

Rudeness and Medical Team Performance

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abstract

OBJECTIVES: Rudeness is routinely experienced by medical teams. We sought to explore the impact of rudeness on medical teams' performance and test interventions that might mitigate its negative consequences.

METHODS: Thirty-nine NICU teams participated in a training workshop including simulations of acute care of term and preterm newborns. In each workshop, 2 teams were randomly assigned to either an exposure to rudeness (in which the comments of the patient's mother included rude statements completely unrelated to the teams' performance) or control (neutral comments) condition, and 2 additional teams were assigned to rudeness with either a preventative (cognitive bias modification [CBM]) or therapeutic (narrative) intervention. Simulation sessions were evaluated by 2 independent judges, blind to team exposure, who used structured questionnaires to assess team performance.

RESULTS: Rudeness had adverse consequences not only on diagnostic and intervention parameters (mean therapeutic score 3.81 ± 0.36 vs 4.31 ± 0.35 in controls, $P < .01$), but also on team processes (such as information and workload sharing, helping and communication) central to patient care (mean teamwork score 4.04 ± 0.34 vs 4.43 ± 0.37 , $P < .05$). CBM mitigated most of these adverse effects of rudeness, but the postexposure narrative intervention had no significant effect.

CONCLUSIONS: Rudeness has robust, deleterious effects on the performance of medical teams. Moreover, exposure to rudeness debilitated the very collaborative mechanisms recognized as essential for patient care and safety. Interventions focusing on teaching medical professionals to implicitly avoid cognitive distraction such as CBM may offer a means to mitigate the adverse consequences of behaviors that, unfortunately, cannot be prevented.

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Dr Riskin, conceptualized and designed the study, carried out the initial analyses, and drafted the initial manuscript; Dr Erez conceptualized and designed the study, coordinated data collection, carried out the initial analyses, and critically reviewed and revised the manuscript; Mr Foulk carried out the initial analyses and reviewed and revised the manuscript; Mrs Riskin-Geuz designed the data collection instruments, coordinated and supervised data collection, and critically reviewed the manuscript; Dr Ziv designed the study, coordinated data collection, and critically reviewed the manuscript; Ms Sela designed the data collection instruments, coordinated and supervised data collection, and critically reviewed the manuscript; Ms Pessach-Gelblum designed the study, coordinated data collection, and critically reviewed the manuscript; Dr Bamberger conceptualized and designed the study and drafted the initial manuscript; and all authors approved the final manuscript as submitted.

DOI: 10.1542/peds.2016-2305

Accepted for publication Nov 4, 2016

WHAT'S KNOWN ON THIS SUBJECT: Rudeness is routinely experienced by medical teams. Medical professionals exposed to rude behavior performed poorly on diagnostic and procedural tasks related to the medical treatment they provided. Reduced information sharing and helping mediated the effects of rudeness on their performance.

WHAT THIS STUDY ADDS: Rudeness had adverse consequences not only on therapeutic components of medical teams' performance, but also on collaborative team processes essential for such performance. Cognitive bias modification as a preventative intervention mitigated most of these negative consequences of rudeness.

To cite: Riskin A, Erez A, Foulk TA, et al. Rudeness and Medical Team Performance. *Pediatrics*. 2017;139(2):e20162305

Rude and disrespectful behaviors, prevalent in all organizations,¹ are increasingly widespread in high-intensity, service-oriented organizations, such as hospitals and health care facilities.²⁻¹¹ Doctors, nurses, and other health care providers are regularly exposed to rude behaviors from their superiors, peers, patients, and families of patients. This is concerning because beyond the adverse effects such behavior can have on their targets' well-being,¹² a growing body of research indicates that rudeness can also have devastating effects on individual performance. For example, studies have demonstrated that in comparison with controls, participants exposed to even mildly rude behavior (eg, insensitive and unexpectedly disrespectful acts or utterances) performed poorly on cognitive tasks, exhibited reduced creativity and flexibility, and were less helpful and prosocial. This effect was observed regardless of whether they were the target of such behavior or simply a witness.¹³⁻¹⁵

Building on such findings, in a recent study, we applied a simulation-based experimental design to examine the impact of colleague-based rudeness on a variety of individual-level practitioner outcomes in a NICU context, finding robust adverse consequences with respect to accuracy of diagnosis and quality of care (ie, misspecification of medical orders and errors in fulfillment of medical orders).¹⁶ Moreover, we identified diminished information sharing and help seeking among the NICU staff as key processes adversely affected by rudeness and mediating its impact on individual practitioner performance.¹⁶ Overall, rudeness explained 43% of the variance in practitioner performance; 20 points more than that accounted for by all other commonly explored causes of iatrogenesis, such as chronic sleep loss.¹⁶ Aside from highlighting the often overlooked role of social

interactions as a risk factor for iatrogenesis,¹⁷ this study raised 3 main questions that we seek to address in the current investigation.

