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Mindfulness Improves Otolaryngology Residents' Performance in a Simulated Bad-News Consultation: A Pilot Study

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INTRODUCTION: Delivering bad news is a stressful moment for both patient and clinician. As poor bad-news consultation quality may lead to misunderstandings, lack of treatment adherence, acute or even post-traumatic stress in patients, training interventions to improve communication skills and stress-management are necessary. Mindfulness is a recognised stress-management strategy that has shown its efficacy in reducing stress in both health professionals and students. We then supposed that a short mindfulness meditation session performed just before a simulated breaking bad-news consultation to patients with laryngeal cancer may help ear, nose and throat (ENT) residents to master their stress and improve their management of this consultation. This study aims at showing how a short mindfulness meditation performed before a simulated bad-news consultation may improve performance in its realisation by ENT residents.

MATERIALS AND METHODS: We enrolled 53 ENT residents, randomised in 2 groups. The first group completed a 5-minute mindfulness session while the other group listened to a control track. Thereafter, every resident completed an 8-minute simulated bad-news consultation with a standardised patient. Two blinded expert assessors evaluated their performance on a 25-point grid (BNC-OSAS). Residents self-assessed their stress before and after the intervention and simulated patients rated their perception of physician's empathy.

RESULTS: The performance was significantly better in the mindfulness group than in the control group (m = 19.8, sd = 3.2 and m = 17.4, sd = 3.7 respectively, $F(1,45)=5.27$, p = 0.026, d = 0.67), especially in the communication and knowledge subdomains. There was no significant difference in perceived stress between the 2 groups. Empathy perceived by simulated patients was positively correlated to residents' performance.

CONCLUSION: A short mindfulness meditation is effective for improving ENT residents' performance in a simulated bad-news consultation. These results encourage further assessments of this method with objective measures of physiological stress. More research is required concerning the feasibility and efficacy of mindfulness before daily clinical activities such as stressing bad-news consultation. (J Surg Ed 000:1–9. © 2020 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

ABBREVIATIONS: BBN, breaking bad-news BNC-OSAS, bad-news consultation - objective structured assessment scale CARE, consultation and relational empathy ECT-OSATS, electro-convulsive therapy - objective structured assessment of technical skills ENT, ear, nose and throat

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FNE, fear of negative evaluation GGIM, group guided integration method JSPPPE, Jefferson scale of patient perceptions of physician empathy MAAS, mindful attention awareness scale MD, medical doctor OSCE, objective and structured clinical evaluation PTSD, post-traumatic stress disorder STAI, state-trait anxiety inventory STAI-S, state-trait anxiety inventory - state STAI-T, state-trait anxiety inventory - trait VAS, visual analogue scale VAS-A, visual analogue scale — attention VAS-E, visual analogue scale - empathy VAS-S, visual analogue scale - stress VAS-SC visual analogue scale - self-confidence

KEY WORDS: Mindfulness, Breaking bad news consultation, Stress, Cancer, Healthcare simulation, Communication skills

COMPETENCIES: Patient Care, Medical Knowledge, Professionalism, Interpersonal and Communication Skills, Practice-Based Learning and Improvement

INTRODUCTION

Breaking bad-news (BBN) consultations are stressful moments both for patients and healthcare professionals.[1] Ear, nose and throat (ENT) specialists are among the practitioners who are regularly required to conduct BBN consultations, particularly to disclose cancer. These moments were regularly found to increase both physiological (heart rate, blood pressure or skin conductance) and psychological (self-measures of stress and anxiety) stress-responses.[2] Ptacek et al. found that until 42% of practitioners indicated that "stress they experienced (after a BBN consultation) lasted several hours to more than 3 days."[3] Actually, skilfully delivering bad news is of high importance since this is a key moment in the history of the patient's illness, with short- and long-term consequences. This disclosure may result for patients in acute distress such as loss of control or devastation,[4] poor treatment adherence,[5] or lead to more serious psychiatric conditions such as post-traumatic stress disorder.[6,7]

Poor BBN consultations quality is related to lack of experience, stress, and poor communication skills.[8] Therefore, training interventions to improve communication skills and stress-management are necessary to improve BBN consultations. These programs were shown to be effective on observer-rated news delivery skills and self-confidence, with one study reporting effects on patient-reported depression/anxiety.[9] These interventions may include several hours of stress-management courses, as it is the case in Bragard et al.'s method.[10] However, these programs do not explore the immediate efficacy of stress-management practice on subsequent clinical practice.

