Breaking Bad News for Anesthesia Residents: A Validity Study of a Simulation Based Education Intervention

BY

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THESIS

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This thesis is dedicated to my husband Georges and my kids Celine, Sarah, Maria and Elie without whom it would never have been accomplished.
ACKNOWLEDGMENTS

I would like to express my deep appreciation to my committee chair and advisor Dr. Ara Tekian for his unwavering support and assistance. I also wish to express my sincere thanks to my committee members Dr. Ilene Harris and Dr. Yoon Soo Park for their guidance and their insightful comments.

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Vanda
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<tr>
<td>ACGME</td>
<td>Accreditation Council for Graduate Medical Education</td>
</tr>
<tr>
<td>BBN</td>
<td>Breaking Bad News</td>
</tr>
<tr>
<td>CanMEDS</td>
<td>Canadian Medical Education Directives for Specialists</td>
</tr>
<tr>
<td>PGY</td>
<td>Post Graduate Year</td>
</tr>
<tr>
<td>LAU</td>
<td>Lebanese American University</td>
</tr>
<tr>
<td>LAU-CSC</td>
<td>Lebanese American University-Clinical Simulation Center</td>
</tr>
<tr>
<td>SP</td>
<td>Standardized Patient</td>
</tr>
<tr>
<td>UIC</td>
<td>University of Illinois at Chicago</td>
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SUMMARY

The validity evidence supporting the use of a previously published "GRIEV_ING" assessment tool in measuring the acquisition of BBN skills for 16 PGY3-4 anesthesia residents after an educational intervention was conducted using a mixed method design study. The GRIEV_ING checklist was modified, pilot tested and reviewed by content experts to accommodate the anesthesia context. Examiners and standardized patients (SPs) underwent frame-of-reference training sessions in preparation for their roles. BBN skills were assessed via videotaped SP encounters after immersive scenarios, at baseline and immediately post-intervention with two different cases. A communication global rating and the GRIEV_ING assessment tool were used. Residents' perception about their own ability and comfort for BBN were collected using the pre and post workshop surveys. A focus group interview was conducted.

The inter-rater reliability for both cases indicated good inter-rater reliability for the GRIEV_ING checklist and good internal-consistency reliability for both assessment instruments. Item analysis on the GRIEV_ING checklist items showed that the majority of items had an excellent discrimination power. Performance did not show significant differences when based on years of training, previous training or experience. Concepts from the focus group discussions were organized into categories that included residents' perceived barriers to BBN; strategies for BBN, strengths of the education intervention and training needs.

Findings from this study indicate that BBN is a teachable skill. The evaluation of our education intervention provides validity evidence to illustrate the value of integrating BBN into the curriculum of the anesthesia resident.
I. INTRODUCTION

Breaking bad news (BBN) to patients and their relatives is a complex and stressful task. In anesthesiology, the range of BBN varies from postponing a surgery to intra-operative patient death. The majority of anesthesiologists will experience peri-operative death or critical incident of a patient over the course of their careers. Although these occurrences are rare, they can have substantial psychological and professional consequences for the anesthesiologist and for the anesthesia team, as well as for patients and their families. The difficult decisions in the direct aftermath of an adverse event may require an experienced physician and will be influenced by the emotional impact that an adverse event has on the physician. Having an effective strategy for addressing patients’ or family members’ distress when bad news are disclosed increases the anesthesiologist’s confidence in this difficult task. This makes it important for anesthesiologists to address BBN as an integral part of the residency training program.

Formal teaching does not often address communication skills and the most common standard for teaching BBN in anesthesiology is to observe attending anesthesiologists conveying bad news to patients or their families. Furthermore, despite the fact that the Accreditation Council for Graduate Medical Education (ACGME) and the Canadian Medical Education Directives for Specialists (CanMEDS) prioritize communication and interpersonal skills as a core competency and require residents to achieve competence in this area, few studies in the anesthesiology literature describe initiatives to include BBN in the postgraduate curricula. These studies describe the comfort level and the attitude of residents toward BBN after an educational intervention, yet without measuring the effectiveness of the educational intervention on residents’ skills in BBN. Therefore, it remains unclear what structure, training methods or
evaluation instruments are best used to teach and assess BBN to anesthesiology residents. The GRIEV_ING “G: Gather, R: Resources, I: Identify, E: Educate, V: Verify, I: Inquire, N: Nuts and Bolts and G: Give” assessment tool is a 27-item instrument, developed by Hobgood for death notification in the context of an emergency department setting. The use of this instrument resulted in improvement in the confidence and competence in BBN for emergency medicine residents, for senior medical students and for paramedics as well as for pediatric residents.

The purpose of this study is to examine the validity evidence supporting the use of a modified GRIEV_ING assessment tool in measuring the acquisition of BBN skills for anesthesiology residents after an educational intervention. Modern validity theory will be used as a framework to gather multiple sources of evidence for the validity of the scores from this testing. Validity is demonstrated by collecting evidence that supports or refutes the proposed meaning of a set of scores, and this evidence can be grouped into five sources that are referred to as: content, response process, internal structure, relations with other variables and consequences.
II. METHODS

Institutional Review Board approval was obtained from the Lebanese American University (LAU) and from the University of Illinois at Chicago (UIC). Participants were informed that their participation was voluntary; results were anonymized. Written consent was obtained prior to the educational intervention.

A. Trainee Population

All PGY 3 and 4 anesthesiology residents from the six Lebanese Schools of Medicine that offer anesthesiology residency programs were invited to participate in this education intervention. Residents were informed about this study by their respective program directors to whom an email with information about the study was sent. There were no specific selection criteria, only availability and willingness to participate. PGY-1 and PGY-2 residents were not invited because of the minimal likelihood of BBN encounters at their junior stage of training. In addition, PGY-1 residents spend most of their clinical base year in clinical rotations outside the anesthesiology department.