First, although the preceding findings suggest that collaborative processes may be adversely affected by rudeness, we know little about the team-level consequences of rudeness. Indeed, whereas laboratory research using student participants has consistently demonstrated the adverse impact of rudeness on the performance of individual victims and witnesses,¹³⁻¹⁵ we are unaware of research examining team-level effects. Accordingly, the first question we address is the degree to which rudeness also affects team processes and, ultimately, team performance. Second, whereas the earlier study demonstrated the adverse effects of colleague-based rudeness, the implications of rudeness stemming from a patient or patient family member remain unknown. This is important because although medical facilities may be able to control colleague-based rudeness, there is little they can do to control patient or family rudeness. Hence, the second question we address is the degree to which findings regarding the impact of colleague-based rudeness are generalizable to patient/family-based rudeness. Finally, because rudeness can have such a devastating effect on practitioner performance, we questioned whether preventative and/or treatment interventions might mitigate these adverse effects.

Accordingly, the first and second aims of the current study were to see if we could replicate our previous findings at the team level with rudeness stemming from an alternative source (ie, patient family). In this context, we examined the extent to which patient-based rudeness influenced such team-level processes as information sharing, workload sharing, helping and communication, as well as

such team-level medical outcomes as diagnostic and procedural performance.

To address the third question, we examined the potential mitigating effects of 1 potential preventative intervention and 1 potential treatment intervention. In terms of the former, framing rudeness as a threatening stimulus eliciting appraisal and interpretation (processes drawing cognitive resources from the task at hand), we looked to interventions focused on cognitive bias modification (CBM) targeting threat-related interpretation biases. CBM interventions involve brief, computerized cognitive training modules designed to alter threat-oriented biases in interpretation by promoting a more positive/benign rather than threat-based interpretation of ambiguous information or stimuli.¹⁸⁻²¹ Similar, preperformance cognitive training modules have been demonstrated to enhance attention control and are in place in a wide variety of performance domains, including surgery and flight control.²²⁻²⁴ CBM may have similar potential in this regard because it has been shown to increase people's resiliency to attention-diverting stressors by training them to shift their attention away from threat. Accordingly, we posited that to the extent that practitioners can learn to interpret interpersonal emotional expression as less hostile, they and their teammates should be less affected by such expressions and be better positioned to apply their cognitive resources to the tasks at hand and provide enhanced clinical care.

The second, treatment intervention was informed by research by Pennebaker on the treatment of victims of sexual abuse.²⁵⁻³⁰ Pennebaker and others have demonstrated that recovery among such victims is facilitated by composing a narrative of the

event. Underlying this approach is the notion that “constructing stories is a natural human process that helps individuals understand their experiences and themselves,” thus facilitating “a sense of resolution, which results in less rumination and eventually allows disturbing experiences to subside gradually from conscious thought.”³⁰ Accordingly, we posited that by writing a narrative about a rude event just experienced, practitioners would more efficiently process the experience and thus be better positioned to focus their attention on their team and subsequent cases they were asked to manage.

METHODS

Participants

Thirty-nine NICU teams, each comprising 2 physicians and 2 nurses, were recruited from among the various NICUs operating in Israel’s hospitals. Teams were offered the opportunity to join a full medical simulation training day in The Israel Medical Simulation Center at Sheba Medical Center at Tel Hashomer.³¹ The espoused purpose of the exercise was to train teams in the debriefing techniques described and examined by Vashdi et al as a means to facilitate team learning and enhance performance.³²

Procedure

Four teams were recruited for each simulation day. Two teams were randomly assigned to either a rudeness (in which the scripted comments of the infant’s mother early in the day included a rude statement completely unrelated to the teams’ performance) or control (neutral comments) condition, and 2 additional teams were assigned to rudeness with either a preventative (CBM) or therapeutic (narrative) intervention.

Randomization

Randomization was achieved by using a system of randomly prepared cards in sealed, nontransparent envelopes containing the 4 condition assignments. There were separate envelopes for each simulation day. At the start of each simulation day, the research assistant drew the cards from the envelope and assigned each of the preregistered teams to 1 of the 4 conditions (control, rudeness, rudeness with narrative, and rudeness with CBM) according to the card pull for that day. On those five simulation days on which a team scheduled to participate failed to show up, the research assistant randomly excluded 1 of the noncontrol condition cards from the card draw to ensure that there was always a team in the control condition.

