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EDUCATIONAL CASE REPORT

Beyond the Protocols: a Team-Based Learning Intervention Improving Student Knowledge and Confidence on Caring for Survivors of Sexual Assault

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Sexual assault victimization rates in the USA are staggering, at 18.3% among women, and higher in marginalized communities [1]. Sexual assault causes acute and long-term sequelae for survivors, who are nearly four times more likely to suffer from psychiatric disorders [2]. Survivors of sexual assault (any coercive sexual act, including rape and unwanted touching) may experience headaches, chronic pain, panic attacks, post-traumatic stress disorder, and difficulty sleeping [1].

Supportive and non-judgmental responses from clinicians empower sexual assault survivors to deliver an accurate medical history and pursue resources and longitudinal recovery [3]. One way to foster positive interactions between survivors and providers is by employing a trauma-informed care environment, consisting of workers who understand the complexity of psychologic trauma responses [4]. Accordingly, it is essential that clinicians not only understand protocols for care, but empathetically move beyond them to gather history and refer to resources for recovery.

Psychiatrists are trained to manage the mental and emotional needs of many vulnerable populations, including sexual assault survivors. However, a survivor's road to mental health care is not always direct. Disclosure can occur within any trusting clinician-patient relationship, and negative health sequelae transcend psychologic needs. Survivors may first encounter other professions or specialties, such as emergency medicine, obstetrics/gynecology, family medicine, or pediatrics, prior to being referred to psychiatry [3, 5, 6]. Other specialties including dermatology and neurology have stressed the importance of identifying sexual assault sequelae [7, 8]. Furthermore, sexual assault impacts the colleagues, friends, and family of providers, who may call on them for support.

Empowering survivors to receive necessary medical care involves awareness, empathy, and confidence [4, 9]. As such, future physicians across specialties need sexual assault and trauma-informed care training, as well as time to reflect on its potential psychological impact on the patient and provider [10]. In recent years, medical schools have implemented training in sexual assault and trauma-informed care utilizing methods such as physical exam training, asynchronous modules, and simulated-patients [3, 9, 11–13]. Siegel and colleagues published a sexual assault module for medical students; however, its virtual nature did not allow for meaningful discussion or interaction, thereby limiting its impact [12]. Other curricula focusing on physical exam skills and simulated-patients had limited scope and required significant educational resources [9, 11, 13]. At our institution, the existing curriculum was minimal. The focus was limited to epidemiology and treatment protocols rather than understanding the mental and emotional needs of survivors.

To address this gap, we developed a student-led, Team-Based Learning (TBL) activity on sexual assault. TBLs are effective in clinical, pre-clinical, and ethics-focused educational settings [14, 15]. TBL's "flipped classroom approach" assesses student knowledge, promotes collaboration to solve a clinical problem, engages students in active decision-making, and requires relatively few educational resources [16]. Our intervention was designed to prepare medical students to care for sexual assault survivors by building knowledge and confidence in providing empathetic, evidenced-based care.

Sexual Assault TBL Curriculum

We designed our TBL exercise based on the approach outlined in the medical education literature [17, 18]. TBL

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methodology includes two sequential tests based on pre-work, prior to engagement in educational content and assessment: the Individual and Group Readiness Assessment Tests (IRAT and GRAT). We integrated 45 min of sexual assault educational content into a 2-h pre-existing mandatory TBL on family violence for all fourth-year medical students. The sexual assault component included five core elements: (1) sexual assault learning outcomes; (2) pre-work; (3) knowledge assessment; (4) application exercise; and (5) specialty discussion.

Learning outcomes focused on students' ability to recognize the role of the physician as an advocate for the comprehensive well-being of sexual assault patients, and to deploy humanistic, professional communication skills to meet the medical, psychological, and ethical needs of sexual assault patients. A list of learning objectives and teaching materials for this TBL can be provided at the request of the authors.

The pre-work was created by content experts on sexual assault, including educators from a local rape crisis center, forensic nurse examiners, student advocates, and faculty. It included a brochure on sexual assault and society, empathetic interviewing strategies, emergency department protocol, forensic nurse exam basics, resources for survivors, considerations for marginalized communities, and literature on the psychological consequences of sexual assault [19]. Students completed a written pre-reflection assignment utilizing two cases of survivors whose physicians made critical missteps which negatively impacted recovery: (1) a 20-year-old female at a new patient obstetrics/gynecology appointment, recently raped by an acquaintance, and (2) a 25-year-old female survivor of domestic violence and rape, presenting to the emergency department.