A few days prior to the date of the workshop, a survey was administered to residents inquiring about their previous experiences with BBN, as well as their self-perceived ability and comfort in BBN. Also, they were asked about any previous training and their perception of the need for training programs (Appendix A).

B. Rationale for the Communication Curriculum Selected

The teaching intervention selected for this study was modeled on “The GRIEV_ING Death Notification Protocol”, a curriculum designed by Hobgood. This curriculum includes short
PowerPoint presentations, small group discussions, and role-play with standardized patients (SP). This protocol was selected because it is a complete curriculum with ready to use SP encounters and assessment tools. Also, this curriculum has demonstrated effectiveness in emergency medicine residents, medical students, and emergency medical service providers and is supported as a resource by the ACGME Outcome Project. This curriculum was modified by adding immersive scenarios with high fidelity manikins that took place before the SP encounters.

A. Delivery of the Education Intervention

The session took place at the LAU-Clinical Simulation Center and was organized by two anesthesiologists and a clinical psychologist, in addition to a simulation educator. The session lasted approximately 4 hours and started with a 15-minutes structured orientation followed by a 10-minutes hands-on introduction to the simulation setting and equipment. Participants, randomly divided into groups of four, participated in two immersive experiences with the high fidelity simulator. This was followed by an individual encounter with an SP. The two encounters were separated by a teaching intervention delivered by a senior anesthesiologist and the clinical psychologist and consisted of short lectures, role-play and group discussions. At the end of the session, participants completed a survey about their own confidence in their ability and comfort in BBN (Appendix B). The survey also included open-ended questions about the strengths and weaknesses of this educational intervention.

A focus group was conducted by the organizing team and six residents representing the six Lebanese residency programs. The focus group interview lasted one hour and was conducted in the Debriefing Room at the LAU Simulation Center. The interview was
conducted, using a set of open-ended questions consistent with the study objectives\textsuperscript{22} (Appendix C). The interview was conducted in Arabic, as it is the primary national language spoken fluently by all residents. The facilitator was the Primary Investigator (VAR) assisted by the anesthesiologist Co-investigator (HB). A sample of prepared questions targeted residents’ perceptions of the barriers for BBN, proper strategies for BBN to patients and their families after this training, the strengths of the training and the ways to address their training needs. All interviews were audio-recorded and transcribed. With the aim to reduce any bias, the two anesthesiologists independently identified themes in the transcriptions. For inter-rater reliability, comparisons were made between the two anesthesiologists’ results and disagreements were discussed. Data derived from the focus group discussions was coded. Analysis of the content was done according to the canons and procedures of the grounded theory approach to qualitative research\textsuperscript{23}.

**B. Scenarios**

Two scenarios describing situations of unexpected intra-operative anesthetic complications were developed by content experts (senior anesthesiologists), assisted by experts in simulation-based medical education (LAU-CSC educators) and in communication skills (clinical psychologist). The cases, anaphylactic shock and cardiac event, occur during a routine anesthesia induction on a healthy patient. Both cases were selected on the basis that the complication is from a purely anesthetic origin and not from the surgery. Following the resuscitation efforts of the participants, the patient was stabilized but his critical state mandated his transfer to the intensive care unit (ICU). Following this immersive simulation experience, each participant was invited in a separate room to inform a patient’s family member about this unexpected complication,
the cancellation of the surgery and the need to transfer the patient to the ICU for further management of his critical situation. All encounters were videotaped. The choice to use two different cases was based on the assumption that, in the context of this education intervention, cases are only used as "vehicles" for assessing the same construct that is "BBN" in residents. In addition, the use of the same case twice during the same intervention would have made it less challenging for the residents. Both cases did not end up in the death of the patient, because an intra-operative death from a purely anesthetic complication is rare, while complications from critical incidents are more common and hence the education intervention targeting BBN after a critical incident was considered as more beneficial, practical and realistic for the residents in learning about BBN.

C. The Assessment Instrument

The GRIEV_ING is a 27-item instrument developed to cover 8 competency areas about death notification (Appendix D). In addition, the instrument can be divided into subscales that measure different components of the BBN skill: 1) Preparation (9 items, Gather-Resource-Identify), 2) bad news delivery (12 items, Educate-Verify-Inquire), and 3) Wrap-up (6 items, Nuts and bolts- Give), addressing specific details of next steps and providing personal availability for follow-up questions/needs. After a thorough review by the organizing team, the general structure of this checklist was maintained, while some descriptors were modified to accommodate the notification of a critical incident or death in the anesthesiology context.

This modification of the instrument was followed by running a few scenarios of BBN with the SPs; the wording was further modified based on feedback. The checklist was also sent to three anesthesiology program directors to ensure its applicability in assessing
the anesthesiology residents in BBN. In addition to this GRIEV_ING checklist assessment form, participants were also assessed for communication skills by the SPs with a global rating instrument (Appendix E).

D. The Raters

Five experienced SPs were recruited from the simulation center pool. Training was conducted by the organizing team (anesthesiologists-psychologist-simulation educator). SPs received a two-hour frame-of-reference training for their roles as family members. In addition, they received four-hour training and calibration sessions to prepare them for their rater role by reviewing the modified GRIEV_ING and the communication global rating instruments, thus ensuring the accuracy and consistency of their ratings. Immediately preceding the workshop, SPs participated in a review session to ensure that all instructions were clear about their roles. The two anesthesiologists who developed the modified GRIEV_ING checklist, and hence are familiar with its use, independently rated the videotaped encounters.

