Educational Exchange

Development of a Simulation-Based Mastery Learning Curriculum for Breaking Bad News

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Abstract

Introduction. Physician communication impacts patient outcomes. However, communication skills, especially around difficult conversations, remain suboptimal, and there is no clear way to determine the validity of entrustment decisions. The aims of this study were to 1) describe the development of a simulation-based mastery learning (SBML) curriculum for breaking bad news (BBN) conversation skills and 2) set a defensible minimum passing standard (MPS) to ensure uniform skill acquisition among learners.

Innovation. An SBML BBN curriculum was developed for fourth-year medical students. An assessment tool was created to evaluate the acquisition of skills involved in a BBN conversation. Pilot testing was completed to confirm improvement in skill acquisition and set the MPS.

Outcomes. A BBN assessment tool containing a 15-item checklist and six scaled items was developed. Students' checklist performance improved significantly at post-test compared to baseline (mean 65.33%, SD = 12.09% vs mean 88.67%, SD = 9.45%, $P < 0.001$). Students were also significantly more likely to have at least a score of 4 (on a five-point scale) for the six scaled questions at post-test. The MPS was set at 80%, requiring a score of 12 items on the checklist and at least 4 of 5 for each scaled item. Using the MPS, 30% of students would require additional training after post-testing.

Comments. We developed a SBML curriculum with a comprehensive assessment of BBN skills and a defensible competency standard. Future efforts will expand the mastery model to larger cohorts and assess the impact of rigorous education on patient care outcomes. J Pain Symptom Manage 2019;57:682–687.

Key Words

Simulation-based mastery learning, breaking bad news, communication skills training, assessment tool, minimum passing standard, entrustment

Introduction

Communication skills impact numerous outcomes including patient and family quality of life, satisfaction, trust in physicians, and health care use.[1] Despite this evidence, communication skills training remains insufficient with many gaps remaining in how we prepare clinicians to have difficult conversations.[1,2] Multiple studies now show that learners gain new skills after rigorous communication skills training.[3,4] However, it is unknown if these new skills are retained over time or transfer to improvements in patient care.[1] In fact, few studies of communication skills training programs have been able to improve patient-reported outcomes and one showed no improvement in ratings of quality of communication and increased depression scores among patients who interacted with postintervention

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Accepted for publication: November 15, 2018.

0885-3924/$ - see front matter
https://doi.org/10.1016/j.jpainsymman.2018.11.012

learners.[5] A possible explanation for this finding is that some learners did not acquire sufficient skills in the classroom to transfer to patient encounters.

One method to ensure learners obtain sufficient skills in the classroom is to use simulation-based mastery learning (SBML). SBML is a rigorous form of competency-based education where learners engage in standardized deliberate practice (DP) on a simulator with individualized feedback until they are able to meet or exceed a minimum passing standard (MPS) on an assessment. In the mastery model, *time* varies while learning *outcomes* are uniform. SBML has been used in a variety of health care contexts including training in procedural, team, and communication skills (e.g., code status discussions).[6] It has powerful effects on both trainee- and patient-centered outcomes.[6,7]

Breaking bad news (BBN) is an important clinical task for physicians, and it is often used as a foundational "difficult conversation" in medical education because it encompasses skills in delivering information and responding to emotion.[4] However, there is no standard method to teach and assess these skills. This is despite the fact that BBN and the associated communication skills are part of the Physician Competency Reference Set used by the Association of American Medical Colleges as the cornerstone of the movement toward competency-based undergraduate medical education.[8,9] The present study had two aims: 1) describe the development of a BBN SBML curriculum for medical students, which includes assessment of BBN skills and 2) set a defensible MPS for the curriculum and apply it to student assessment scores.

Innovation

The main challenge facing undergraduate medical education is how to transition from a norm-based system to a competency-based system to ensure uniform high performance as graduating medical students enter residency.[9] As part of an institutional effort to create a competency-based "Capstone" experience for graduating medical students, we developed a BBN curriculum for fourth-year medical students at Northwestern University Feinberg School of Medicine, a large, urban medical school in Chicago, Illinois. We used the Thomas model for development of medical curricula.[10] The innovation was the use of a SBML model to ensure competency-based communication skills training in "Breaking Bad News."

Our general needs assessment led us to focus on "Breaking Bad News" as this has been identified in a national survey as an essential competency for graduating medical students.[2] We also reviewed the Physician Competency Reference Set, the foundation of the Association of American Medical Colleges' work in creating milestones and Core Entrustable Professional Activities for graduating medical students, which state medical students in accredited U.S. schools should "demonstrate sensitivity, honesty, and compassion in difficult conversations (e.g., about issues such as death, end-of-life issues, adverse events, bad news, disclosure of errors, and other sensitive topics)." In addition, students should "demonstrate insight and understanding about emotions, and human responses to emotions that allow one to develop and manage interpersonal interactions."[8] In a local targeted needs assessment, we realized our institution did not have a defensible method for competency-based assessment of medical student skills in BBN.

