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Clinical note

Can words hurt? Patient–provider interactions during invasive procedures

Elvira V. Lang*, Olga Hatsiopoulou, Timo Koch, Kevin Berbaum, Susan Lutgendorf, Eva Kettenmann, Henrietta Logan, Ted J. Kaptchuk

Department of Radiology, Beth Israel Deaconess Medical Center, 330 Brookline Ave, West CC Room 308F, 02215 Boston, MA, USA

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Abstract

Patients are often prepared for procedural discomforts with descriptions of pain or undesirable experiences. This practice is thought to be compassionate and helpful, but there is little data on the effect of such communicative behavior. This study assesses how such descriptions affect patients' pain and anxiety during medical procedures. The interactions of patients with their healthcare providers during interventional radiological procedures were videotaped during a previously reported 3-arm prospective randomized trial assessing the efficacy of self-hypnotic relaxation. One hundred and fifty-nine videos of the standard care and attention control arms were reviewed. All statements that described painful or undesirable experiences as warning before potentially noxious stimuli or as expression of sympathy afterwards were recorded. Patients' ratings of pain and anxiety on 0–10 numerical scales (0 = No Pain, No Anxiety at All and 10 = Worst Pain Possible, Terrified) after the painful event and/or sympathizing statement were the basis for this study. Warning the patient in terms of pain or undesirable experiences resulted in greater pain ($P < 0.05$) and greater anxiety ($P < 0.001$) than not doing so. Sympathizing with the patient in such terms after a painful event did not increase reported pain, but resulted in greater anxiety ($P < 0.05$). Contrary to common belief, warning or sympathizing using language that refers to negative experiences may not make patients feel better. This conclusion has implications for the training in medical communication skills and suggests the need for randomized trials testing different patient–practioner interactions.

Keywords: Pain; Anxiety; Invasive medical procedures; Sedation; Communication; Nocebo

1. Introduction

The idea that words can hurt is very old. In Epidemic I, one of the earliest volumes in the *Hippocratic Corpus*, the author states that the physician must pay attention to both talk and silence (Jones 1972). Compassionate communication is still considered an important element of medical practice, and training in communication skills has become an integral component of medical curricula (Makoul, 2001). With the best intentions, healthcare providers often use terms with unpleasant emotional content such as 'sting and burn,' 'pain,' or 'bad' to guide patients through medical procedures and to express sympathy (Blankfield, 1991; Erickson, 1994). It is assumed that such words help patients but there is little evidence to support this commonly held belief. Although the literature acknowledges the adverse physiological effects of statements with distressing emotional content (Barsky et al., 2002; Benedetti et al., 1997; Benson, 1997; Spiegel, 1997), suggestions for change towards a more neutral vocabulary are often met with strong resistance in daily clinical experience. Some would even consider a prospective randomized study to test the concept unethical unless data were available to justify omission of such presumably compassionate statements. We therefore assessed the effects of words with unpleasant emotional content on patients' pain perception and anxiety with data from an existing study in the controlled setting of invasive medical procedures.

2. Methods

In a 3-arm prospective controlled randomized trial, which tested the effect of a nonpharmacologic analgesia adjunct

* Corresponding author. Tel.: +1 617 754 2513; fax: +1 617 754 2651.
E-mail address: elang@bidmc.harvard.edu (E.V. Lang).

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(self-hypnotic relaxation) during interventional radiological procedures, all interactions of patients with their healthcare providers were videotaped to assess fidelity of treatment (Moncher and Prinz, 1991). We previously reported the primary results of this trial, which was performed at the University of Iowa Hospital and Clinics and analyzed at the Beth Israel Deaconess Medical Center, Harvard Medical School (BIDMC) (Lang et al., 2000). For this current study, we used the existing data set of the 159 videos of the two control arms of this trial (Standard Care and Attention controls). The de novo analysis of these videos at the BIDMC and the relationship to procedural outcome data forms the basis for this study.

In this Institutional Review Board approved study, eligible subjects were: adults referred for transcatheter diagnostic and therapeutic peripheral vascular and percutaneous renal interventions, who were able and willing to give written informed consent. Exclusion criteria were severe chronic obstructive pulmonary disease, psychosis, intolerance towards midazolam or fentanyl, pregnancy, and/or inability to hear or understand English. Regardless of which treatment group they were assigned to, patients had access to as much medication for comfort as they wanted within the realm of safety. To assure that patients in the treatment and control groups had the same access to drugs, a patient-controlled analgesia model with IV fentanyl and midazolam was used. One milligram midazolam and 50 μg fentanyl rsp were weighted as one drug unit.