Simulation training is an ideal condition to explore the impact of stress on clinical situations before implementing them in clinical practice. As stress has a potential negative impact on clinical performance,[11] various stress-management programs were tested in simulation training. Most of them were conducted by surgeons and included mental practice, mental rehearsal, relaxation or coping techniques.[12-14] To our knowledge, no study investigated the impact of a mindfulness-based intervention on a simulated practice.

Mindfulness meditation was conceived and developed by Jon Kabat-Zinn in the early 90s. He defines it as "paying attention on a particular way: on purpose, in the present moment, and nonjudgmentally".[15] More generally, the term meditation "refers to a family of self-regulation practices that focus on training awareness and attention to [. . .] foster general mental well-being and development and/or specific capacities such as calm, clarity and concentration".[16] Most studies on the use of mindfulness in healthcare were conducted using Mindfulness-Based Stress Reduction program (MBSR), which is known to reduce physiological stress, blood pressure and heart rate.[17] Mindfulness-based interventions also reduced stress among healthcare professionals and students.[18,19] Unfortunately, the interventions studied until then require a specific training (i.e., time) and are then difficult to adjust to the busy schedule of a healthcare professional. Actually, a recent review highlighted the need of healthcare professionals for shorter and tailored mindfulness interventions to adapt them to their daily clinical practice.[20] Few studies adapted these interventions to clinical context but none in the context of BBN consultations. Gockel et al., in social work students, selected exercises from the MBSR program to offer 10-minute periods of mindfulness training with 5-minute periods of discussion before clinical interviewing classes, resulting in improvement in counselling self-efficacy and further engagement in mindfulness practice.[21] No objective assessment of clinical practice skills was undertaken. In this context, our study aims at exploring the impact of a short mindfulness practice on performance to a subsequent simulated BBN consultation in ENT residents.

METHODS

Study Participants

The study was conducted in ENT residents. Inclusion criteria were: Being an ENT resident from one of the 5 medical colleges of the East of France (Reims, Nancy, Strasbourg, Dijon, and Besançon) and participating in a training day organised for ENT residents coming from these universities on the 27th of September 2018.

Fifty-three ENT residents took part to this training day and all of them were included, stratified according to their year of residency and randomised in 2 groups. Their age and gender, the number of BBN consultations they had performed (either supervised or alone) or attended were registered. Six residents were not included in the analysis because they either missed the mindfulness task or the simulated BBN consultation. In total, the results were analysed for 47 participants. The study took place at the European Unit of Healthcare Simulation (*UNIté Européenne de SIMulation en Santé, UNISIMES*) of the University of Strasbourg, France.

Procedure

All residents were first offered a 45-minute lecture on BBN consultation based on SPIKES recommendations.[22] We chose SPIKES recommendations for their international approval and large use in teaching BBN consultations,[9] their intelligibility and clinical realism, then adaptable to a pedagogical context. This lecture was made on a GGIM format[23] (Group Guided Integration Method, a pedagogical strategy consisting in 20 minutes of lecture, 10 minutes of individual filling of a lecture's framework, 10 minutes of mutual completion of this plan in small groups and 5 minutes of conclusion). After this lecture, they completed the State-Trait Anxiety Inventory-State form (STAI-State [STAI-S] and STAI-Trait [STAI-T]: each from 20 to 80 points),[24,25] the Mindful Attention Awareness Scale (MAAS, from 15 to 90 points),[26,27] the Fear of Negative Evaluation scale (FNE, from 0 to 30 points).[28] Then, the participants attended their program of cranial and neck anatomy and technical skills in simulation. During these lessons, each resident had a personal schedule indicating when he or she could go to bad-news consultation training. This intensive planning with other simulated activities created the conditions of a stressful clinical day, close to professional reality.