For the knowledge assessment, two multiple-choice questions with face validity created by content experts were used for the IRAT and GRAT. The first question focused on myths and stereotypes surrounding sexual assault. The second question was about trauma-informed emotive interviewing strategies; we hypothesized that this question would be difficult because students are typically trained to gather as much *medical* information as possible, which can be emotionally traumatic for sexual assault survivors, and create distrust [19]. Students completed the questions again during the curricular unit cumulative final exam.

For the application exercise, students reflected on necessary clinical care, and the consequences of the behavior of other clinicians in the two cases. Students were asked to role-play conversations to improve patient trust and recovery. Medical students trained in sexual assault advocacy facilitated the 45-min session with faculty present.

The session concluded with a 10-min discussion on how this knowledge can be implemented in other specialties, and about self-care in the context of sexual assault. Similar to the application exercise, this facilitated discussion was completed in small and large groups.

Implementation

This study was approved by the institutional review board at The Ohio State University College of Medicine. Students completed a pre- and post-TBL survey consisting of two and three Likert-style questions, respectively (Table 1). Across 2 academic years, 336/368 (91.3%) of fourth-year medical students who participated agreed to the use of their data for research purposes. Forty-eight percent of students identified as female and 41.1% as male. A future-frontline-specialty (i.e., a specialty in which a first disclosure of sexual assault is more likely: psychiatry, emergency medicine, pediatrics, family medicine, and obstetrics/gynecology) was reported by 40% of students, including 3.9% pursuing psychiatry, compared to 60% of students reporting a future-non-frontline-specialty.

Evaluation

We assessed the potential impact of a sexual assault–focused TBL on medical students' knowledge, attitudes, and confidence. Given that previous studies identified females as less accepting of rape myths and more likely to screen for sexual assault, we assessed potential differences by gender (male versus female) [9]. Furthermore, specialty was considered as it is possible that more disclosures occur in future-frontline-specialties, which may lead students to be more motivated to learn and implement best practices with sexual assault survivors [20].

Prior to the TBL, we asked students if their medical school curriculum prepared them to care for sexual assault survivors (1=strongly disagree; 5=strongly agree). A quarter of students (24.8%) disagreed, and less than one-third (31.0%) agreed (M = 3.09; Table 1). A 2 (gender) × 2 (specialty) between subjects analysis of variance (ANOVA) revealed no differences in perceived preparation by gender or specialty.

Students performed well on the first multiple-choice ("myths") question, with 99.3% answering correctly on the IRAT (Table 2). Students performed less favorably on the second ("emotive interviewing") question, answered correctly by 43.1% of students on the IRAT. A multivariate generalized estimating equation model assessing the relationship between knowledge about emotive interviewing (0=incorrect; 1=correct) and time (IRAT versus Final Exam), gender, and specialty revealed significant main effects for time and specialty. Regardless of gender or specialty, students were three-and-a-half times more likely to answer correctly on the Final Exam than on the IRAT (OR = 3.57 [95%CI: 1.82–6.99], $p < 0.001$). Furthermore, students pursuing a future-frontline-specialty were two times more likely to answer correctly than students pursuing a future-non-frontline-specialty (OR = 2.22 [95%CI: 1.00–4.93], $p = 0.05$; Table 2).

Table 1 Preparation, relevance, and confidence descriptives by gender and specialty

	Gender					
	Male		Female		Total	
Specialty	*n* (%)	Mean (SD)	*n* (%)	Mean (SD)	*n* (%)	Mean (SD)
Preparation to treat sexual assault (pre-test)[1]						
Total	112 (100.0%)	3.18 (0.85)	144 (100.0%)	3.01 (0.90)	256 (100.0%)	3.09 (0.88)
Non-frontline	76 (67.9%)	3.20 (0.86)	74 (51.4%)	3.16 (0.92)	150 (58.6%)	3.18 (0.89)
Frontline	36 (32.1%)	3.14 (0.83)	70 (48.6%)	2.86 (0.86)	106 (41.4%)	2.95 (0.86)
Perceived relevance of sexual assault to specialty interest (pre-test)[2]						
Total	112 (100.0%)	4.25 (0.98)	143 (100.0%)	4.63 (0.75)	289 (100.0%)	4.41 (0.93)
Non-frontline	76 (67.8%)	3.95 (1.02)	74 (51.7%)	4.31 (0.92)	173 (59.9%)	4.05 (1.03)
Frontline	36 (32.1%)	4.89 (0.47)	69 (48.3%)	4.97 (0.17)	116 (40.1%)	4.94 (0.30)
Perceived relevance of sexual assault to specialty interest (post-test)[2]						
Total	112 (100.0%)	4.43 (0.91)	145 (100.0%)	4.70 (0.60)	291 (100.0%)	4.54 (0.81)
Non-frontline	76 (67.9%)	4.18 (0.99)	76 (52.4%)	4.47 (0.74)	175 (60.1%)	4.26 (0.93)
Frontline	36 (32.1%)	4.94 (0.33)	69 (47.6%)	4.96 (0.21)	116 (39.9%)	4.95 (0.26)
Confidence treating patient (post-test)[3]						
Total	112 (100.0%)	3.66 (0.64)[a]	145 (100.7%)	3.87 (0.64)[b]	257 (100.4%)	3.78 (0.65)
Non-frontline	77 (68.8%)	3.60 (0.67)	76 (52.8%)	3.87 (0.68)	153 (59.8%)	3.73 (0.69)
Frontline	35 (31.3%)	3.80 (0.53)	69 (47.9%)	3.87 (0.59)	104 (40.6%)	3.85 (0.57)
Confidence supporting friend (post-test)[4]						
Total	112 (100.0%)	3.90 (0.70)[a]	145 (100.7%)	4.17 (0.68)[b]	257 (100.4%)	4.05 (0.70)
Non-frontline	77 (68.8%)	3.86 (0.74)	76 (52.8%)	4.13 (0.72)	153 (59.8%)	3.99 (0.74)
Frontline	35 (31.3%)	4.00 (0.59)	69 (47.9%)	4.22 (0.64)	104 (40.6%)	4.14 (0.63)