E. The Assessments

Residents’ skills in BBN were assessed with an SP encounter at two separate time points: before the teaching intervention with scenario 1 = anaphylaxis (pre-test) and immediately post-intervention with scenario 2 = cardiac event (post-test). Residents were not assessed on the way they managed the intra-operative events, but were only assessed on the way they did the BBN to the patient’s family. SPs completed both the modified GRIEV_ING checklist and the communication global rating assessment. The GRIEV_ING checklist is a binary assessment tool with 1 = performed item and 0 = did not perform item. The
communication global rating tool include a scale from 1 = poor to 5 = excellent. To ensure inter-rater reliability, six encounters from Case One and from Case Two were randomly sampled and rated by two anesthesiologists and the psychologist.

F. Data Analysis

The intraclass correlation coefficient (ICC) was used to evaluate inter-rater reliability. Each rater scored each assessment item on a yes/no basis (1 = performed item, 0 = did not perform item). Cumulative scores were calculated by adding the total number of performed items. Also, the percentage of performed items was calculated for all residents. The internal-consistency reliability (Cronbach's alpha) for the communication global rating and the complete checklist, as well as for the subscores, was calculated for Case One and Two. A paired-samples t-test was used to compare trainee scores before and after the intervention for the entire checklist as well as for the subscales and for the global rating scale. The Pearson’s correlation coefficient was used to calculate the association between the GRIEV_ING checklist and the communication global rating scores.

An item analysis for the GRIEV_ING scale was conducted. An item difficulty index was calculated as a percent of items performed correctly. This index was interpreted according to four levels of difficulty. In addition, item discrimination was conducted. A discrimination index D, given by the difference in proportions of examinees in a high-scoring group (top 27%) who got the item correct and those in a low scoring group (bottom 27%) who got the item correct, was used. The discrimination power of the items, according to their D value, was interpreted according to Ebel’s classification. Survey data was summarized by frequency counts and means. Data were analyzed using the
Statistical Package for Social Sciences (SPSS) version 21.

All interviews were audio-recorded, transcribed, and analyzed, using open and selective coding, and using as the unit of analysis words and sentences. Through an inductive thematic analysis using a semantic approach, common themes were formulated and interpreted. All the data was coded by the PI (VAR) and reviewed by the co-investigator (HB).
III. RESULTS

A. Participation

A total of 34 third and fourth-year residents are currently enrolled as anesthesiology residents across the six Lebanese residency programs. Out of the 34 residents, 16 residents (47%) participated in our education activity. Nine were PGY-3 (7 females, 2 males) and 7 were PGY-4 (2 females, 5 males). Three PGY-3 (2 females, 1 male) and 3 PGY-4 (1 female, 2 males) residents participated in the focus group interview.

In general, pretest scores were low on the GRIEV_ING checklist with its three subscales as well as on the communication global rating, with residents scoring consistently below 65%, while posttest scores were consistently above 71%. The mean percent of items performed correctly of the pretest and posttest scores for the GRIEV_ING checklist and the communication global rating are presented in Table 1.

| TABLE I: DESCRIPTIVE STATISTICS: MEAN PERCENT OF ITEMS PERFORMED CORRECTLY FOR THE GRIEV_ING CHECKLIST AND THE COMMUNICATION GLOBAL RATING OF THE PRETEST AND POSTTEST SCORES |
|----------------------------------|-----------------|-----------------|--------|
|                                 | Pretest (n=16)  | Posttest (n=16) | P-value |
|                                 | Mean (SD)       | Mean (SD)       |        |
| GRIEV_ING -Complete             | 55.30 (12.63)   | 80.78 (11.57)   | < .001 |
| GRIEV_ING - Preparation         | 53.47 (22.22)   | 82.63 (13.01)   | < .001 |
| GRIEV_ING - Delivery            | 64.58 (16.24)   | 83.85 (13.96)   | < .001 |
| GRIEV_ING -Wrap up              | 33.33 (18.13)   | 71.87 (23.36)   | < .001 |
| Communication global rating | 64.58 (12.99) | 84.74 (10.51) | <.001 |

**B. Content**

The review of the GRIEV_ING checklist blueprint by the panel of three anesthesiology program directors showed that, after minor modifications, the content of the checklist is consistent with the needs of the anesthesiology residency program. In addition, the pilot testing of the checklist, with the two SPs and two non-participant residents, demonstrated its practical applicability in assessing the anesthesiology residents in BBN.

**C. Response Rate**

Three raters (two anesthesiologists and one clinical psychologist) independently assessed six SP encounters from Case One and six encounters from Case Two. For Case One, the ICCs were 0.96 for the overall checklist scores, 0.87 for the Preparation subscores, 0.91 for the Bad News Delivery subscores, and 0.63 for the Wrap-up subscores. For Case Two, the ICCs were 0.83 for the overall checklist score, 0.60 for the Preparation subscores, 0.66 for the Bad News Delivery subscores, and 0.81 for the Wrap-up subscores. ICCs for both cases indicate good inter-rater reliability for the complete checklist as well as for its subscales, consistent with Landis and Koch’s ICC guidelines.²⁶

**D. Internal Structure**

For the GRIEV_ING checklist, the internal-consistency reliability (Cronbach’s alpha) of Case One for the complete checklist score was 0.67, for Preparation 0.7, for Bad News Delivery 0.71 and for the Wrap-up 0.59. For Case Two, Cronbach’s alpha for the complete checklist score was 0.65, for Preparation 0.53, for Bad News Delivery 0.58 and
for the Wrap-up 0.56 for case two. Those values indicate an acceptable to good internal-consistency reliability. For the communication global rating, the internal-consistency reliability (Cronbach’s alpha) was 0.70 for Case one and 0.79 for Case Two, also indicating good internal consistency reliability.

