Effectiveness of a Curriculum for Pediatric Residents to Address Adolescent Nonsuicidal Self-Injury

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Objectives

The present study assessed changes in pediatric resident competence in addressing adolescent nonsuicidal self-injury (NSSI) following a brief, single-session didactic training during the educational unit in adolescent medicine. This study also evaluated knowledge acquisition and retention over time, overall helpfulness of the training, and changes in the perception of how important residents believe that physicians receive training in NSSI.

Methods

Pediatric residents participated in a single-session NSSI curriculum delivered as part of a monthlong clinical rotation from August 2016 to February 2019. Participants completed pretest, posttest, and 6-month follow-up surveys, and t tests and analyses of variance with post hoc comparisons evaluated changes in variables across the three time points.

Results

One hundred twenty-seven of 162 eligible residents participated (78.4% response rate), and 69 completed the 6-month follow-up (54.3% retention rate). Prior to the NSSI didactic, 107 (85.6%) reported feeling not at all competent or only somewhat competent in responding to patients with a history of NSSI. Residents’ self-perceived competence increased significantly (p < .001) from pretest to posttest and was sustained longitudinally. A measure of objective knowledge also showed retention over time. Residents were significantly (p < .001) more likely after the didactic to believe that training in NSSI for physicians is very important compared to before the training.

Conclusions

Following NSSI training, residents demonstrated increased knowledge and subjective competence in caring for adolescents who self-injure. It is feasible and important to integrate a brief, single-session NSSI curriculum into pediatric residency programs, such as in the adolescent medicine rotation.

Keywords

Nonsuicidal self-injury • Medical education • Adolescent health • Resident; Self-harm

Internationally, approximately 22.9% of adolescents report ever having engaged in nonsuicidal self-injury (NSSI) [1], defined as the intentional, self-inflicted damage of body tissue without suicidal intent and for purposes not socially or culturally sanctioned [2]. As many as 18.6% of adolescents report having self-injured within the past 12 months [1], and 5.5% of high school students in the USA have self-injured 6 or more times within the past year [3]. Risk of NSSI onset peaks in adolescence, around ages 13–14 and again around ages 20–24 [4, 5], with early onset (i.e., before age 12) associated with greater severity of the behavior [6, 7] and greater likelihood of having made a suicide plan [6] and/or attempt [7]. In fact, NSSI is one of the strongest risk factors for attempting suicide [8] and often persists into adulthood if not addressed [9].

Physicians are often the first to learn about a young person’s engagement in NSSI [10], and primary care clinicians have an increasingly important role as entry points to specialty mental healthcare for children and adolescents [11], including those who self-injure [12]. Nevertheless, just one in four routinely inquire about NSSI, nearly half report feeling unprepared to address it, and most (70%) report wanting more training [13]. Research has shown that healthcare professionals with training in addressing NSSI report feeling greater competence, empathy, and positive attitudes toward those who self-injure [14]. Relatedly, pediatric residency programs
responding to calls for action to provide training in mental health care [13] and suicide risk [16, 17] have demonstrated significant increases in resident skill acquisition, confidence, and knowledge in addressing adolescent mental health and safety assessment [18–20].

Both the American Board of Pediatrics (ABP) [21, 22] and Society for Adolescent Health and Medicine (SAHM) [23] highlight the importance of addressing adolescent mental health, including screening all adolescents for depression, anxiety, suicidal ideation, and NSSI. Nevertheless, resources for screening and addressing NSSI specifically are not currently offered. Because adolescent medicine is a required educational unit (rotation) for all pediatric residents, there is opportunity for concentrated volume of one-on-one interviews with adolescent patients who may disclose self-harm behaviors. Although NSSI behavior may be encountered in other rotations, such as developmental/behavioral, primary care, urgent care, or emergency department settings, the ABP adolescent medicine content specifications explicitly list “self-harm” as a mental and behavioral health issue to be addressed [22].

Collaboration between pediatricians and behavioral health clinicians to educate and train residents in best practices for addressing NSSI and other pediatric mental health needs is important and directly contributes to achieving the Accreditation Council for Graduate Medical Education (ACGME) milestone of working interprofessionally to enhance patient safety and quality of care [24, 25]. To this end, we developed and implemented a brief (45- to 60-min) one-time NSSI training for pediatric residents as part of their medical education curriculum during their monthlong adolescent medicine rotation. This study assessed changes in resident self-perceived competence in addressing adolescent NSSI following the didactic training. Secondarily, this study assessed changes in perception of how important residents believe it is that physicians receive training in responding to NSSI. We also evaluated NSSI knowledge acquisition and retention over time and overall helpfulness of the didactic.

Method

The Institutional Review Board at both the University of Texas Southwestern Medical Center and Baylor College of Medicine approved this study.

Study Setting and Participants

We implemented the single-session NSSI curriculum monthly during the monthlong adolescent medicine rotation at Children’s Medical Center of Dallas (CMCD) and Texas Children’s Hospital (TCH) in Houston, the two largest children’s hospitals and pediatric residency programs in Texas. We delivered it in person at CMCD and virtually to the residents at TCH; in-person and virtual sessions were taught separately. All participants, most of whom were in their second year of residency, participated in the NSSI didactic as part of each residency program’s required curriculum, with the exception of a few who could not attend due to illness or scheduling conflict. We evaluated the curriculum over a 2.5-year period from August 2016 to February 2019 using a pretest, posttest, and 6-month follow-up. Those who completed study surveys did so voluntarily and provided appropriate consent. Before we reviewed and analyzed data, the study coordinators assigned a study identification number to anonymize participants and then deleted their email addresses so that we as faculty could not identify residents.