[a,b] Different superscripts within a row denote mean scores that are significantly different ($p < 0.05$)

[1] "Prior to preparing for this TBL, I feel LSI has prepared me for caring for patients who are sexually assaulted" (1=strongly disagree; 5=strongly agree) (LSI is the Lead Serve Inspire Curriculum at The Ohio State University College of Medicine)

[2] "In my specialty, I would characterize learning about sexual assault as:" (1=irrelevant; 5=essential). This question was evaluated at both pre- and post-test

[3] "I feel confident providing medical care and support for a patient who has been sexually assaulted" (1=strongly disagree; 5=strongly agree)

[4] "I feel confident providing support for a colleague or friend who has been sexually assaulted" (1=strongly disagree; 5=strongly agree)

Pre- and post-TBL, we asked students to assess the degree to which sexual assault education was relevant to their specialty (1=irrelevant; 5=essential). Overall, perceived relevance was high at pre-test ($M = 4.41$; SD = 0.928; scale of 1 to 5; Table 1). A 2 (time) × 2 (gender) × 2 (specialty) between-within subjects ANOVA revealed a significant interaction effect between time and specialty ($F(1,247) = 7.38$, $p = 0.007$). Relative to students pursuing a non-frontline-specialty, future-frontline-specialty students reported greater perceived relevance both pre- ($F(1,247) = 59.68$, $p < 0.001$) and post-TBL ($F(1,247) = 44.316$, $p < 0.001$; Table 1). Additionally, perceived relevance significantly increased pre- to post-TBL for students pursuing a future-non-frontline-specialty ($F(1,247) = 23.963$, $p < 0.001$) but not for students pursuing a future-frontline-specialty ($F(1,247) = 44.316$, $p < 0.001$; Table 1).

Post-TBL, we asked students if they felt confident caring for a patient or friend who had been sexually assaulted (1=strongly disagree; 5=strongly agree). Students were confident in their ability to care for patients (62.2% agreement) and friends (70.5% agreement) (Table 1). A 2 (gender) × 2 (specialty) between-subjects ANOVA revealed a significant effect for gender. Relative to males, females reported higher confidence in caring for a patient ($F(1,257) = 4.132$, $p = 0.043$) and a friend ($F(1,257) = 7.378$, $p = 0.007$; Table 1).

Impact of Educational Approach

Our curricular exercise taught students, using an evidence-based educational method integrating trauma-informed care, to facilitate physical and mental healing for patients—an approach not previously found in the literature. We ameliorated the problem of "curricular squeeze" by incorporating the content into an extant TBL on family violence. This only added an additional 1 h of pre-work, no additional time for IRAT/

Table 2 Sexual assault knowledge frequencies by time and specialty

	IRAT		GRAT		Final Exam		Total	
Specialty	Incorrect	Correct	Incorrect	Correct	Incorrect	Correct	Incorrect	Correct
Emotional interviewing strategies								
Total	168 (56.9%)	127 (43.1%)[a]	157 (53.2%)	138 (46.8%)	84 (28.5%)	211 (71.5%)[a]	252 (42.7%)	338 (57.3%)
Non-frontline	108 (61.0%)	69 (39.0%)	96 (18.1%)	81 (45.8%)	52 (29.4%)	125 (70.6%)	160 (45.2%)	194 (54.8%)[b]
Frontline	60 (50.8%)	58 (49.2%)	61 (51.7%)	57 (48.3%)	32 (27.1%)	86 (72.9%)	92 (39.0%)	144 (61.0%)[b]
Recognizing sexual assault myths and stereotypes								
Total	2 (0.7%)	293 (99.3%)	32 (10.8%)	263 (89.2%)	0 (0.0%)	295 (100.0%)	2 (0.3%)	588 (99.7%)
Non-frontline	2 (1.1%)	175 (98.9%)	18 (10.2%)	159 (89.8%)	0 (0.0%)	177 (100.0%)	2 (0.6%)	352 (99.4%)
Frontline	(0.0%)	118 (100.0%)	14 (11.9%)	104 (88.1%)	(0.0%)	118 (100.0%)	(0.0%)	236 (100.0%)