The bad news consultation training session included 3 consecutive phases (preparation, simulated consultation, postsimulation), for each resident individually.

The preparation phase was divided in 3 steps. First, residents performed 2 Visual Analogue Scales assessing Stress (VAS-S) and Self-Confidence (VAS-SC),[29] both subsequently converted to a 0 (not at all) to 100 (fully) numerical scale. Second, half of them completed a 5-minute guided mindfulness meditation session and the other half listened to a 5-minute control track. The meditation track was adapted from a text of Christophe André (MD), originally inspired by Williams et al[30,31] (see Supplementary material S1). The main investigator (ACM) recited this meditation (listen to Supplementary audio material Track 1 - Mindfulness). The control track consisted on the definition of an atom also read by ACM (listen to Supplementary audio material Track 2 - Control).[32] The investigator read this track with the same voice and the same tone than the meditation track to create a control task where participants were also focused on an audio material. The aim was to ascertain that the effectiveness of meditation was linked to its specific content and not just the result of a few moments of concentration. Third, all residents performed the VAS-S and VAS-SC and a VAS for attention (VAS-A), assessing to which extent they were attentive to the content they listened to (see Supplementary material S2).

In the consultation phase, each resident completed an 8-minute simulated bad-news consultation (disclosure of a laryngeal cancer) to a standardised patient. The scenario was adapted to the specific psycho-social and medical background of patients with laryngeal cancers (for the objectives and the scenario, see Supplementary material S3). The performance evaluation was completed by 2 blinded and independent assessors, a psychiatrist and an ENT specialist (a total of 5 assessors took part to the study, 3 psychiatrists and 2 ENT specialists). Evaluators were located in a separated room, using an audio-video transmission device and rated the participants with our newly developed bad-news consultation rating scale (BNC-OSAS, Bad-News Consultation Objective and Structured Assessment Scale, see Supplementary material S3). The BNC-OSAS was created on the model of a global rating scale for Electro-Convulsive Therapy (ECT-OSATS).[33] This scale was chosen as OSATS model was widely experienced as a reliable tool for assessment in simulation training [34,35] and that SPIKES recommendations were easy to insert into this model. We adapted these recommendations to the 5 domains included in our scale (Respect, Efficacy, Knowledge, Communication, and Overall impression of performance) and included clear indications for raters to increase inter-rater correlation. Each domain was rated on a 5-point scale (1-5) and a global rating score was calculated (5-25). Interrater correlation for total scores of the BNC-OSAS was measured using intraclass correlation (ICC = 0.64, $p < 0.0001$). A final "pass or fail" outcome was then completed, indicating whether the examiner feels that the resident would be safe enough to perform bad-news consultation independently (on the next live patient) or not.

In the postsimulation phase, each student performed the VAS-SC and the VAS-S once again and the VAS-Empathy (VAS-E) where they assessed the empathy they felt for the patient. Standardised patients assessed perceived empathy by completing the Jefferson Scale of Patient Perceptions of Physician Empathy (JSPPPE).[36]

Statistical Analyses

Regarding sociodemographic data, our samples were compared using either *t* test when data followed a normal distribution (scores at MAAS, STAI-T, STAI-S and FNE scales) or a Mann-Whitney test when not (year of residency). A Fisher's exact test was performed for age (divided in 4 age categories), number of previous bad-news consultation (divided in 5 categories [0; 1-2; 2-5; 5-10; >10]) and gender. The primary outcome was the score of both raters on the BNC-OSAS and was compared using an ANOVA with the group (mindfulness vs control) as a fixed factor. Secondary outcomes were the subscores on the 5 different domains of the BNC-OSAS, the "pass or fail" outcome, the stress-reduction estimated by residents and the score on the JSPPPE. BNC-OSAS subscores, JSPPPE score, VAS-A and VAS-E scores were measured using separate ANOVAs, while "pass or fail" was measured by an exact binomial test. Regarding VAS-S and VAS-SC scores, separate mixed ANOVAs for repeated measures were used with group as a between-subjects factor and time (before vs after) as a within-subjects factor. We calculated Pearson's r (when distributions were normal) or Spearman's ρ (when at least one distribution was not normal) correlation coefficients between performance on the one side and socio-demographic data, VAS scores and assessment of empathy on the other.