Therefore, the goal of our curriculum were to teach medical students how to break bad news to patients while demonstrating sensitivity, honesty, and compassion. The objective of the BBN curriculum was after completing training, fourth-year medical students will meet or exceed the MPS on a BBN skills assessment using standardized patient (SP) encounters.

The learning strategy of our curriculum incorporated SBML to ensure a competency-based design. SBML first requires learners to participate in a simulated skills pretest before starting any education. A pretest is a key part of the learning intervention because it informs learners and instructors of preworkshop deficits. Next, learners observe a didactic session and then participate in DP, focusing on the skills identified in the pretest. Finally, learners undergo post-testing where they are expected to meet or exceed the MPS. Trainees who do not meet this standard participate in further DP until they can be retested and meet this score.

For our BBN SBML curriculum, we developed a clinical case to assess learner BBN skills at pretest and post-test. The pretest involved each student leading a 15-minute conversation with an SP. The student was asked to disclose serious information about a brain scan showing a likely cancer to an outpatient. After completing the pretest, learners participated in a four-hour BBN skills development workshop. At the start of the workshop, learners received focused feedback about their pretest performance. A lecture then focused on the SPIKES[11] protocol to deliver bad news and included a demonstration of a BBN encounter led by a clinical expert. The SPIKES framework was chosen as it has been shown to result in greater skill acquisition compared to curricula based on another or no framework.[3] After completing this didactic content, each student used their pretest feedback to develop individualized learning plans for improved BBN skills.

As part of the four-hour workshop, participants next completed three hours of DP of BBN skills. We developed six clinical cases highlighting various clinical

scenarios where students could practice delivering BBN to simulated patients. These DP sessions involved small group training with a simulated patient using methods adapted from the VitalTalk methodology.[1,4] Each learner practiced and received feedback from a faculty facilitator, emphasizing topics in their individualized learning plan. New skills were continuously practiced until the desired change in learner behavior was observed by the faculty rater. Finally, the learner participated in a post-test. The pretest and post-test cases had the same clinical details but were presented by different SPs.

The assessment tool for the pretest and post-test was created by an expert panel using techniques described by Stufflebeam[12] drawing upon relevant literature describing evaluation of communication skills such as BBN.[4,13,14] The expert panel included 13 education experts in communication skills training, undergraduate medical education, graduate medical education, continuing medical education, general internal medicine, critical care medicine, palliative medicine, and mastery learning. The final BBN assessment tool contains a 15-item checklist and six scaled items. The six scaled items included three questions using a five-point global rating scale and three Likert-scale questions developed from data about patient preferences regarding receiving bad news.[14] Taken together, the scaled items assess the quality of communication (QOC), including quality of verbal and nonverbal responses to emotion, overall quality, and patient-valued communication skill quality. The use of both checklist and scaled items allows the rater to assess whether key steps are performed and how well key skills are performed.

After completion of the assessment tool, we performed pilot testing of the curriculum on all fourth-year medical students ($N = 10$) who were on their previously assigned medical sub-internship rotation at the time of the training. This pilot test was done to 1) modify and fine-tune the curriculum based on informal feedback; 2) inform the MPS during standard setting exercises; and 3) ensure the data derived from the assessment tool are reliable. All pretest and posttest were video-recorded. Two raters (J. H. V. and G. J. W.) serially evaluated a sample of videos and created a grading rubric using anchors on the scaled items until there was consistent agreement on scoring. All pretest and post-test from present study subjects were scored by one examiner (J. H. V.). A second examiner (G. J. W.) evaluated a random 50% of examinations using the same assessment tool to assess inter-rater reliability (IRR).

An expert panel was convened to set an MPS using the Angoff and Hofstee standard setting methods.[15] The panel had eight judges including one palliative care nurse, four palliative care physicians, and three internal medicine physicians. Panel members had expertise in patient-physician communication, communication skills training, and medical education.

As part of our evaluation of the curriculum, we measured the difference in pretest and post-test BBN checklist scores and collected demographic information. Demographic information included age, sex, previous training in how to conduct a BBN conversation, experience delivering bad news, and experience with palliative care teams. These data were used to evaluate relationships between demographic information and pretest and post-test performance. We evaluated how many students would not have met the MPS at post-test and therefore would be required to undergo more DP and retesting as required in the mastery model. This study was approved by the Northwestern University Institutional Review Board.