Item analysis on the GRIEV_ING checklist items showed that 33.3% of the items are of moderate difficulty, 14.8% are easy, 18.5% are hard, while 33.33% are too easy or too hard (Table II). The majority of items (40.7%) had an excellent discrimination power, 7.4% had good power, 18.5 had moderate and 33.3% were poor discriminative items (Table III).

**TABLE II: ITEMS DIFFICULTY ANALYSIS ON THE GRIEV_ING CHECKLIST**

<table>
<thead>
<tr>
<th>Description</th>
<th>Item Difficulty index</th>
<th>Percentage of items</th>
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<tbody>
<tr>
<td>Moderate difficulty</td>
<td>0.45 - 0.75</td>
<td>33.3%</td>
</tr>
<tr>
<td>Easy</td>
<td>0.76 - 0.91</td>
<td>14.8%</td>
</tr>
<tr>
<td>Hard</td>
<td>0.25 - 0.44</td>
<td>18.5%</td>
</tr>
<tr>
<td>Too easy or too hard</td>
<td>&lt; 0.24 or &gt; 0.91</td>
<td>33.3%</td>
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**TABLE III: ITEMS DISCRIMINATION ANALYSIS ON THE GRIEV_ING CHECKLIST ACCORDING TO EBEL’S CLASSIFICATION**

<table>
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<tr>
<th>Items Description</th>
<th>Discrimination index (D)</th>
<th>Percentage of items</th>
</tr>
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<tbody>
<tr>
<td>Excellent</td>
<td>&gt; 0.39</td>
<td>40.7%</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>Mediocre</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>0.3-0.39</td>
<td>0.20-0.29</td>
</tr>
<tr>
<td></td>
<td>7.4%</td>
<td>18.5%</td>
</tr>
</tbody>
</table>

E. Relations to Other Variables

Comparison of the scores of the two cases showed that the mean value of the posttest score was significantly higher than the pretest score for the complete checklist (82.63 ± 13.01 and 53.47 ± 22.22, \( P < .001 \)), for the Preparation subscore (53.47 ± 22.22 and 82.63 ± 13.01, \( P < .001 \)), for the Delivery subscore (64.58 ± 16.24 and 83.85 ± 13.96, \( P < .001 \)) as well as for the Wrap up subscore (33.33 ± 18.13 and 71.87 ±23.36, \( P < .001 \)).

In addition, the mean value of the posttest score for the global rating scale was significantly higher than the pretest score (84.74 ± 10.51 and 64.58 ± 12.99, \( P < .001 \)).

For the GRIEV_ING checklist, post-test scores improved by 46.07% (complete checklist), 54.5% (Preparation), 29.8% (Bad News Delivery) and 115.6% (Wrap-up).

Post-test scores showed 31.21% improvement in the communication global rating.

Pearson coefficients demonstrated a strong, positive correlation between the GRIEV_ING checklist and the communication global rating for Case One (\( r = 0.823, N=16, P<0.001 \)) and a weak correlation for Case Two (\( r = 0.34, N=16, P=0.19 \)).

Performance did not show significant differences when based on the year of training (\( 14.7±3.8 \) for PGY3 and \( 16.6±4.0 \) for PGY4, \( P = 0.34 \)), on any previous received
training (15.9± 3.5 and 15.0±4.5, \( P = 0.66 \)), or on any previous BBN encounters (17± 3.9 for \( \leq 5 \) encounters and 14.3±3.7 for \( \geq 5 \) encounters, \( P = 0.18 \)).

**F. Consequences**

Nine out of the 16 residents (56.2%) rated their ability in BBN as good and very good before the workshop. This number increased to 15 (93.7%) after the session. Ten out of the 16 residents (62.5%) felt comfortable in BBN before the session and all of them after the session.

**G. Focus Group Discussion Results**

Associated concepts from the focus group discussions were organized into categories and subcategories. The resulting framework consisted of 4 major categories, 11 subcategories and 44 concepts (Tables IV-VII). Categories included residents' perceived barriers to BBN; residents’ perceptions of strategies for BBN to patients and their families; residents' perceptions of the strengths of the education intervention and residents' perceptions of training needs.

**Category 1: Barriers to BBN**

This major category includes residents' views regarding barriers to the effective and empathic delivery of BBN in the anesthesiology setting (Table IV). Findings for this category are divided into three subcategories: personal barriers, institutional barriers and cultural barriers.

1-Personal barriers: Residents reported apprehension and tension in dealing with family members' reactions to bad news. This was reflected by the comments of a resident who said:
"Dealing with family reactions must be the most uncomfortable part. In addition, not being prepared for this encounter is so stressful! ".

Additionally, residents expressed worries such as being considered by their patient's families as not enough compassionate. This was revealed in the comments of one resident:

"We need to look highly professional yet empathic at the same time. It is not an easy task. It needs lots of self confidence."

Inadequate time to prepare emotionally oneself and the content of the encounter were reported as significant barriers by our focus group participants. A resident best summarized this by saying:

'In anesthesiology, we don't have enough time to be prepared. Things sometimes happen so quickly and unexpectedly. It is so scary."

2-Institutional barriers: The absence of a clear plan on what to do and the lack of support from the hospital administration were frequently named as a barrier to BBN. The following illustrates this concept:

"It seems to me that there is no clear plans in our hospital if such incidents happen. We don't know to whom we should report or what are the services offered by the hospital to the families. This definitely adds to our stress".