The 159 patients' ages ranged from 18 to 92 years (mean, 57 years); 76 were male, 83 were female, 149 were white, and 10 were black. One hundred and thirty-nine patients had vascular, and 20 had percutaneous renal procedures. Procedures lasted 22–330 min (mean 81 min, median 70 min). Study patients were randomly assigned to receive intraoperatively standard care treatment ($n=79$), or structured attention ($n=80$). Standard Group patients received the standard care typical for the institution; they were cared for by the department's special procedure nurses, who were instructed to behave normally, do their best to comfort the patient, but to abstain from induction of imagery and hypnosis (which were assessed in the test group of the randomized trial). In the Attention Group, an additional provider displayed standardized structured attentive behavior. Structured attentive behavior included eight key components: matching the patients' verbal communication pattern, matching the patients' nonverbal communication pattern, attentive listening, provision of the perception of control, swift response to patients' requests, encouragement, use of emotionally neutral descriptors, and avoidance of negatively-loaded suggestions. While the additional provider reliably avoided the use of negatively- loaded suggestions in the Attention group, it was not possible to prevent all other personnel in the procedure suite from using them (e.g. operating staff physicians, trainees, entering referring physicians and house staff).

2.1. Pain and anxiety scoring

Pain and anxiety were assessed by self-report on 0–10 numerical verbal analog scales which had been validated previously (Benotsch et al., 2000; Murphy et al., 1988; Paice and Cohen, 1997). Before and during the procedure, patients were asked every 15 min to indicate their comfort levels on a 0–10 scale with 0 = No Pain At All (or No Anxiety at All) and 10 = Worst Pain Imaginable (or Terrified).

2.2. Assessment of verbal communications

An independent researcher, who was not involved in the original study, reviewed all 159 videos and transcribed all statements made by the healthcare professionals in the procedure room. Prior to review of the transcripts 'negatively-loaded suggestions' were defined as biased or leading questions and comments that mentioned an undesirable experience using words of unpleasant content such as 'pain', 'hurt', 'anxious', even when they were toned down by modifiers such as 'little,' 'barely,' 'not much' or announced as not to be expected ('do NOT worry'). Also included were statements of immobilization such as 'don't move' when shouted unnecessarily into the room. The rationale for inclusion of these latter statements referencing pain, anxiety, or untoward movement was based on studies stressing the priming of the subconscious mind towards undesirable experiences or actions even when they are mentioned in a negated context (Zajonc, 1980; Hammond, 1990). A list of negatively-loaded suggestions based on the McGill Pain Questionnaire categories (Melzack et al., 1982; Pearce and Morley, 1989) was then used to select statements from the transcripts for inclusion in the study by consensus of four investigators without knowledge of the procedure data. Another independent researcher reviewed the tapes again and recorded the times of statements and potentially painful events (e.g. administration of local anesthetic, percutaneous puncture/catheter insertion, tract or vessel dilatation, and intravascular injection of contrast medium). Comments were grouped into those 'warning' a patient within 2 min of an upcoming event, and those 'sympathizing' made after the event but before the next rating. A third researcher assessed the tapes with focus on patient behaviors or verbalizations that might have provoked the provider's leading suggestion. The three researchers who reviewed the tapes had been previously trained to perform adherence checks on videos obtained during the course of two ongoing prospective randomized nonpharmacologic analgesia trials with an inter-rater reliability of at least 0.81 in their ability to assess provider behaviors including their use of negative suggestions (for details see Lang et al, 2000). The third reviewer was able to recapture 81 of the 86 statements that the first two reviewers had attributed as negative suggestions to the peri-procedure interval. She did not find any additional statements that required inclusion in the study. Agreement among reviewers thus reached 94%.