Data Analysis

IRR was assessed using the Kappa (κ) coefficient for dichotomous checklist data, and intraclass correlation (ICC) coefficients were used for interval data on the scaled QOC items. Overall mean differences in BBN checklist skills were evaluated using paired *t*-tests. Fisher's exact tests were used to evaluate differences between individual checklist items and scaled QOC and Likert items. We used the Spearman's rho correlation coefficients to evaluate for relationships between demographic information provided by the pilot learners and pretest performance. All analyses were performed using SPSS, version 25.0 (IBM Corp, Armonk, NY).

Outcomes

IRR was moderate to high, average $\kappa = 0.91$, for the 15-item checklist, average ICC = 0.72, for the three global rating scale items, and average ICC = 0.63, for the three Likert-scale items. The expert panel set the MPS at 80% of the checklist items correct and at least a score of 4 of 5 on the scaled QOC and Likert-type scale questions.

Ten fourth-year medical students participated in the pilot study as part of a required four-week medicine sub-internship rotation. All students were male, and the majority (7 of 10) reported they had never participated in a BBN conversation or had only done so one or two times in the last year. Two students reported they had participated in a BBN conversation approximately once per month, and one student reported they had participated in a BBN conversation a few times per month over the last year. No students had completed a prior palliative care rotation although the majority of students (7 of 10) had shared a patient with the palliative care service over the last year.

Students' overall checklist performance significantly improved from mean 65.33% (SD = 12.09%) checklist

items correct to 88.67% (SD = 9.453%, $P < 0.001$). Specific checklist items such as asking permission, using clear, specific language such as the word "cancer" and avoiding medical jargon also significantly improved (Table 1). Students were significantly more likely to have at least a score of 4 of 5 for the six scaled questions after the workshop compared to before. In addition, particular skills such as verbally responding to emotion, overall QOC, and the ability to clearly convey information were significantly improved after the intervention (Table 2). There were no relationships between demographic information and pretest or post-test performance.

When applying the MPS to the post-test data, one student (10%) did not meet the MPS based on the 15 checklist items alone. However, using both the checklist and the six additional scaled items, a total of three students (30%) would require additional DP and retesting to achieve the MPS.

Comment

This study shows that developing a SBML curriculum for BBN is feasible and results in robust skill improvement. This is important because the quality of patient-physician communication is increasingly being recognized by health care professionals and researchers alike as impacting patient experience, resource use, and multiple clinical outcomes.[1]

This is the first study to develop an assessment tool and a training model for a BBN SBML curriculum. In addition, this is the first study to develop defensible standards on assessments that ensure learners acquire a high level of BBN skills. The fact that 10% of learners did not meet the MPS on checklist alone, but an additional 20% did not meet the MPS on the scaled items suggests that having both was valuable in ensuring that not only were key steps performed but that learners had acquired the skills to perform them well. Including both types of items is an innovation in comparison to prior SBML communication skills assessment tools.[6]

Our study has several limitations. First, this study included a small sample size of students of a single sex at one academic institution. We may have been underpowered to evaluate relationships between demographic information and test performance. Second, the SBML intervention was resource intensive. In addition to needing access to SPs and a clinical education center with video-recording capabilities, the intervention is time intensive (approximately 1.5 faculty hours per student trained including SP training time), making scalability an issue. Currently, a larger study is ongoing to evaluate the scalability and outcomes of implementing this mastery learning curriculum with a larger group of students. One option being studied to promote scalability is the use of trained, nonphysician raters, which would cut faculty time by 33%. Another option would be to hold larger courses with multiple small groups running at the same time which would allow SPs to rotate between the groups resulting in decreased SP costs and decreased faculty time spent in didactics and SP training. The third limitation is

Table 1
Number (%) of Medical Students Performing Each Item Correctly on the Breaking Bad News Skills Checklist