Support from colleagues and from anesthesiologists attending as well as from the surgeons was described by the residents as being "crucial" before, during and after the
meeting with the family. This was underlined by a resident who said:

"In such moment, you need a friend, not a critical and judgmental colleague."

3- Cultural barriers: Residents reported additional stress when dealing with the misconception of people about dying from anesthesia and feelings that anesthesia is frightening. This was reflected in the comments of one the residents:

"People are so afraid from anesthesia. It's a cultural issue. They think that might not wake up again..."

Category 2: Strategies for BBN

This category included the strategies used by the residents to deliver the bad news (Table V). The resulting three subcategories consisted of verbal delivery, non-verbal delivery and supportive measures.

1-Oral delivery: The use of a simple language and the avoidance of medical jargon were identified by residents as a fundamental element in effective delivery of bad news. This was highlighted by the comments of one participant:

"We should always tell the truth in simple words that lay people could understand. It is not an easy task to find the appropriate words when we are stressed..."

2-Non-verbal Delivery: Residents agreed that non-verbal communication (proxemics, body language and movement) is essential in conveying bad news. In addition, giving families enough time during the interview and allowing pauses are important features.

3-Supportive measures: Residents felt that dealing with families' emotions after
conveying them the bad news is an extremely stressful task.

**Category 3: Strengths of the education intervention**

The third category focused on residents' perceptions about the strengths of the education intervention. The strengths were broken down into three subcategories: provision of framework, organization, and national level initiative (Table VI).

1-Providing framework for BBN: Residents appreciated the use of a mnemonic to remember the steps for BBN. Many of them didn’t know that BBN is a teachable skill. This was revealed by the comments of one resident:

“I sometimes think about what to do and what to say if I encounter such issue in my private practice. I had never imagined before that BBN is a skill that can be learned!. I feel less anxious about it now..”

2- Instruction and assessment: To most residents, this workshop was the first encounter with an SP. Residents appreciated working with real professional actors. Furthermore, most residents valued the opportunity to measure their own progress by the inclusion of the two scenarios. In addition, the intervention of the clinical psychologist was highly rated. This was reflected in the following resident’s comments:

“It was a great idea to have the input of the psychologist. He oriented us on different ways to interact with the family. I had never thought about all those small details.”

3- National education initiative: Residents appreciated the opportunity to meet with residents from other Lebanese universities. They expressed their desire to conduct more
collective workshops.

**Category 4: Addressing residents' training needs**

The fourth major category focused on residents' perceptions of their training needs. The training needs were broken down into three subcategories: Program changes, team training and future topics (Table VII).

1- Timing of training: Residents agreed that the framework for BBN should be introduced early in the curriculum of the Medical School and reinforced subsequently during the residency.

2-Participants: Workshops should be addressed to multidisciplinary teams that include operating room nurses, surgeons and anesthesiologists. This approach would allow the residents to be more confident during the interview with the family. The following illustrates this concept:

"*Having another person during the interview, who is not emotionally involved with the current problem would certainly decrease our anxiety level.*"

3- Content: New topics could include intraoperative death; dealing with an angry family and BBN with multiple family members. Some residents particularly stressed the importance of exploring BBN after an intraoperative death in their future training.

**TABLE IV: BARRIERS TO BBN**

| Personal Barriers: Not being prepared; feelings of being nervous and stressed; concern about confrontations with unknown family members; fear of accusations from family. |
2-Institutional Barriers: Concern about staff and colleagues backup, concern about the absence of clear plans for family support at the hospital.

3-Cultural Barriers: Feelings that anesthesia is frightening, that people die from anesthesia; lack of trust in anesthesiologist skills.

<table>
<thead>
<tr>
<th>TABLE V: STRATEGIES FOR BBN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Verbal Delivery: Use appropriate language; convey empathy; clarify role; summarize; don't use euphemisms.</td>
</tr>
<tr>
<td>2-Non-verbal Communication: BBN in quiet room; face to face with family; sitting down near the family, not behind a desk; give enough time; allow for pauses</td>
</tr>
<tr>
<td>3- Supportive Measures: Assess support by the hospital; judge family's reactions; indicate own availability for future contact.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE VI: STRENGTHS OF THE EDUCATION INTERVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Providing Framework for BBN: Provided mnemonic; practical; reduced stress; never knew it’s a teachable skill.</td>
</tr>
<tr>
<td>2- Instruction and Assessment: Opportunity to measure own progress by inclusion of two scenarios; realistic immersive scenarios; real professional actors; professional educators;</td>
</tr>
</tbody>
</table>
presence of a clinical psychologist; timely; very professional; free of charge.

3- National Education Initiative: Inclusion of residents from all Lebanese universities--; opportunity to meet and learn together.

<table>
<thead>
<tr>
<th>TABLE VII: ADDRESSING RESIDENTS' TRAINING NEEDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Timing of Training: Starts at the beginning of medical school; reinforcement throughout residency training.</td>
</tr>
<tr>
<td>2- Participants: Have multidisciplinary sessions (surgeons, nurses); have training for attending anesthesiologists; multi institutional.</td>
</tr>
<tr>
<td>3- Content: Include intraoperative death; include dealing with an angry family; include BBN with multiple family members.</td>
</tr>
</tbody>
</table>
IV. DISCUSSION

Interpreting the results of our education intervention requires the analysis of several sources of validity evidence, which are discussed successively in the following sections.