2.3. Assessment of patient and procedure factors

Since a patient who is very anxious or in pain may influence the provider's subsequent verbal statements, we compared scores on the Spielberger State Anxiety Inventory (STAI; Spielberger, 1983), and baseline anxiety and pain scores on the verbal analog scales among patients who were exposed to warnings and sympathizing statements and those who were not. State Anxiety refers to the intensity of anxiety experienced in reaction to a specific event at a given time (in this case the upcoming procedure), assessing 'feelings of apprehension, tension, nervousness, and worry' and is measured on a self-rating 20-item Likert scale with a maximum score of 80. Patients filled out STAI score sheets after consenting to the study and before entering

the procedure room. The researchers analyzed the STAI sheets only after completion of the study to prevent bias. Additional patient factors were studied to control for possible individual differences. These included sex, age, and weight. Since procedural complexity or the perception thereof may influence provider communication, procedure times, number of prior procedures, and the American Society of Anesthesiologists Physical Status Classification (ASA) status were analyzed. An ASA of 1 describes healthy patients, ASA of 2 describes those with mild systemic disease, ASA of 3 describes those with severe systemic disease, and ASA of 4 refers to those with life-threatening disease.

Potentially 'painful events' were defined as those in which the operator entered or disturbed tissue by mechanical or medicinal means such as administration of local anesthetic, percutaneous puncture/catheter insertion (performed after local anesthetic has been given), tract or vessel dilatation (performed after catheter insertion if needed), and intravascular injection of contrast medium (after a catheter has been placed).

2.4. Data analysis

A multivariate analysis of variance included treatment condition (Standard Care or Attention), type of procedure, and whether the patient received a 'warning' or not as independent variables. Pain and anxiety ratings and medication use in the interval after the painful event were dependent variables. A similar multivariate analysis of variance substituted a factor of whether the patient received 'sympathy' or not as an independent variable. Prior to analysis, logarithmic transformations were applied to remove skewness from the data; however, all results were presented in terms of the original scales. There were 415 stimuli for assessment of advance warning (111 administrations of local anesthesia, 90 percutaneous entries, six tract dilatations, and 208 contrast injections), and 337 events were amenable for assessing sympathizing statements (82 administrations of local anesthesia, 68 percutaneous entries, and 187 contrast administrations), and 45 post-event commiserations occurred.

3. Results

3.1. Patient and procedure factors

Thirty-three patients were exposed to 86 negatively-loaded statements in the peri-stimulus period with each hearing between 1 and 5 such statements. Forty-one

Table 1
Negatively-loaded statements warning patients from upcoming events

Unsolicited statements
"You might feel like you wet your pants" (2×)
"Little sting here," or "It will sting a little bit!," or "You'll feel a little sting, now" (7×)
"Another sharp jab in a minute" (1×)
"Little sting here!—Little sting here again!" (1×)
"Little sting!—Sorry!" (pronounced "sooorry") (1×)
"Little sting here!—Sorry!—Little sting again!" (2×)
"You shouldn't feel anything except for some pressure—Just a little bee sting—Just stings a little!" (1×)
"Cold hands ah? Feels like a sting here!" (1×)
"Little sting!—Sorry!—It stings sometimes!—Is that hurting?" (1×)
"It will feel like a bee sting" (or "A bee sting here") (3×)
"Feels like a sting here" (1×)
"Stinging coming up!" (1×)
"There will be a stinging sensation" (1×)
"You shouldn't feel anything sharp" (2×)
"You shouldn't feel too much. You feel sharp here?" (1×)
"Sharp scratch!" (1×)
"Small sting in the back!—and a burn" (1×)
"This will hurt a bit! There will be a little poke!" (1×)
"Cold on your back!" (1×)
"You shouldn't have too much discomfort" (1×)
"It's a bit tender, ah?" (1×)
"Are you uncomfortable? This isn't ideal, I know. If you're not comfortable, you let me know."
"Let us know if you feel pain" (1×)
"If you're hurting much just let me know" (1×)
"You're going to feel some burning." (2×)
"OK! It's going to be really hot!" (1×)
"I know it's really hard right now. Spread your fingers! I will tell you when you can relax! Don't move! " (1×)
Solicited Statements
The patient, who lies on his stomach, lifts the back of his head (face not seen by the MD). MD: " A little more pushing and tagging. The worst is over!"
The patient looks around in the room, catches the nurse's eye, and asks for medication to relax. The nurse approaches "Hit that bell when you need the pain medicine. You'll feel some burning there, that's the lidocaine"

Statements made within the 2 min prior to and during initiation of the event. Numbers in parenthesis reflect frequency of nearly verbatim usage. Unsolicited statements were those made without preceding verbal or obvious behavioral cues from the patient. In cases of solicited statements, the patient's preceding behavior is listed.