Ethical Considerations

Each team member underwent a prestudy, consenting process in which they signed an informed consent form (written per the specifications of the institutional review boards of the first author’s university, and the medical center with which Israel Center for Medical Simulation is affiliated). This form specified that the purpose of the study was to examine factors influencing medical team performance. As part of this process, participants were specifically told that in the course of the simulations, their performance would be recorded and observed by others, and that they would be required to interface with actors playing the role of their patients’ family members. They were also told that rather than giving them feedback during the course of their simulation work, observers would do so after each simulation in the context of the debriefing. We explained to them that these postsimulation sessions would be used not only to provide performance feedback but also to

teach debriefing skills, including reflection, analysis, and planning. We also reviewed with participants the section of the consent form indicating that they were free to withdraw from the study at any time. Upon completing the final instruments at the end of the simulation day, all participants were debriefed. In this poststudy debriefing, we (1) again reviewed participants’ right to withdraw from the study as well as their right to withdraw their personal data from the study; (2) reminded participants that although the “patients” and “family members” that they interacted with in different scenarios were just manikins and actors, respectively, it was perfectly normal to be disturbed by some of these experiences; and (3) informed participants that support was available for those feeling particularly disturbed by their experiences. None of the participants withdrew their informed consent or requested that their data be withheld or destroyed, and no one asked for the psychological assistance that we offered to provide discretely.

After reviewing the informed consent forms, participants were briefed on the reflexivity training exercise that would occur at the conclusion of each of the simulations during the day.

Scenarios

Regardless of condition, the day comprised 5 emergency scenarios in neonatal medicine:

Neonate with severe jaundice (pathologic hyperbilirubinemia) because of glucose-6-phosphate-dehydrogenase deficiency. Because intensive phototherapy did not sufficiently reduce the bilirubin levels, double volume exchange transfusion should be performed.

Newborn in hypovolemic shock. The neonate was delivered via vacuum extraction and developed a rapidly expanding subgaleal hemorrhage with consumption coagulopathy.

Infant with severe respiratory distress after meconium aspiration syndrome. The neonate developed persistent pulmonary hypertension, was intubated and received inhaled nitric oxide. His respiratory status was further complicated by a pneumothorax necessitating insertion of a thorax drain.

Newborn with severe neonatal asphyxia with hypoxic ischemic encephalopathy. Total body cooling, also referred to as hypothermia treatment, is the state-of-the-art management of this condition.

Imminent delivery of very premature (23 weeks and 6 days gestation) extremely low birth weight infant at the verge of viability. This scenario required the team to manage the initial delivery room resuscitation and stabilization. They then had to address the neonate's deterioration secondary to massive pulmonary hemorrhage and severe bilateral grade IV intraventricular hemorrhage. The scenario required the team to manage family grieving as well as ethical dilemmas.

We arranged for the first scenario (incorporating the rudeness event) to occur concomitantly across all 4 conditions. The other scenarios occurred in random order.

In each scenario, the participants were told that the NICU manikin lying in the incubator was their patient and that the patient's vitals would appear on the monitors immediately at the start of the simulation. Additionally, the participants were provided with neonate's medical history. They were also informed that they might encounter professional actors playing parents of their patient and would be asked to interact and respond to them as they would in real life. Additionally, participants were asked to work as a team and told that they would receive 20 to 25 minutes to

discuss and develop a treatment plan for each clinical scenario. Specifically, the team was required to identify the acute deterioration in the newborn's condition and respond promptly by providing the appropriate resuscitative treatments, while trying to diagnose the underlying medical condition. Based on conventional protocol, the main actions required from the medical team were detailed for each scenario and distributed to independent judges (senior neonatologists and veteran nurses) to facilitate their monitoring and evaluation. The scenarios were designed such that a team's failure to follow these specified actions would likely lead to further rapid deterioration and ultimately the infant's demise within a short time. The scenarios involved diagnostic and manual intervention skills and required that members engage with one another in making and executing therapeutic decisions. Following each simulation, the team entered a separate room for a reflexivity-based debriefing. Prior to the start of the reflexivity exercise, the judges were asked to complete a questionnaire in which they graded the participants' performance.

Measures

Two independent NICU staff (1 senior doctor and 1 experienced nurse) blinded to the experimental intervention observed each team's performance in each of the simulation scenarios from an adjacent control room with 1-way mirrors and multiple video monitors allowing for close-up observation and the monitoring of the patient's vital signs. Before serving in that capacity, all judges underwent a daylong training program emphasizing the monitoring and assessment of the team (rather than individual members) as the unit of analysis. To enhance interrater reliability, as part of this training, descriptors and examples of indicative behaviors

were presented to the judges and discussed by them to ensure that all had a common understanding of their meaning and application. For each scenario, using a 5-point Likert scale (1 = failed; 5 = excellent), judges independently rated each team's performance along items relating to 9 parameters separated into 2 broad aspects of team performance:

Medical and therapeutic performance—(1) Diagnostic performance (ie, time taken to diagnose, accuracy of diagnosis), (2) quality of therapy plan (ie, appropriateness of plan given diagnosis; plan accounts for unique constraints), (3) intervention (ie procedural or skill performance), and (4) overall general assessment of medical therapy (eg, errors made in diagnosis, therapy plan or execution; adequacy of performance given unique constraints).¹⁶