A. Content

Content evidence refers to ensuring that the construct being assessed is accurately and completely represented on a test \(^{27}\). Results of assessing emergency medicine residents for BBN with the GRIEV_ING instrument, has shown an improvement in their confidence and competence in BBN immediately and three months after an education workshop \(^{15}\). In addition, significant improvement in medical students' confidence and competence, using an abbreviated 12-item version, was reported. For this 12-item version, the internal consistency was 0.56 and 0.65 and correlated significantly with assessments of interpersonal communication\(^{16}\). The GRIEV_ING assessment tool was also used for pediatric residents \(^{18}\). The intra-class correlation coefficient demonstrated substantial inter-rater agreement. In addition, the analysis of the three subscales indicated distinct differences in their scores, as demonstrated through discriminant validity, performance differences, and lack of association between subscales \(^{18}\).

The initial GRIEV_ING model was slightly modified to accommodate the anesthesia context and a broader context than the death notification. The cases were developed based on experts' judgment. They were used only as “vehicles” for assessing BBN in anesthesiology residents and therefore they measure the same construct: BBN for a critical incident report of the same importance. Boulet et al. noted that in anesthesiology, the task specificity for nontechnical skills
such as communication is less important when compared to technical skills. In fact, the resident’s ability to communicate with the patients and their families is not expected to differ widely as a function of the type of simulated event.\footnote{28}

A rigorous approach to the development and pilot testing of the instruments, including groups of content experts and a consensus survey, provides further evidence to support content validity. The modified GRIEV_ING checklist was pilot-tested, with scenarios with SPs, to ensure clarity and ease of use. Furthermore, this checklist was sent to three anesthesia program directors to ensure its applicability in assessing the anesthesia residents in BBN. Two separate rating scales were developed: the communication global rating instrument completed by the SP and the modified GRIEV_ING checklist completed by both the SP and the anesthesiologist.

B. Response Process

To ensure that the results of the testing are valid, the ratings provided by examiners should be accurate. The intra-class correlation coefficient (ICC) was used to assess rater reliability and showed substantial correlations for the complete checklist as well as for all the subscales for Case One and for Case Two.

An important step when introducing a new assessment instrument is to ensure that raters undergo adequate training with the instrument.\footnote{29} Residents’ communication skills were rated by the anesthesiologists after viewing the videos and by the SPs immediately after the encounter using the modified GRIEV_ING checklist. Residents were also rated by the SPs using the communication global rating form. Raters were the anesthesiologists who worked on the elaboration of the checklist. Also, SPs received extensive training for use
of the rating scales. In addition, they received training to ensure that the portrayal of their roles was accurate and consistent. Immediately preceding the workshop, SPs participated in separate orientation sessions to ensure that all instructions were clear. Data entry was performed by experienced staff with quality control checks.

C. Internal Structure

Evidence for internal structure relates to the psychometric properties of a test \(^{20}\). The scores from this testing were found to be reliable. For Cases One and Two, the internal-consistency reliability (Cronbach’s alpha) for the GRIEV_ING checklist and for the communication global rating showed acceptable values for such a low stakes formative assessment. Items from the GRIEV_ING checklist that were shown to be too hard (33.3%) belong to the Wrap-Up section. This emphasize the importance of adequately addressing the details of the patient’s care during the next step as well as providing personal availability.

D. Relations to Other Variables

When considering the relationship between measures of the construct of interest with other variables, both convergent and discriminant validity as sources of evidence should be considered \(^{30}\). The posttest scores showed a substantial improvement for the communication global rating and for the GRIEV_ING checklist and its sub-scores, the most important one being for the wrap-up sub-score.

There was a strong correlation between the GRIEV_ING checklist and the communication global rating for Case One and a weak (not statistically significant)
correlation for Case Two. This could be explained by the fact that our short training resulted in a more rapid improvement in measurable objectives skills assessed by the GRIEV_ING checklist. Despite the intervention of the clinical psychologist, the improvement in communication skills as measured by the communication global rating was expected to require more sessions to be substantially improved.

For BBN skills, it might be expected that more senior trainees and those who had more frequently encounters in BBN would perform better. However, performance scores did not show significant differences when based on the year of training (PGY3 vs PGY4) or any previous training in BBN. This could be explained by the fact that most residents did not receive any formal training during their residency program. Only five residents (37.5%) had received some information about BBN through a course on ethics during their preclinical years. In addition, the number of previous BBN encounters did not lead to a significant difference in participants' performance. This could be explained by the fact that those encounters were not based on a solid theory and a sound strategy in BBN.

E. Consequences

The results from this study have important implications for anesthesiology residency programs. Overall, scores on the pretest were low, which clearly demonstrated the need for education in BBN skills as part of the residency curriculum. There was an increase in the self-perceived comfort and ability in BBN after the education intervention. This is expected for our participants who, at best, had a minimum previous knowledge in strategies of BBN. However, this is an important finding because it shows that a short, yet focused and practical, training could result in empowerment of residents in their own ability in BBN.
Medical education is currently shifting toward outcomes-based assessment of residents and fellows as evidenced by the Next Accreditation System and the Milestone project developed by the ACGME and by the CanMEDS. Residencies are asked to evaluate trainees on developmentally based education achievements in the core and sub-competencies through time, including interpersonal and communication skills. However, formal teaching in anesthesiology often does not address communication skills and residents learn BBN "on the job". This training is also highly variable and context specific as many of the "teachers" themselves have had no formal training. On the other hand, exposure to patients in a clinical setting, with ad hoc education sessions, is not sufficient to create competent anesthesiologist in the required competencies, namely for BBN, a skill that is not often performed by residents. There are special characteristics of the anesthesiology context regarding its conditions and dynamics. Anesthesiologists are in a unique position as, unlike physicians in other specialties, patients do not choose their anesthetic provider. As a result, patients and families may not have the same comfort and trust when communicating with the anesthesiologist. Death and serious injuries associated with anesthesia are rare, but when they occur, they usually arise suddenly and unexpectedly. Unlike physicians in most fields of medicine, who may get ready in advance for BBN, and while some of them tend to avoid BBN for which they feel they are untrained or unprepared to perform, anesthesiologists cannot avoid such situations, especially if they have to announce the death or the occurrence of an intra-operative critical incident to the family of an anesthetized patient. BBN in this context lacks the benefits of an ongoing professional relationship with the patient and is done with the patient's anxious family. This unique situation, in addition to little formal
training in BBN, as well as limited exposure for anesthesiology trainees in BBN, underscores the need for simulation training and experiential learning to supplement these less common real-life learning experiences.