'warning' statements announced 23 administrations of local anesthetic, nine percutaneous entries, and nine contrast injections (Table 1). Thirty-nine of the 41 negatively-loaded statements were made without apparent antecedent behavior or verbalization of the patient soliciting such a remark.

Forty-five 'sympathizing' remarks referred to 14 administrations of local anesthetic, 10 percutaneous entries, and 21 contrast injections (Table 2). At least 18 of the 45 statements were made without the antecedent behavior or verbalization of the patient soliciting a response.

There were no significant differences among patients who were subjected to negatively-loaded statements and those who were not with regard to scores on the STAI, baseline pain and anxiety, age, sex, weight, ASA status, procedure duration, and number of prior procedures (Table 3).

3.2. Effect of warning with negatively-loaded statements

Examples of 'warning' with negatively-loaded wording are given in Table 1. Warning the patient of a potentially painful event with negatively-loaded wording was associated with subsequent greater reported pain than not saying anything before the event (pain scores 3.9 vs. 2.8, $F(1,399)=4.99$, $P=0.0261$). Warning the patient in such manner was also associated with subsequent greater reported anxiety (anxiety scores 4.4 vs 3.2, $F(1,399)=11.75$, $P=0.0007$). Warning the patient with negatively-loaded wording did not produce any difference in the amount of medication used by the patient during the interval surrounding the painful event (0.35 vs. 0.46 drug units, $F(1,399)=0.00$, $P=0.9498$).

Table 2
Negatively loaded remarks after potentially painful events ('Sympathizing')

Patient verbalization/behavior	Statement
Patient turns head towards nurse	"The burning there that is the lidocaine" (1×)
U	"You feel some burning there, that's the lidocaine" (1×)
U	"Hey hopefully that's will help a little bit, right? You feel a little burning down there " (1×)
Patient asks quietly "What are they doing down there ?"	"You feel pressure down there but no pain. It shouldn't hurt so much. If it's pressure this means they getting the catheter in." (1×)
Patient wants to know status of procedure	"Pressure sensation rather than sharp?" (1×)
Patient grimaces	"That's hurting ?" (1×)
Patient appears in pain	"Is it pressure or is it sharp? " (1×)
? (Tape doesn't show patient well enough)	"Is it pressure or is it sharp?" (1×)
Patient says "eiee" and grimaces	"Do you feel sharp pain?" (1×)
U	"You feel sharp here?" (1×)
Patient feels tingling and asks if this normal	"You should feel some pressure, but you should never feel anything sharp. That you are going to feel for a while" (1×)
Patient makes small jerk	"Is that hurting? It stings sometimes!" (1×)
? (Tape doesn't show patient well enough)	"Some more pain there?; That hurts! This is the hardest part!" (1×)
U	"It's not that bad, right? Or "This isn't that bad ?" (5×)
U	"Is it uncomfortable at the injection site?" (2×)
Patient jerks and moves	"Did I hurt you there? I've got to press a little bit!" (1×)
Patient shows mall movement	"Did I hurt you ?" (1×)
U	"Did this hurt ?" (3×)
U	"Did that hurt much?" (1×)
U	"Are you hurting anywhere?" (1×)
U	"Is it hurting down there ?" (1×)
U	"You felt that, eh?!—or "Felt that contrast injection, ah?" (included for its negative suggestive tone) (3×)
U	"That hurts down the leg, doesn't it?" (1×)
No indication of discomfort in the 10 min preceding	"Still uncomfortable?" (2×)
? (Tape doesn't show patient well enough)	"What's hurting ? Are you tender down there?" (1×)
U	"Once it's in it doesn't cause much discomfort; If you feel anything sharp, we need to know about; Is that hurting?" (1×)
Patient has small involuntary movement	"Don't move! Hold your foot still! Don't move!; Hold your foot still! "(1×)
U	"Hold your left leg real still! Don't move!"
U	"You need to hold real still for us!; Hold real still! Don't move (that foot)!" (2×)
U	"Now we are going to have to poke you on your left side!" (1×)
U	"This isn't too bad, is it?" + multiple admonitions not to move (1×)
U	"Any increased pain anywhere ?" (1×)
U	"Are you feeling any pain there ?" (2×)

Patient verbalization/behavior refers to observations made on the tapes immediately prior to the provider's statements. U—unsolicited; no identifiable patient verbalizations or behaviors were noted that would have elicited the provider's remark. Statements invoking immobilization were included when they were shouted.