Item	Pretest Correct, *n* (%) (*N* = 10)	Post-test Correct, *n* (%) (*N* = 10)	*P*-value
Delivering bad news			
Creates initial rapport when first walking into room. (Introduces self if first visit and acknowledges you before discussing medical information: e.g., "it's good to see you" or "how you are doing" etc.)	6 (60)	8 (80)	.31
Assesses patient/family's perception or understanding of medical situation (e.g., "tell me what you understand …," "what have the other doctors told you about …")	9 (90)	10 (100)	.50
Asks permission before giving the news (e.g., "I would like to discuss the results of your scan now. Is that OK?")	3 (30)	10 (100)	.002
Gives a clear and concise "warning shot" (e.g., "I have some serious news")	6 (60)	8 (80)	.31
Uses word "cancer" when giving bad news	3 (30)	10 (100)	.002
Waits 3+ seconds after delivering bad news	8 (80)	10 (100)	.24
Delivers bad news within the first few minutes of the conversation	10 (100)	10 (100)	–
First statement after giving the news is an empathic statement (e.g., "I know this is not what you expected to hear today," "This is difficult news")	8 (80)	9 (90)	.50
Discusses plan only after patient asks to or gives permission to discuss next steps.	6 (60)	10 (100)	.04
Suggests a plan for the next step	10 (100)	10 (100)	–
General patient-centered interviewing skills			
Uses summary statements to ensure understanding of patient/family's statements (e.g., "It sounds like …")	2 (20)	8 (80)	.71
Avoids medical jargon (uses technical language without clarifying what it means)	2 (20)	8 (80)	.01
Gives information in small chunks (no more than 1 chunk of information before allowing patients to process)	9 (90)	9 (90)	.76
Avoids giving information or discussing plan while patient/family very emotional	6 (60)	9 (90)	.15
Avoids providing reassurance as first response to patient/family's emotion (avoided saying something like "It's okay" or "Don't worry!")	10 (100)	10 (100)	–

Table 2
Number (%) of Medical Students Performing Each Item Correctly on Breaking Bad News Skills Scaled Items

	Pretest ($n = 10$)		Post-test ($n = 10$)		
Item	1 through 3, *n* (%)	4 or 5, *n* (%)	1 through 3, *n* (%)	4 or 5, *n* (%)	*P*-value
When talking with the clinician about important issues like bad news, how good is he/she at:					
Verbally responding to your emotion[a]	7 (70)	3 (30)	1 (10)	9 (90)	.01
Nonverbally responding to your emotions[b]	4 (40)	6 (60)	3 (30)	7 (70)	.50
Overall, how would you rate this clinician's communication with you?[c]	7 (70)	3 (30)	1 (10)	9 (90)	.01
The doctor demonstrated that he or she was able to recognize the impact of this moment on me[d]	1 (10)	9 (90)	0	10 (100)	.50
The doctor was able to convey the information clearly and provide guidance on how we should proceed[d]	2 (20)	8 (80)	0	10 (100)	.24
During the conversation, the doctor was able to notice how I was doing and switch back and forth between providing information/guidance and acknowledging the impact of the news on me[d]	3 (30)	7 (70)	1 (10)	9 (90)	.29

[a]Global Rating Scale (1 = no verbal response to my emotion or responses hampered my relationship with the physician, e.g., said something I found off-putting; 5 = consistent verbal acknowledgment of my emotions that almost always felt natural and tailored to my needs).
[b]Global Rating Scale (1 = no nonverbal response to my emotion or nonverbal actions hampered my relationship with the physician, e.g., inappropriate touch, uncomfortable silence, distracted body language, no eye contact; 5 = consistent verbal acknowledgment of my emotions that almost always felt natural and tailored to my needs).
[c]Global Rating Scale (1 = the physician communicated in a way that was detrimental to our relationship; 5 = the physician consistently said/did things that I found helpful and responses/actions that almost always felt natural and tailored to my needs).
[d]Likert scale (1 = strongly disagree, 5 = agree).

that only medical students were trained using this intervention. However, this research agenda is being expanded to groups including graduate medical education, continuing medical education and interdisciplinary team members including nurses, social workers, and chaplains. Future research will also include expanding this model to other types of conversations such as goals of care conversations. Finally, we did not evaluate clinical outcomes. Future research should focus on the effects of the curriculum on translational patient outcomes such as a patient's perceptions about the QOC, patient/family psychological outcomes, health care use, and provider resilience after learners engage in a mastery learning communication curriculum.

In conclusion, this is the first study to develop a SBML curriculum for BBN. This study introduces a novel method for rigorously assessing the skills necessary to deliver serious news. Use of the mastery model allows for individualized assessment and progression based on competence rather than time. Future work will expand the mastery model to larger cohorts, different learners, various conversations, and assess the impact of rigorous education on patient care outcomes.

Disclosures and Acknowledgments

G. J. W. is a partner with and has received speaking fees from VitalTalk, a 501c3 nonprofit communication skills training organization. The work of VitalTalk informed the communication skills training in the paper. All other authors have no relevant financial disclosures.

The authors would like to acknowledge Drs. Douglas Vaughan and Kevin O'Leary for their support and encouragement of this work. The authors thank the Northwestern University Feinberg School of Medicine medical students for their dedication to education and patient care.

Funding: No external funding was received to support this work. This was supported by the Department of Medical Education at Northwestern University.

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