This is the first study examining BBN skills in relation to a critical incident in anesthesiology residents. The improvement in performance after this short education intervention is encouraging. The most important improvement was shown in the wrap-up phase, followed by the preparation phase and the bad news delivery phase. However, this improvement did not result in perfect performance, as shown in the posttest grades. Repeated interventions, such as refresher workshops, could further increase the degree of improvement from baseline 37,38.

Our education intervention was based on adult learning principles 39 and findings in the literature on delivering bad news 40-42. The most effective interventions are those that provide opportunities for learners to discuss concerns, practice, and receive feedback on their skills 43. In addition, role-playing or simulation is a key part of instruction for these communication skills 44-47. Offering more than one opportunity to practice and receive feedback, so that learners can try out new conducts they may not have showed in their first encounter, has been shown to be important 4. This was demonstrated by the increase in the self-confidence and the perceived ability of our participants at the end of the workshop.

Important barriers to BBN identified by the anesthesiology residents included personal worries and institutional barriers, as well as cultural barriers. Those barriers are similar to those encountered by other medical and surgical residents 48. Barriers may be overcome
by offering adequate training in BBN for residents, by ensuring a greater support from
the anesthesiology department members, from the surgeons and the entire operating room
staff. Furthermore, highlighting the importance of the anesthesiologist's work and the
importance of offering proper training in BBN for anesthesiologists should be
emphasized by the local anesthesiology societies. In addition, our residents identified
timely and multidisciplinary training as important needs. Those needs should be included
on the agenda of the anesthesiology curriculum reform.

F. Limitations and Strengths

Limitations of this study include the relatively small sample size and the lack of control
group. Limitations in participant availability were mainly due to clinical obligations that
prevented some residents from participating in this workshop or to the mandatory
rotations for PGY4 outside Lebanon in one program. Other limitations include the lack of
assessment of long-term retention of BBN skills as well as the transfer of learned skills to
the clinical practice. Various studies in simulation based education showed that there is
no guarantee that the resident's performance in a simulated environment will translate to
real-life situations\textsuperscript{49,50}. Furthermore, assessing the effectiveness of simulation-based
interventions in residents is difficult, because some skills are rapidly evolving as a result
of the training \textsuperscript{51}. Future studies should thus assess the long-term retention of BBN skills
as well as the impact of training in BBN skills on residents' transfer of these skills to their
interactions in the clinical world.

Strengths of this study include the use of a validity framework. Several sources of
evidence for validity of the scores from this education intervention were systematically
presented, including the process for development of the cases and the rating instruments
as well as the extensive rater training. The incorporation of immersive high fidelity scenarios preceding the SPs encounters allowed for assessment of trainees in a realistic and complex setting. The collaboration with a clinical psychologist to analyze and teach the verbal and nonverbal communication for delivering bad news to family members was a great addition to the intervention. Finally, the inclusion of a qualitative research design in this study and the conduction of the focus group interview in Arabic language, the residents’ mother tongue, strengthened the results of our study and rendered it more authentic and sound. Results from this interview provided rich perspectives of the anesthesiology residents’ perceived barriers for BBN. Recommendations for their training needs provided a framework for a future implementation of BBN training in the curriculum of the anesthesiology residency programs at a national as well as international level.

G. Conclusion

“The delivery of sad, bad, and difficult news will always be an unpleasant but necessary part of medical practice” as noted by Fallowfield. A strategy for addressing patients’ or family members’ distress when bad news is delivered can increase anesthesiologist confidence in this challenging task and lead to less stress and burnout as well as avoiding the anesthesiologist having the status of a “second victim”. Findings from this study indicate that BBN is a teachable skill and the evaluation of our education intervention provides validity evidence to illustrate the value of integrating BBN into the curriculum of the anesthesiology residents, which has led to improved learner performance.
CITED LITERATURE


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Appendix A

Breaking Bad News - What's Wrong?
Workshop for Anesthesiology Residents
Pre workshop survey

Bad News can be defined as "Any information that adversely and seriously affects an individual's view of his/her future". In anesthesiology, the range of Breaking Bad News (BBN) to patients/family can vary from postponing a surgery to intraoperative patient death.

