention with its increasingly applied tasks yielded

positive changes in student perception of the importance of offering effective apologies, confidence in doing so, as well as their comfort in disclosing an error to a patient or faculty member. This cohort of students in their first year of medical school considered the teaching modes used in the intervention as useful (ie, online, small group, standardized patient). The automation of the online module as well as the straightforward small-group tasks suggests other institutions could readily adopt this intervention. The higher evaluations of apologies written by female students as well as the lower evaluations when adopting the patient versus peer perspective when evaluating an apology warrant further investigation. Determining if any of the tasks can be streamlined or eliminated while maintaining the positive learning outcomes is another future research study. Finally, a longitudinal study considering actual error apology behaviors of the students completing this intervention would be beneficial.

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