Table 3
Patient and procedure factors

Exposure to peri-stimulus negatively-loaded statements	Yes	No	
Patients in group, number	33	126	
Male/female (%male)	16/17 (48%)	61/65 (48%)	
Weight, mean, lbs	170	17	$P=0.6591$
STAI score, mean	43	43	$P=0.8465$
Baseline anxiety, mean[a]	3.1	2.6	$P=0.3983$
Baseline pain, mean[a]	1.0	1.0	$P=0.9915$
ASA status, mean	2.3	2.2	$P=0.3004$
Procedure time, min, mean (range)	78 (35–195)	82 (22–330)	$P=0.6700$
Number prior procedures, mean (range)	5.3 (1–18)	4.9 (1–17)	$P=0.6349$

[a] Mean refers to the mean obtained with logarithmically transformed data, presented in the natural scale

3.3. Effect of sympathizing with negatively-loaded wording

Examples of negatively-loaded wording used for 'sym-sympathizing' after potentially painful events are given in Table 2. Such sympathizing was not associated with increased reported pain (pain scores 2.7 vs. 2.5, $F(1,329)=0.93$, $P=0.3351$), but was associated with greater reported anxiety (anxiety scores 3.7 vs 2.9, $F(1,329)=4.54$, $P=0.0339$). Likewise, sympathizing with the patient in such terms did not produce any difference in the amount of medication used by the patient during the interval surrounding the painful event (0.32 vs. 0.26 drug units, $F(1,329)=2.63$, $P=0.1056$).

4. Discussion

Warnings and commiserations that referred to painful sensations or unpleasant emotions did not help our patients reduce pain and anxiety. To the contrary, this mode of communication was associated with increased distress. The effect could be called 'nocebo' in analogy to the well-known term 'placebo.' Placebo refers to non-specific positive outcomes in a treatment setting, nocebo refers to non-specific negative outcomes (Hahn, 1997; Spiegel, 1997). Like placebo, nocebo effects are clinical outcomes which are not attributable to the actual pharmacological or physiotherapeutic intervention and are susceptible to attention, expectation, suggestion, and conditioning (Kaptchuk, 1998). Patients who expect negative outcomes are more likely to have adverse outcomes (Bayer et al., 1998; Zajonc, 1980). Expectations can be influenced by unintended comments or suggestions by the healthcare team and the words used to give the patient information (Murphy and Zajonc, 1993). For example, in a laboratory study, 53% of subjects reported pain during sham treatment after being told they may or may not experience headache during placement of sham electrodes on the forehead (Krosnick et al., 1992).

The mechanism producing the adverse effects of negatively-loaded wording in this study may be negative affective priming (Zajonc, 1980). According to this concept, suggestions can produce the suggested affective effect even when the suggestive input is minimal: Affective reactions are set in motion and then become relatively independent of cognitive processing. Negatively-valenced priming results in more negative evaluations of ambiguous stimuli than does positive priming (Krosnick et al., 1992; Murphy and Zajonc, 1993). Thus, via negative priming, the negatively-loaded suggestions by healthcare professionals in our study would be expected to result in negative affective reactions and increased reports of pain independent of the intensity of the physical stimuli. The word 'hurt', even when announced as 'it hurts a bit' defines the situation to the subject as one in which pain is expected

Thirty-three patients heard 86 negatively loaded peri-stimulus suggestions. One might argue that patient or procedure characteristics may have elicited the providers' remarks. However, comparison with the other patients did reveal no significant differences in State Anxiety, baseline anxiety and pain scores, drug seeking behavior, sex, or age of patients, and procedural complexity. Also, the stimuli chosen for the analysis were relatively standard, such as administration of lidocaine, subsequent puncture, or injection of contrast medium. This suggests that voicing negatively-loaded suggestions is more likely a habit of some providers who believe in its merits rather than something all providers do when it is solicited by the patient. Consistent with this explanation was a high percentage of 'gratuitous' remarks by bystanders expressing warning from upcoming stimuli (Table 1). This common clinical experience is reflected in the last example on Table 1: The patient asks for medication to *relax*. The nurse offers *pain* medicine and prophesizes *burning*. Another example is a technologist screaming to the patient from the adjacent control room during repeat filming to hold a leg still that is completely immobilized in a cast and an extension, even after having been alerted that it would be physically impossible for this patient to move this leg.