1- Sex: □Male □Female

2- Level of training: □PGY3 □PGY4

3. Have you ever received any education for BBN? □Yes □No

4. If yes, where did you receive education for BBN? Check one or more answers.
   □In medical school, while learning about medical ethics
   □In medical school, while learning clinical skills
   □During seminars or education programs for residents
   □On the internet or through mass media
   □By senior residents or staff
   □Other: Specify __________________________

5. Have you ever delivered bad news to patients or patients' family? □Yes □No

6. If yes, what was the encounter? How many times?
   □Postponing or canceling a surgery □1-4 □5-10 □>10
☐ Unexpected postop ICU admission  ☐ 1-4  ☐ 5-10  ☐ >10
☐ Intraoperative death  ☐ 1-4  ☐ 5-10  ☐ >10
☐ Other: ...........................................  ☐ 1-4  ☐ 5-10  ☐ >10

7. If yes, rate your own comfort in dealing with patients' or family members' emotions (e.g., crying, anger, denial)
☐ Very comfortable  ☐ Quite comfortable  ☐ Not very comfortable  ☐ Uncomfortable

8. How do you feel about your own ability to break bad news?
☐ Very good  ☐ Good  ☐ Fair  ☐ Poor

9. Do you believe that BBN is a skill that can be taught?
☐ Strongly believe  ☐ Believe  ☐ Fairly believe  ☐ I don’t believe at all

10. Do you believe that training is needed for adequate skill development in BBN during your residency program?
☐ Strongly believe  ☐ Believe  ☐ Fairly believe  ☐ I don’t believe at all

11. Are you willing to attend a training workshop if you have the opportunity?
☐ Yes  ☐ Not decided  ☐ No
Appendix B

Breaking Bad News- What's Wrong?
Workshop for Anesthesiology Residents
Post workshop survey

1. After attending this workshop, rate your own comfort in your future encounters with patients' or family members' emotions (e.g., crying, anger, denial)?
   □ Very comfortable □ Quite comfortable □ Not very comfortable □ Uncomfortable

2. After attending this workshop, how do you feel about your own ability to break bad news in your future encounters with patients or family members?
   □ Excellent □ Very Good □ Good □ Poor

3- Did the workshop help you reduce the stress levels when you will deliver bad news to patient/family?
   □ Very much □ Acceptable level □ Not so much □ Not at all

5- Did the workshop change your perceptions regarding delivering bad news?
   □ Very much □ Acceptable level □ Not so much □ Not at all

6- What were the most important things you learned during this workshop?

7- What were the major strengths of this workshop?

8- What are the major improvements that could be made in this workshop?

9- What are the subjects that you would like to have for a next workshop?
Appendix C

Focus Group Interview

I- Orientation to the interview

The purpose of this interview is to explore the perceptions of anesthesiology residents about this education intervention. Strengths, weaknesses and ways to improve this intervention will be discussed to help develop and eventually implement this new activity in the curriculum of the anesthesiology residency program.

II- Interview questions

1. What are, in your opinion, the current barriers for BBN?

2. What are the most important strategies for BBN to patients and their families you experienced during this training?

3. What are, in your opinion, the major strengths of this training?

4. What are the ways to address your training needs?
Appendix D

The GRIEVING COMPETENCE INSTRUMENT
(Modified for anesthesiologist use)

Directions: Please indicate whether the physician completed the stated actions, with Y = completed (Yes) or N = did not complete (No).

G—Gather

1. Ensured that family members were present prior to the delivery of the critical incident/death notification.

R—Resources

2. Inquired and facilitated access to supportive resources for the family: Important family members

3. Inquired and facilitated access to supportive resources for the anesthesiologist: facility and human support (senior anesthesiologist, surgeon, OR director, consultant medical physician)

I—Identify

4. Clearly stated the name of the patient.

5. Clearly introduced herself/himself.

6. Clearly stated his/her role in the care of the patient.

7. Determined the level of knowledge the family member possessed prior to their arrival in the waiting room.

8. Provided an appropriate opening statement (i.e., avoided bluntly stating the critical incident/death of patient).

9. Used preparatory phrases to forecast the news of the critical incident/death.

E—Educate

10. Clearly indicated the chronology of events leading up to the critical incident/death of the patient.

11. Clearly indicated the cause of the critical incident in an understandable manner.

12. Used language appropriate for the family member’s culture and educational level.

13. Provided a summary of important information to ensure understanding.
V—Verify
14. Used the terms "critical state" or "dead" or "died." □
15. Avoided using euphemisms (indirect terms).
16. Avoided medical terminology/jargon or clearly explained such terms when used.
17. Was attentive and not rushed in his/her interaction with the family member/s.
18. Paused to allow the family to assimilate the information before discussing details.

I—Inquire
19. Allowed the family member/s to react to the information and ask questions or express concerns.
20. Encouraged the family member/s to summarize important information to check for understanding.
21. Immediately but appropriately corrected any misconceptions of the family member/s.

N—"Nuts and bolts"
Explained and addressed the following details of the patient's care adequately.
22. Transfer to ICU and ICU stay.
24. Accessibility and schedule visit in ICU.

G—Give
25. Established personal availability to answer questions for the family member/s at a later date.
26. Provided family member/s the appropriate information to contact him/he at a later time.
27. Provided the family member/s with appropriate information to contact the care provider team (ICU physician, consulted physician, social worker, ...).

Total score: ......../27
Appendix E

RELATIONSHIP AND COMMUNICATION INSTRUMENT

To be completed by Standardized Patients

HOW WAS THE RESIDENT YOU JUST SAW AT...

1 2 3 4 5 Greeting you warmly; never crabby or rude.
1 2 3 4 5 Treating you with modesty and professionalism
1 2 3 4 5 Showing interest in you as a person.
1 2 3 4 5 Listening carefully; asking thoughtful questions; not interrupting while you are talking.
1 2 3 4 5 Encouraging you to ask questions; answering them clearly; never avoiding your questions.
1 2 3 4 5 Using easily understood words when explaining the situation; explaining any technical medical terms in plain language.

WITH THIS RESIDENT, TO WHAT DEGREE DID YOU FEEL...

1 2 3 4 5 Respected
1 2 3 4 5 Comfortable/At ease
1 2 3 4 5 Understood

Total: ---- /45 points

SCALE: 1=poor 2=fair 3=good 4=very good 5=excellent
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