Our power analysis was based on an expected average of 15 at the BNC-OSAS score in the first group and an average of 20 in the second group, with a common standard deviation of 5. The alpha risk and power were set at 5% and 80%, respectively. With these hypotheses, the number of subjects to include was 46. A 10% addendum was applied due to possible subjects lost to follow-up. The number of subjects required was therefore 50 (i.e., 25 per group).

RESULTS

Sociodemographic Characteristics

There were no significant differences between mindfulness and control groups in terms of age, gender, training level or previous experience with bad-news consultations (see Table 1).

TABLE 1. Sociodemographic characteristics.

	Mindfulness group (n = 24)	**Control Group (n = 23)**	**p**
	n	*n*	
Age			*0.37*
25-27	*8*	*6*	
28-30	*16*	*14*	
31-33	*0*	*0*	
34-36	*0*	*1*	
Sex			*0.99*
female	*12*	*11*	
male	*11*	*10*	
Previous bad-news consultations			*0.371*
0	*2*	*1*	
1-2	*2*	*7*	
2-5	*9*	*3*	
5-10	*9*	*4*	
> 10	*2*	*6*	
	mean (sd)	*mean (sd)*	
Year of residency	*3.2 (1.3)*	*3.5 (1.3)*	*0.52*
MAAS	*58.1 (10.0)*	*61.5 (11.6)*	*0.29*
STAI-T	*49.6 (3.2)*	*50.6 (5.0)*	*0.45*
STAI-S	*49.7 (3.4)*	*49.8 (4.1)*	*0.95*
FNE	*15.5 (4.1)*	*15.5 (6.6)*	*0.99*

Performance at the Simulated Bad-News Consultation

Participants in the mindfulness group had significantly higher total scores at the BNC-OSAS than did the control group (m = 19.8, sd = 3.2 and m = 17.4, sd = 3.7 respectively, $F(1,45)=5.27$, p = 0.026, Cohen's d = 0.67) (see Fig. 1). Regarding BNC-OSAS subscales, Knowledge and Communication scores were significantly higher in the mindfulness than in the control group (ps < 0.049) whereas Respect, Efficiency and Overall impression of performance scores did not differ significantly between groups (ps > 0.065) (see Table 2).

Percentage of Pass

The percentage of pass was higher in the mindfulness than in the control group but the difference was not statistically significant (percentage of pass of 75% and 58.7% respectively, $\chi^2 = 0.09$). However, significantly fewer residents were rated "fail" by both assessors in the mindfulness group than in the control group (4.3% vs 30.4% respectively, p = 0.04).

VAS of Stress, Confidence, Attention

Stress scores did not differ significantly between mindfulness and control group ($F(1,44)=1.06$, p = 0.302) but decreased significantly between before and after intervention ($F(1,44)=4.95$, p = 0.031). Confidence scores were higher in the mindfulness than in the control group ($F(1,44)=7.65$, p = 0.008) but did not differ between before and after intervention ($F(1,44)=2.35$, p = 0.133). For both stress and confidence scores, the interaction between group and time was not significant (Fs$(1,44)<1.01$, ps > 0.32). Attention to the audio content was