Teamwork or relational cooperative aspects of performance within the team—(5) Information sharing, (6) workload sharing, (7) helping among team members, (8) communication between team members, and (9) overall general assessment of teamwork.^{16,33-40}

Interventions

Each NICU team was exposed to comments or critiques by the infant's parents, according to the control or rudeness condition. These comments included neutral statements in the control condition or the same, mildly rude statement (ie, "I knew we should have gone to a better hospital where they don't practice Third World medicine!") in all 3 of the rudeness conditions (rudeness by itself, CBM followed by rudeness, and rudeness followed by the narrative intervention).

Exposure to rude or neutral comments from the mother of the infant occurred at the beginning of the first scenario of the day, which

was the same for all groups (scenario 1 of the infant with severe neonatal jaundice).

Just before this first scenario, teams in the preventative, CBM intervention²⁰ engaged in a 20-minute computer game in which they looked at a series of morphing faces,⁴¹ were asked to move a cursor to indicate whether the emotion expressed was more of anger or pleasure, and then received immediate feedback on their choice.

The Emotion Recognition Task of the CBM Intervention

Stimuli for the task were generated using Morpheus Photo Morpher v3.16 (Morpheus Software, Grand Rapids, MI). Four sequences of morphed faces were generated based on the happy and angry pictures of 2 males and 2 females taken from the NimStim set³⁰. The faces were selected to represent both genders and different racial origins (Caucasian, African American, Hispanic, and Asian) and after pilot tests that demonstrated test-retest validity for these morphed sequences in the emotion perception task. Each sequence consisted of 15 faces equally spaced on a continuum between the happy and angry end points. Each face from each morphed sequence was presented 3 times, for a total of 180 trials (4 sequences × 15 faces × 3 repetitions). Faces were displayed in a random order. Each trial began with a fixation cross (800–1200 milliseconds), followed by a color morphed face picture (90 mm in height and 70 mm in width). The face was displayed for 200 milliseconds and then masked by a scrambled face display for 200 milliseconds. Then a question mark appeared on the screen and remained until a response was made. Participants were instructed to press 1 of 2 designated buttons as fast as they could to indicate whether the face was “angry” or “happy.” After the participant’s response, the next

trial began 100 to 400 milliseconds later. The order in which the various faces were displayed was randomly determined.

During this game, the computer program first determined the participants threshold to threat (ie, angry faces) and then gave them feedback designed to raise this threshold and as such “immunize” them from devoting substantial attention to minor threats.

While teams in this condition were engaged in the CBM computer game, teams in the narrative intervention^{28–30} worked on their first simulation and were exposed to the rudeness incident specified earlier. Immediately after this simulation, teams in this condition were directed to a debriefing room and asked to write 1 or 2 paragraphs about how they thought the mother of the infant felt when it seemed to her that the team was unsuccessful in treating her newborn.

In all, teams were randomly allocated to 1 of 4 conditions: (1) control, (2) rudeness, (3) rudeness with the CBM intervention, and (4) rudeness with the narrative intervention. Effects of rudeness exposure (vs neutral control condition) and the moderating effect of the intervention (CBM or narrative) were assessed repeatedly throughout day.

Manipulation Check

The primacy effect of the rudeness manipulation and its possible degradation over time was checked at 2 points during the simulation day, once at midday (after the third scenario) and once at day’s end (after the fifth and final scenario). An analysis of variance (ANOVA) with the rudeness condition as the independent variable and perceived rudeness (assessed on the basis of a 4-item measure validated in previous research^{13,14,42} and with $\alpha = .93$) as the dependent variable indicated that participants rated the attitude

toward them, especially of the mother of the infant, as significantly more polite (ie, less rude) in the control condition ($M_{\text{control}} = 4.75$, $SD_{\text{control}} = 0.45$) than in the rude condition ($M_{\text{rudeness}} = 3.75$, $SD_{\text{rudeness}} = 0.77$) ($F_{1,38} = 16.31$, $P < .001$). This effect remained consistent, although somewhat attenuated, through the end of the day ($M_{\text{control}} = 4.66$, $SD_{\text{control}} = 0.56$ vs $M_{\text{rudeness}} = 4.01$, $SD_{\text{rudeness}} = 0.61$, $F_{1,38} = 9.26$, $P = .004$), thus confirming that the rudeness manipulation was effective.