[a] Students were three and a half times more likely to answer correctly on the Final Exam than on the IRAT (OR = 3.57 [95%CI: 1.82–6.99], $p < 0.001$)

[b] Controlling for time and gender, students pursuing a frontline-specialty were two times more likely to answer correctly than students pursuing a non-frontline-specialty (OR = 2.22 [95%CI: 1.00–4.93], $p = 0.05$)

IRAT Individual Readiness Assessment Test, *GRAT* Group Readiness Assessment Test

GRAT questions, and 30 min to the TBL application exercise, since we eliminated redundant material and integrated sexual violence on a continuum with child abuse and intimate partner violence. We expanded on "traditional" TBL by introducing a pre-session reflection assignment. The reflective writing allowed students to interact more deeply with the content, synthesizing material from the pre-readings and case studies. With integration of trauma-informed care, medical students were able to process and anticipate their response in these patient encounters both individually and in the classroom application exercise. As medical student facilitators who are trained in trauma advocacy, we had a robust knowledge of the cases, requisite medical knowledge, advocacy experience, and appreciation for our peers' perspectives. This allowed us to create a safe, tailored learning environment to begin unravelling the clinical complexities of survivors, who may experience more trauma when receiving sub-optimal healthcare for acute and chronic mental and physical sequelae.

Overall, the curriculum improved student understanding of emotive interviewing. Future-frontline-specialty students were more knowledgeable about sexual assault compared to future-non-frontline-specialty students. We speculate that students most likely to encounter sexual assault survivors in the future felt the curriculum was more relevant and were more motivated to utilize the information. They may have also pursued learning on this topic outside of required curriculum. This hypothesis bore out, as future-frontline-specialty students reported higher levels of perceived relevance than their future-non-frontline-specialty counterparts. However, our intervention stressed the importance of all physicians integrating trauma-informed care into every encounter and was particularly impactful for future-non-frontline-specialty students, who reported an increase in perceived relevance following the intervention. This finding is significant, given that perceived relevance of a subject correlates with students' ability to learn and stay motivated [20].

Lastly, we found that females reported greater confidence in caring for survivors of sexual assault, despite no observed differences in knowledge or relevance. Unfortunately, society has traditionally viewed sexual assault as a "women's issue" despite all genders being affected and having a role in combating myths and empowering survivors. As females are more likely to experience sexual assault, it is possible that personal and relational experiences of female medical students outside the curriculum have built additional confidence in caring for patients and friends.

Our study had limitations. The lack of a pre-post design with a control/comparison group limited our ability to fully optimize internal validity, and restricted understanding of the full curricular impact. Sexual assault is known to impact marginalized communities at higher rates [1]. However, low sample sizes prevented drawing meaningful conclusions based on student background. The sensitive nature of the content made practicing tangible objectives challenging. We attempted to mitigate this by using real clinical scenarios and asking students to "script" responses individually during the pre-reflection, and in small and large groups during the application exercise, to formatively assess knowledge application. While incorporating a simulated-patient could have provided objective measures to assess clinical skills, our intervention still allowed for real-time instruction, used fewer resources, and engaged students in an important societal discussion. The observed gender difference in confidence to care for sexual assault survivors is not ideal. Our curriculum was designed to anticipate potential gender biases by using cases of female physicians who made missteps in sexual assault care, and knowledge questions that included male sexual assault survivors.

Future educational interventions can build on our effort by more fully targeting gender myths and biases as a means to

reduce the confidence gap between male and female students. Our TBL could be implemented at other medical schools, especially those that already use TBL components. Finally, at our institution, we are establishing a longitudinal "curricular thread" that approaches sexual assault education at developmentally appropriate steps throughout medical school.

In summary, it is critically important that physicians of all specialties are capable of empathetically empowering sexual assault survivors to pursue necessary medical, psychiatric, and community resources. Educational modalities, such as integrated TBL, that allow the learner to simultaneously "know and show" sensitive communication and advanced clinical skills could be employed to strengthen the developmental continuum for all medical students.

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Declarations

Disclosures On behalf of all authors, the corresponding author states that there is no conflict of interest.

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