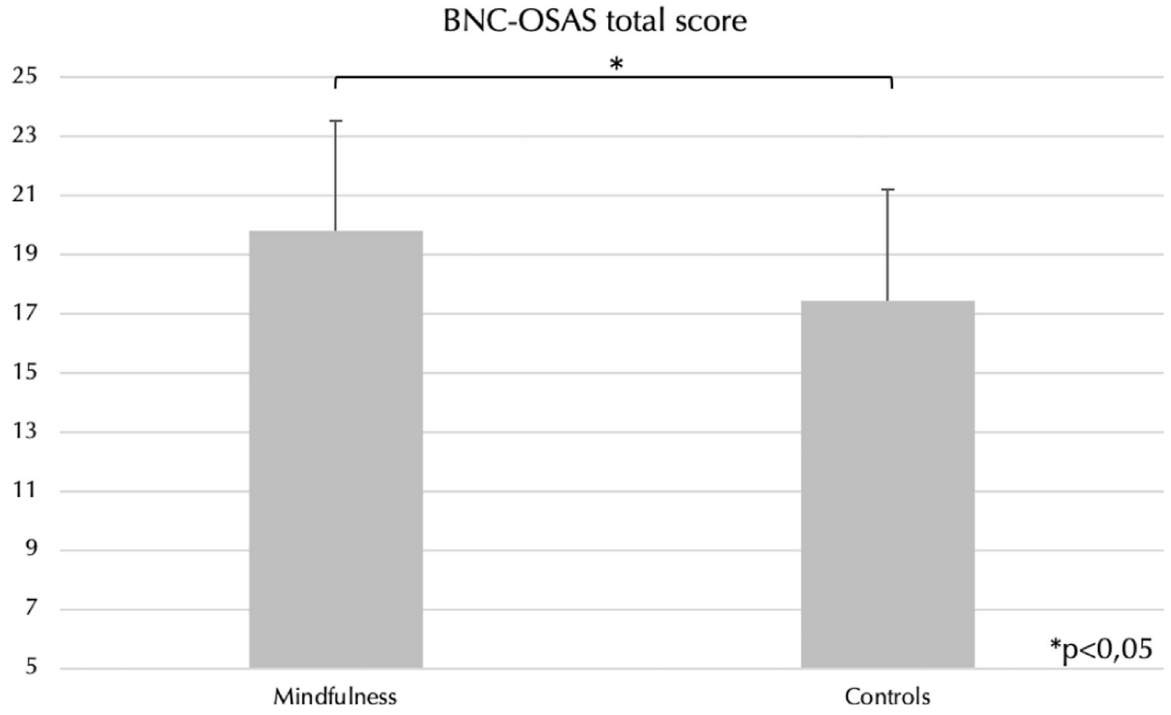

FIGURE 1. Total score at the Bad News Consultation – Objective and Standardized Assessment Scale (BNC-OSAS) for participants in the mindfulness and control groups.

significantly higher in the mindfulness than in the control group ($F(1,44)=16.15$, $p < 0.001$).

Empathy

There was no significant group difference neither in empathy perceived by standardised patients nor as self-assessed by residents ($F(1,41)=0.17$, $p = 0.685$ and $F(1,44)=0.36$, $p = 0.552$).

Correlation Analyses

Performance (BNC-OSAS) was significantly correlated with perceived stress and confidence before intervention ($r = -0.426$, $p = 0.004$ and $r=0.450$, $p = 0.002$ respectively), with perceived confidence after intervention ($r=0.326$, $p = 0.029$), with self-assessment of empathy ($\rho = 0.448$, $p = 0.002$), and with empathy perceived by simulated patients ($r = 0.541$, $p < 0.001$).

Secondary Analysis

As performance was correlated to confidence after intervention and given that participants in the mindfulness group had higher confidence score after intervention, we entered self-confidence after intervention as a covariate in an ANCOVA comparing BNC-OSAS score between groups. The group effect was still marginally significant

TABLE 2. Subscores at BNC-OSAS.