Statistical Analysis

All analyses were conducted using SPSS (version 23, IBM, Armonk, NY) unless otherwise indicated. A power analysis based on data from a previous study¹⁶ and assuming a desired power of 80% with α of .05 (2-sided test) indicated that samples of at least 9 teams per condition would be required to capture moderate effects. Because each team’s performance in each of the scenarios was rated by 2 judges, we assessed reliability (the relative consistency among raters), by calculating intraclass correlation coefficients (ICC_1 ; R version 2.15.0, The R Foundation for Statistical Computing, Vienna, Austria). An ICC_1 of 0.10 or higher indicated that the item could be averaged across judges.⁴³ Comparisons of therapeutic and teamwork performance scores were done using multivariate ANOVA (MANOVA). Comparisons of all variables included in therapeutic and teamwork performance scores in the 4 conditions (ie control, rudeness, rudeness with narrative intervention and rudeness with CBM intervention) were analyzed using 1-way ANOVA. Statistical significance was set at .05.

RESULTS

To ensure that our randomization process of assigning teams to conditions was appropriate, we first tested whether the cumulative

TABLE 1 Team Performance Scores—Control Versus Rudeness

	Control (<i>n</i> = 11)		Rudeness (<i>n</i> = 10)		<i>F</i>	<i>P</i>	η^2
	Mean	SD	Mean	SD			
Diagnostic score	4.27	0.41	3.89	0.49	3.80	.07	0.17
Therapy plan	4.23	0.34	3.81	0.38	7.27*	.01	0.28
Intervention score	4.38	0.36	3.75	0.37	15.43**	.001	0.45
General therapeutic score	4.37	0.40	3.80	0.34	12.02**	.003	0.39
Information sharing	4.41	0.42	4.08	0.36	3.65	.07	0.16
Workload sharing	4.40	0.44	3.93	0.35	7.06*	.02	0.27
Helping	4.50	0.37	4.08	0.37	6.56*	.02	0.26
Communication	4.42	0.38	4.03	0.45	4.64*	.04	0.20
General teamwork score	4.43	0.39	4.06	0.34	5.62*	.03	0.23
Midday manipulation check	4.75	0.45	3.98	0.37	19.21**	<.001	—
End day manipulation check	4.66	0.56	4.07	0.31	8.60**	.009	—

—, not applicable.

* *P* < .05.** *P* < .01.

experience of the team's members was distributed equally across the conditions. We conducted an ANOVA with the conditions (eg, control, rudeness, rudeness with narrative intervention, and rudeness with CBM intervention) as the factor and cumulative team experience (eg, number of years in a NICU) as the dependent variable. The results showed that there were no significant differences between the conditions (*P* = .26) indicating that the randomization process had been successful. Controlling for cumulative experience in all subsequent analyses did not significantly change any of the results. Therefore, we report the results without controlling for cumulative experience.

Because each team's performance in each of the scenarios was rated by 2 judges, we first assessed reliability (the relative consistency among raters) by calculating ICC₁. The resulting ICCs indicated moderate to high interrater reliability, thus supporting aggregation to the team level (data not shown but available from the first author).

Next, we tested whether the rudeness manipulation harmed team's performance. We first averaged the 4 indicators of the therapeutic team scores (ie, diagnostic, therapy plan, intervention, and overall therapeutic performance, with α = .97) and the

5 indicators of teamwork score (ie, information sharing, workload sharing, helping, communication, and overall performance, with α = .96) to form scales. Next we conducted a MANOVA with the rudeness versus control condition as the factor and therapeutic and teamwork scores as the dependent variables. The overall model representing the influence of rudeness on the 2 dependent variables was significant (multivariate *P* < .05, η^2 = 0.36). ANOVA results showed that the rudeness condition affected both the therapeutic score (*P* < .01, η^2 = 0.39; $M_{rudeness} = 3.80$, $SD_{rudeness} = 0.34$, $M_{control} = 4.37$, $SD_{control} = 0.40$) and the teamwork score (*P* < .05, η^2 = 0.23; $M_{rudeness} = 4.06$, $SD_{rudeness} = 0.34$, $M_{control} = 4.43$, $SD_{control} = 0.39$). Table 1 reports mean comparison between the control and rudeness groups for all performance measures. As shown, rudeness was associated with diminished team performance along all team outcomes (eg, diagnostic score; intervention score) and process (eg, information sharing, communication) parameters, although these differences were only marginally significant (*P* < .10) in the case of diagnostic accuracy and information sharing).

Next, we tested the effects of the CBM intervention on the performance measures. We first conducted a MANOVA with the "CBM inoculation

followed by rudeness" condition versus control condition as the factor, and medical/therapeutic performance and teamwork as the dependent variables. The overall model representing the influence of the CBM intervention on the 2 dependent variables was not significant (multivariate *P* = .61). ANOVA results showed that after employing the CBM inoculation, rudeness did not affect the therapeutic score (*P* = .48), nor did it affect the teamwork score (*P* = .47). Table 2 reports mean comparison between the control and CBM groups for all performance measures. As shown, the CBM intervention reduced the effects of rudeness on all the team outcomes (eg, diagnostic score; intervention score) and process (eg, information sharing, communication) parameters. Thus, it seems that the CBM intervention succeeded in "immunizing" participants from the effects of rudeness.