The clinical relevance of a difference in pain ratings between 3.9 and 2.8 on a scale of 0–10 in association with negatively-loaded statements may be interpreted with respect to previous findings. A quality control survey after interventional radiological procedures asked patients to indicate their procedural pain levels and 'acceptable'pain levels on a scale with 0=no pain, 1=mild pain, 2=moderate pain, 3=severe pain, 4=very severe pain, and 5=worst pain possible (Lang and Berbaum, 1997). On average patients reported a pain level of 1.5 as acceptable. In the same study, patients reported an average experienced pain level of 1.5 for arteriographic and percutaneous renal interventions when attended by personnel who had been trained in advanced rapport techniques including avoidance

of negative suggestions. Patients attended by personnel not trained in these techniques experienced more pain (2.6 and 2.4 for arterial and renal interventions rsp). While the 0–10 scale, administered intraprocedurally cannot necessarily be compared directly to the 0–5 point-scale post-procedure report, roughly translating the 3.9–2.8 pain difference on the 0–10 scale to approximate 2.0 vs 1.4 on the 0–5 scale suggests that the pain reduction in this study may bring more patients within an acceptable pain level. While anxiety reduction can be considered desirable in itself it must also be considered in its interplay with pain perception.

The additional providers in the Attention Group were limited in how they could respond to patients in that they were to avoid negatively-loaded suggestions. All present during the procedure were asked not to initiate hypnosis or imagery with the patients. Because if this, some providers may have felt artificially limited in how they could help patients cope with the procedures which, in turn, could have affected the suggestions they made to patients. The conclusions of our retrospective review must be considered provisional because patients did not receive suggestions according to randomized assignment. We also hope that our study raises sufficient questions to motivate a prospective randomized controlled trial in which patients are randomly assigned to treatments with specific word sets and communication patterns. The problem that we observed in controlling communications by all present in the procedure room, however, highlights how difficult it would be to conduct a prospective randomized study that would test the accepted, unproven standard of provider–patient interaction. How would we convince providers who believe strongly in the value of their communication patterns to withhold them? Our results suggest that negatively-loaded communications during a procedure may become a self-fulfilling prophesy, and the suffering that that is associated with these communications may reinforce the provider's belief in the appropriateness of using them. This may help to explain the widespread use of such negatively-loaded statements and herald difficulty in promoting change. But testing a standard unproven method requires deviation from said method for an experimental trial.

If warning and sympathizing with negatively-loaded language increases suffering during procedures then how should we communicate with patients? This poses an ethical dilemma. Doctors and nurses need to provide full disclosure of accurate information, prepare their patients for procedural stimuli, and assess their levels of distress. They also have a responsibility to reduce pain and avoid unnecessary anxiety. How then do we inform, prepare, and assess if that process in itself may increase pain and anxiety? We believe that *prior* to the procedure is the appropriate time to inform the patients of the possibility of discomfort and explain how it will be managed. During the procedure, standard pain scales and questions such as 'what are you experiencing?' instead of 'did that hurt much?' would then be more appropriate and neutral statements or 'positive suggestions' which focus on a competing sensation, a desired outcome, or provide distraction could be the focus of provider communication. For example, during application of local anesthetic, one may simply tell the patient that local anesthetic is being given rather than announcing a 'sting and a burn.' Alternatively the patient might be instructed to focus on a sensation of cool, tingling, or spreading of numbness. 'Doing no harm' may begin with not inadvertently biasing patients toward perceiving more pain and anxiety.

Our findings have implications for medical education. The Accreditation Council for Graduate Medical Education (ACGME) requires that doctors be taught effective communication skills. Medical curricula place increasing emphasis on teaching and assessment of compassionate, empathic behavior (Makoul, 2001). Unfortunately, our conventional understanding of compassionate behavior may be based more on belief than scientific evidence. An analysis of 599 articles in medical education research found that most focused on trainee performance and that patient outcome was addressed in only four articles (Prystowski and Bordage, 2001). The results flag the need to re-examine provider–patient interactions and insist on evidence-based practices. We hope that despite the limitations of the retrospective nature of this study, it raises sufficient questions to strongly suggest the need for a rigorous prospective trial in which specific word sets and communication patterns are randomly assigned to different patient arms. We need to understand how our communications influence patients and validate the practices we teach new physicians.

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