	Mindfulness Group (n = 24)	**Control Group (n = 23)**	***F***	**p**
BNC-OSAS subscores	*m (sd)*	*m (sd)*		
Respect (1-5)	*4.1 (0.9)*	*3.5 (1.1)*	*3.57*	*0.065*
Efficiency (1-5)	*4.0 (0.9)*	*3.0 (1.0)*	*3.42*	*0.071*
Knowledge (1-5)	*4.3 (0.8)*	*3.8 (0.8)*	*5.42*	*0.024**
Communication (1-5)	*4.0 (0.9)*	*3.0 (1.0)*	*4.09*	*0.049**
Overall performance impression (1-5)	*4.0 (1.1)*	*3.0 (1.2)*	*2.96*	*0.093*
Total (5-25)	*19.8 (3.9)*	*17.4 (4.4)*	*5.27*	*0.026**
Pass or fail	*n (%)*	*n (%)*		
Fail/fail	*1 (4.2)*	*7 (30.4)*		*0.040**
Pass/fail	*10 (41.7)*	*5 (52.2)*		*0.301*
Pass/pass	*13 (54.2)*	*11 (47.8)*		*0.839*

($F(1,42)=3.89$, p = 0.055) whereas the effect of self-confidence was not ($F(1,42)=0.12$, p = 0.117).

DISCUSSION

Our results show that a short mindfulness meditation session performed just before a simulated bad-news consultation can improve performance in its fulfilment by ENT residents rated on the BNC-OSAS scale. Moreover, the number of residents who were considered as not sufficiently autonomous to achieve bad-news consultations on their own (rated "fail") by both assessors was significantly lower in the mindfulness group. These results are encouraging since such a guided mindfulness practice is easy to learn and perform. Indeed, contrary to previous studies that mostly examined the impact of mindfulness' programs (mostly MBSR) on health professionals well-being or competencies,[18,37] our study fits to daily clinical reality and residents needs,[20] promoting a short 5-minute mindfulness tool and observing its immediate effect on subsequent clinical practice. Plus, teaching mindfulness in the context of simulation practice could foster its transferability and use in clinical practice as learning context is authentic and close to reality.[38] Indeed, Gockel et al. showed that students further engaged themselves in mindfulness practice when they learnt it before clinical lessons.[21]

The BNC-OSAS subscore for communication was significantly higher in the mindfulness group than in the control group. This secondary outcome was expected because mindfulness could allow residents to calm down and communicate more effectively. Mindfulness meditation can also generate compassion and lead to more empathetic communication.[37] Indeed, while empathy perceived by standardised patients was not higher in the mindfulness group, a secondary analysis showed that the sub-score for communication was well correlated with perceived empathy ($r = 0.533$, p < 0.001). The improvement of residents' communication skills is particularly interesting because effective physician's communication is linked to a better psychological response from the patient who is diagnosed with cancer.[39] The knowledge subscore was also better in the mindfulness group. This result was less predictable since the 2 groups were comparable in terms of experience (year of residency and consultations carried out). However, their previous knowledge might have been different, a data that our study did not specifically explore. Finally, one may wonder whether the meditation session had enabled the residents to better manage their stress and therefore have better access to their knowledge.

Our study showed no influence of mindfulness on perceived stress and stress-reduction which rather contradicts our predictions. However, these subjective measures of stress are not always correlated with physiological measures.[8] Further studies on mindfulness in simulated bad-news consultations would gain in including objective measures of stress (i.e., using heart-rate variability and/or electrodermal conductance) in order to bypass this limitation. Other paradigms of perceived psychological stress could also bring a more consistent measurement. Indeed, Rudland et al. recently highlighted how *eustress* - considered as a good stress, in comparison to *distress* - may foster learning.[40] According to this model, the stress/performance relationship describes an inverted "U" curve, challenging the relevance of linear scales for measuring stress in a pedagogical frame. For instance, scales based on the theory of cognitive evaluation (measuring the ratio between self-evaluated available resources for the simulated scenario to come and necessary resources for the simulated scenario to come) may offer a greater consistency with simulation.