Finally, we tested the effects of the narrative intervention on the 2 performance outcomes. Here again, we first conducted a MANOVA with the "rudeness followed by narrative intervention" condition versus control condition as the factor, and medical/therapeutic performance and teamwork as the dependent variables. The overall model representing the influence of the narrative intervention on the 2

TABLE 2 Team Performance Scores—Control Versus CBM

	Control (n = 11)		CBM (n = 9)		F	P
	Mean	SD	Mean	SD		
Diagnostic score	4.27	0.41	4.26	0.56	0.00	.97
Therapy plan	4.23	0.34	4.14	0.71	0.15	.71
Intervention score	4.38	0.36	4.08	0.64	1.66	.21
General therapeutic score	4.37	0.40	4.19	0.66	0.52	.48
Information sharing	4.41	0.42	4.29	0.35	0.43	.52
Workload sharing	4.40	0.44	4.22	0.50	0.69	.42
Helping	4.50	0.37	4.26	0.34	2.16	.16
Communication	4.42	0.38	4.35	0.45	0.17	.68
General teamwork score	4.43	0.39	4.29	0.46	0.54	.47
Midday manipulation check	4.75	0.45	3.28	0.74	29.97**	<.001
End day manipulation check	4.66	0.56	3.72	0.68	11.64**	.003

** $P < .01$.

dependent variables was significant (multivariate $P < .05$, $\eta^2 = 0.31$). ANOVA results showed that the rudeness in the narrative condition affected both the therapeutic score ($P < .05$, $\eta^2 = 0.25$; $M_{\text{narrative}} = 3.89$, $SD_{\text{narrative}} = 0.48$, $M_{\text{control}} = 4.37$, $SD_{\text{control}} = 0.40$) and the teamwork score ($P < .05$, $\eta^2 = 0.22$; $M_{\text{narrative}} = 4.04$, $SD_{\text{narrative}} = 0.39$, $M_{\text{control}} = 4.43$, $SD_{\text{control}} = 0.39$). Table 3 reports mean comparison between the control and narrative groups for all performance measures. As shown, the narrative intervention did not reduce the effects of rudeness for any of the team outcomes (eg, diagnostic score; intervention score) and process (eg, information sharing, communication) parameters. Thus, the data indicate that the narrative intervention failed.

Examination of the manipulation checks presented in Tables 1, 2, and

3 shows that, similar to the rudeness without intervention condition, those in the CBM intervention condition viewed the mother in the rudeness manipulation scenario as more rude than those in the control condition both at midday ($P < .01$) and at the end of the day ($P < .01$). In contrast, at midday those in the narrative condition did perceive the mother to be more rude than controls ($P < .05$), but by the end of the day, those in the narrative condition did not view the mother as more rude than controls ($P = .09$).

DISCUSSION

Our findings indicate that NICU teams exposed to mild rudeness expressed by a patient's mother resulted in diminished team performance with respect to outcome parameters relating to both diagnosis and

intervention and process parameters including team information and workload sharing. These findings not only replicate earlier findings^{13,14} demonstrating the deleterious effects of rudeness expressed by a senior colleague on individual medical performance¹⁶ but also extend them by demonstrating that similar effects are elicited by rudeness from other sources and are manifested at the team level. Interestingly, however, the effects of rudeness on diagnosis and information sharing were only marginally significant. Although we can only speculate as to the relative weakness of these particular effects, one possibility is that because these activities require greater conscious effort, they may be less subject to any threat-based redirection of cognitive resources away from the task.

Additionally, we demonstrated that a preventative or "immunization" CBM intervention, targeting negative interpretations of emotional displays and applied before the rudeness incident, largely mitigated these deleterious effects on team medical outcomes and processes, whereas a postincident, treatment intervention based on victim's composition of a narrative was largely ineffective in doing so. Still, it should be noted that although there was no statistically significant difference between the performance scores of teams in the

TABLE 3 Team Performance Scores—Control Versus Narrative

	Control (n = 11)		Narrative (n = 9)		F	P	η^2
	Mean	SD	Mean	SD			
Diagnostic score	4.27	0.41	3.88	0.52	3.64	.07	0.17
Therapy plan	4.23	0.34	3.81	0.57	4.30	.05	0.19
Intervention score	4.38	0.36	3.83	0.50	7.82*	.01	0.30
General therapeutic score	4.37	0.40	3.89	0.48	5.85*	.03	0.25
Information sharing	4.41	0.42	3.94	0.43	5.90*	.03	0.25
Workload sharing	4.40	0.44	3.82	0.45	8.37*	.01	0.32
Helping	4.50	0.37	4.17	0.22	5.66*	.03	0.24
Communication	4.42	0.38	4.04	0.27	6.44*	.02	0.26
General teamwork score	4.43	0.39	4.04	0.39	5.03*	.04	0.22
Midday manipulation check	4.75	0.45	3.92	0.91	7.17*	.01	—
End day manipulation check	4.66	0.56	4.17	0.67	3.25	.09	—

—, not applicable.