Residents in the mindfulness group showed a significantly higher self-confidence both before and after audio listening than in the control group, which may have contributed to their better performance in the simulated bad-news consultation. Indeed, self-rated confidence was correlated with performance in simulated consultation. Firstly, this result contrasts with previous ones on self-confidence and performance in simulation training. Actually, 3 studies showed no correlation between self-reported confidence and simulation performance. However, only one of these studies included a self-assessment of self-confidence prior to the simulated consultation,[41-43] while in our study self-reported confidence after simulated practice was also not correlated with performance. These observations invite researchers to monitor students' self-confidence levels in future studies of stress regulation methods in simulation training. Indeed, although we controlled the level of constitutional and instantaneous stress by using several scales (STAI-T, STAI-S, FNE, VAS-S), they did not show any difference between the 2 groups, although they did not approach simulation training with a similar state of mind since they differed in terms of self-confidence. This higher self-confidence in the mindfulness group before consultation raises the issue of whether a simple baseline group difference could explain our results. Secondary analyses taking into account self-assessed confidence before the simulated consultation, showed in fact that the group effect was still marginally significant, but the effect size remained medium ($d = 0.61$), this arguing in favour of an effect of meditation p*er se* and softening the possible influence of baseline self-confidence.

Empathy perceived by simulated patients was not higher in the mindfulness group, though this measure was correlated with residents' performance. Data

concerning assessment of empathy by simulated patients are contrasting. On the one hand, a study found that empathy assessed by simulated patients on a 5-point Likert scale was positively correlated with performance in Objective and Structured Clinical Evaluations (OSCEs) while another found a high inter-rater reliability between empathy assessed by standardised patients and expert assessors in psychiatry OSCE.[44,45] On the other hand, a study found that simulated patients assessed empathy higher than expert assessors in family medicine students with the Consultation And Relational Empathy (CARE) scale.[46] An interesting point is that the estimation of empathy by the simulated patients (as well as by the residents themselves) was correlated with all BNC-OSAS subscores except knowledge, providing an argument that the attitude of the physician has a much greater impact on the patients' feelings than his or her knowledge. This underlines how knowledge and interpersonal skills are 2 essential dimensions of care.

Some limitations of our study must be acknowledged. First, our evaluation was conducted at a single 8-minute OSCE station, while the current recommendations offer a minimum of 8 stations to obtain a reliable final score.[47] However, the feasibility of such a number of stations in our study was null. Second, this was the first use of the BBN consultation skills assessment scale (BNC-OSAS) that we created for this study. Nevertheless, we decided to create this grid as to our knowledge no validated grid to assess bad-news consultations existed. Plus, it has been based on international recommendations for BBN consultations and on a previous objective scale based on areas of expertise recognised by the CanMeds. Though our study should not be considered as a validation process of BNC-OSAS, this grid showed good inter-rater reliability during our study.

CONCLUSION

Our results indicate that a short mindfulness session improves performance of ENT residents in a subsequent simulated bad-news consultation, which seems of clinical relevance considering it may lessen psychological disturbances (depression, cancer-related PTSD),[6] foster treatment adherence [5] and improve health professionals fulfilment and well-being at work. Future research may confirm these results in similar and different settings (type of mindfulness practice, time between mindfulness and consultation, etc.) in simulation training and in daily clinical practice to study its effect on real breaking bad-news consultations. A qualitative study could investigate the methods spontaneously used by practitioners to prepare themselves to these consultations and relieve their stress. Such a survey would allow us to explore the needs of physicians and thus the feasibility and transferability of a mindfulness meditation practice into their daily clinical practice. As a whole, our research is also in line with the idea that health professionals' well-being at work may directly impact patients' health.

AUTHORS CONTRIBUTIONS

ACM and CK conceived the study protocol. ACM drafted the first and subsequent drafts. ACM, NT and FB performed the final statistical analysis. JPC carried out the randomisation. AC and JPC drew up the study planning. AC, ML and PV contributed to the critical revision of the paper. All authors approved the final manuscript for submission and have agreed to be accountable for all aspects of the work.

ETHICAL APPROVAL

This study was approved by the local ethic committee of the Hôpitaux Universitaires de Strasbourg (CE-2018-81). The investigation was carried out in accordance with the latest version of the Declaration of Helsinki.[48] All participants received appropriate written information, signed and informed consent form before enrolment in the study. After completion of the study, a debriefing was proposed to the participants.

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SUPPLEMENTARY INFORMATION

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