* $P < .05$.

CBM intervention and those of the teams in the control condition, the scores for the former were nominally lower, suggesting that for some groups under certain conditions, the CBM might not always be entirely effective. Nevertheless, we demonstrated that these mitigation effects of the CBM intervention were, on average, sustained over the entire day.

Interestingly, examination of the manipulation checks presented in Tables 1, 2, and 3 shows that similar to the rudeness without intervention condition, those in the CBM intervention condition viewed the mother in the rudeness manipulation scenario as more rude than those in the control condition. This suggests that the CBM intervention did not distort participants' views nor cause them to misperceive the mother's rude behavior. Instead, as designed, the CBM intervention "immunized" participants' medical/therapeutic performance and teamwork by shifting their attention away from the implicit threat posed by the mother, thus likely preserving cognitive resources for the tasks at hand. Results of these supplementary analyses indicated that the CBM intervention operated not so much by mitigating the appraisal of rudeness (indeed, those in this condition viewed the perpetrator as more rude than those in other conditions), but by making team members more resilient to the appraised rudeness; in particular, the intervention mitigated the degree to which such appraisals adversely affected their ability to engage in team processes (eg, workload and information sharing) central to timely and accurate diagnosis and error-free intervention. In contrast, by the end of the day, those in the narrative condition did not view the mother as more rude than controls. These results suggest that although writing about the experience from the mother's perspective facilitated

participants' positive reappraisal of her rude behavior, it failed to help them overcome the cognitive disruption it caused.

One possible explanation for this seemingly inconsistent finding is that the cognitive processes involved in consciously reflecting on experienced behavior and assessing its level of politeness (targeted by the narrative intervention and demanded by our manipulation check for rudeness) are different from those involved in more automatic determinations of potential or actual threat (targeted by the CBM intervention).⁴⁴ It is known that these 2 types of cognitive processes do not always operate in tandem. In the CBM task, the judgment is fast and crude in the sense that it requires a quick, dichotomous response, whereas the politeness rating score is based on a more thoughtful judgment process (answering a 4-item questionnaire rated on a Likert scale). Interestingly, this reflective and thoughtful process may be more similar to the one in the narrative condition and thus might have been more influenced by it.

The findings of this study are significant in a number of respects: first, our results reaffirmed how rudeness can debilitate intervention acuity, thus resulting in poorer medical treatment and, particularly in the intensive care context studied, potentially catastrophic clinical outcomes. Moreover, we also demonstrated that these deleterious effects of rudeness are not restricted to individuals as has been shown previously¹⁶ but also to teams. This is important because, based on the assumption that teams can often overcome and compensate for individual performance limitations, medical work is increasingly being structured around teams.⁴⁵⁻⁴⁸ Our findings question the generalizability of this assumption in situations in which rudeness is prevalent because they demonstrate that,

precisely in these situations, the very collaborative processes that generally enable teams to outperform individuals may break down. To the extent that rudeness impedes team helping and workload sharing, teams may not be able to deliver the heightened level of patient care that practitioners have come to expect from them. Thus, we believe that our findings offer the first real evidence of the impact that rudeness has on the performance of medical teams and not just individuals working in teams.

Second, these findings are important because, consistent with our earlier findings at the individual level,¹⁶ they suggest that relatively benign but negative human interactions could underlie many of the iatrogenic incidents commonly occurring in medical care settings. On one hand, it is highly disturbing because, as noted, such interactions are prevalent and, particularly in high-intensity, life-and-death contexts, unlikely to be preventable. On the other hand, the finding that (as shown in Table 1) rudeness explains 39% of the variance in team-level general therapeutic outcomes (a figure remarkably similar to the effect size found in our earlier individual-level analysis¹⁶) suggests that we may have identified an important and potentially "treatable" iatrogenesis-related risk factor.

Third, these findings are also important in that they suggest this iatrogenesis-related risk factor may indeed be "treatable" on the basis of "immunization" approaches structured around cognitive bias modification. Indeed, our finding that a 20-minute "computer game" generated a sustained (daylong) mitigation effect suggests that contextual rudeness might be more amenable to intervention than are many other iatrogenesis-related risk factors identified in previous research (eg, patient overcrowding, physician workload, patient

morbidity characteristics, length of hospitalization). Nevertheless, because daily CBM treatments are unlikely to be feasible or efficacious, additional research is needed to estimate the robustness of the exhibited mitigation effects over longer periods of time and identify alternative CBM approaches that might offer a more sustained impact.

Furthermore, although researchers have hinted that contextual adversity may result in heightened rates of iatrogenesis by affecting individual-level cognitive processing and team-level collaborative processes,^{2,16,17,45,48} our findings identified and documented several of the collaborative processes most directly and adversely affected by contextual rudeness. Indeed, an understanding of the collaborative mechanisms involved may facilitate the development of proactive and reactive training and protocol interventions designed either to strengthen these team processes or to compensate for them when they are weakened by the team's exposure to rudeness.

These study implications stand in stark contrast to the policy recommendations proposed by leading health care think tanks with regard to patient safety, many of which emphasize the need to enhance medical team engagement and patient focus.⁴⁹ By highlighting the impact that adverse social contexts may have on team-level coordinative processes, our findings provide the foundation for a wide range of interventions aimed at enhancing patient safety. Our results suggest that instituting protocols and procedures aimed at bolstering the defenses of medical teams to the cognitive distraction and drain elicited by rudeness exposure can help mitigate the devastating consequences of these events, even when they cannot be prevented.

In conclusion, the findings presented here suggest that the deleterious effects of rudeness on medical performance are no less severe on teams than they are on individuals and that these effects are not specific to any particular type of source. Moreover, beyond its direct effect on cognitive functions and on performance of manual procedural skills, we showed that exposure to rudeness debilitates the very collaborative mechanisms, such as communication, workload sharing, and helping, assumed to make team-based medical care more effective and safe than that offered by individual care providers. However, our findings also offer some basis for optimism: although it may be impossible to prevent patients and their families from being rude to care providers, we may be able to "immunize" these same providers against the adverse implications of such behavior on the performance of care providers and the teams to which they belong.

ACKNOWLEDGMENTS

We are grateful to the judges who evaluated the teams after each simulation and conducted the reflexivity-based debriefing: Dr Omer Globus and Ms Sarah Meir from Sheba Medical Center, Tel Hashomer; Dr Ilan Segal from Barzilay Medical Center, Ashkelon; Dr Arye Simmonds from Laniado Medical Center, Netanyah; Ms Limor Partom from Bnai Zion Medical Center, Haifa; Dr Irit Berger and Ms Anna Shtamler from Lis Maternity Hospital, Sorasky Medical Center, Tel Aviv; Dr Smadar Even-Tov Friedman, Dr Ofra Peleg, Ms Deena Schwartz and Ms Olga Gorodetzky from Haddassah Medical Center, Jerusalem; Dr Dan Waisman and Ms Lina Khoury from Carmel Medical Center, Haifa; Dr Reuven Bromiker and Ms Adina Gale Dorembus from Shaare Zedek

Medical Center, Jerusalem; Dr Bernard Barzilay and Ms Sophy Dombe from Assaf Haroefe Medical Center, Tzrifin, Rishon Lezion; Israel.

We are also grateful to the participating teams from the neonatal intensive care units of the following hospitals in Israel: Ziv Medical Center, Tzfat; Haemek Medical Center, Afula; English Hospital, Nazareth; Bnai Zion Medical Center, Haifa; Rambam Medical Center, Haifa; Carmel Medical Center, Haifa; Hillel Yaffe Medical Center, Hadera; Laniado Medical Center, Netanyah; Meir Medical Center, Kfar Sava; Schneider Children's Hospital, Petach Tiqua; Sheba Medical Center, Tel Hashomer, Ramat Gan; Lis Maternity Hospital, Tel Aviv; Wolfsson Medical Center, Holon; Haddassah Medical Center, Jerusalem; Shhare Zedek Medical Center, Jerusalem; Kaplan Medical Center, Rehovot; Barzilay Medical Center, Ashkelon; Soroka Medical Center, Beer Sheva.

We appreciate the assistance of the professional team at Israel Center for Medical Simulation in the preparation and operation of the simulation scenarios. We thank Professor Yair Bar-Haim and his PhD student Dr. Keren Maoz from the laboratory for research on anxiety and trauma, School of Psychological Sciences and Sagol School of Neuroscience, Tel Aviv University, Israel for their insightful and helpful comments on this manuscript. We thank Dr. Ellen Bamberger from the department of Pediatrics and the Infection Control unit at Bnai Zion Medical Center for revising and professionally editing our manuscript.

ABBREVIATIONS

ANOVA: analysis of variance
CBM: cognitive bias modification
ICC: intraclass correlation coefficient
MANOVA: multivariate analysis of variance

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: Professor Bamberger has support from the Israel Science Foundation research grant 1217/13, Israel Academy of Science and Humanities for this work.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

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Pediatrics 2017;139;

DOI: 10.1542/peds.2016-2305 originally published online January 10, 2017;

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DOI: 10.1542/peds.2016-2305 originally published online January 10, 2017;

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