Didactic Curriculum

We developed the curriculum as a collaboration between the Adolescent and Young Adult program faculty and Outpatient Psychiatry clinic at CMCD based on a recognized gap in resident training. The first author developed the content and began delivering the didactic monthly in October 2013. We revised it over subsequent months based on informal teacher evaluations and learner feedback, which included residents’ desire for knowing what to ask adolescents when conducting an NSSI screening/risk assessment as well as how to ask these questions so that the screening and assessment could be administered briefly (e.g., within 5 min) but extended if needed or desired. As a result, the first author published the general content of this curriculum as the SOARS model [26] and presented the material to all participants in the current study.

The aim of the SOARS curriculum is to provide guidance on (1) what questions to ask (based on research showing associations between NSSI and suicide); (2) why to ask these specific questions (based on theoretical frameworks such as the Interpersonal Theory of Suicide [27, 28]); (3) how to ask each question (based on counseling skills); and (4) how residents can remember each question (i.e., the acronym SOARS: Suicidality; Onset, frequency, methods; Aftercare; Reasons; Stage of change) [26]. The model also recognizes the fast-paced nature of many clinics and the possibility of only having time to ask three questions, thereby highlighting the importance of asking about Suicide, Aftercare, and Reasons. The curriculum is grounded in contemporary research on NSSI, which is referenced and discussed in greater detail in the published SOARS risk assessment model [26]. The didactic includes a variety of resource handouts, deidentified real-life case examples, and interactive discussion. Faculty at both sites printed hard copies to share and made electronic versions available when requested.

Survey Design

We evaluated the effectiveness of the didactic using brief pretest, posttest, and 6-month follow-up surveys we developed. We
assessed key variables, such as self-assessed competence and perception of NSSI as a training priority for physicians, across all three time points using Likert-type response options (Table 1).

**Analyses**

We calculated descriptive statistics for each variable. We conducted a series of one-way analyses of variance (ANOVAs) to assess differences in responses between residents from CMCD and those from TCH and one-way repeated-measures ANOVAs with post hoc comparisons to examine changes in variables across the three time points. We used paired-sample t tests to examine changes in survey items assessed at two time points, such as perceived feasibility of the SOARS model (posttest compared to 6 months), and likelihood of screening for NSSI (pretest compared to 6 months). We conducted all analyses using IBM SPSS Statistics Version 26.

**Results**

A total of 127 of 162 eligible residents participated (78.4% response rate) by completing at least one survey (71 from CMCD, 56 from TCH). Of these residents, 69 responded to the 6-month follow-up (38 from CMCD, 31 from TCH), indicating a 54.3% overall retention rate. Sixty-eight (53.5%) participants responded to all three surveys, 39 (30.7%) completed pretest and posttest but did not respond to multiple requests to complete the 6-month follow-up, 17 (13.4%) completed the pretest but did not complete the posttest or 6-month follow-up, 2 (1.6%) did not complete the pretest or 6-month follow-up but did complete the posttest, and 1 (0.8%) completed the pretest and 6-month follow-up but not the posttest. There were no differences on baseline (pretest) survey responses among those who completed at least one of the follow-up surveys compared to those who did not complete any follow-up survey (p > .05).

Prior to the NSSI training, participants from TCH endorsed significantly greater importance of the topic for training than did participants from CMCD (p = .027), although there was no difference at posttest and 6-month follow-up (p > .05). At posttest, participants from TCH reported viewing use of the SOARS model as significantly more feasible than participants from CMCD (p = .030), but there was no difference at 6 months (p > .05). There were no differences between groups on any other variables.

Table 1 Descriptives of responses for residents completing the NSSI curriculum

| Variable                                     | Pretest (n = 125) | Posttest (n = 109) | 6 months (n = 69) |
|----------------------------------------------|------------------|-------------------|------------------|
| Competence (1 to 4)                          | M (SD)           | % (n)             | M (SD)           | % (n)             | M (SD)           | % (n)             |
| 1 = not at all competent                     | 1.82 (.71)       | 33.6 (42)         | 3.11 (.58)       | 0.0 (0)           | 3.04 (.81)       | 0.0 (0)           |
| 2 = somewhat competent                       | 52.0 (65)        | 52.0 (65)         | 11.9 (13)        | 30.4 (21)         |
| 3 = fairly competent                         | 12.8 (16)        | 65.1 (71)         | 65.1 (71)        | 34.8 (24)         |
| 4 = very competent                           | 1.6 (2)          | 22.9 (25)         | 22.9 (25)        | 34.8 (24)         |
| Importance of NSSI training (1 to 4)         | 3.37 (.67)       | 0.0 (0)           | 3.74 (.58)       | 0.0 (0)           | 3.52 (.68)       | 0.0 (0)           |
| 1 = not at all important                     | 10.4 (13)        | 10.4 (13)         | 7.3 (8)          | 10.1 (7)          |
| 2 = somewhat important                       | 42.4 (53)        | 42.4 (53)         | 11.0 (12)        | 27.5 (19)         |
| 3 = fairly important                         | 47.2 (59)        | 47.2 (59)         | 81.7 (89)        | 62.3 (43)         |
| 4 = very important                           | 3.34 (1.27)      | (Not asked)       | 3.68 (.95)       | 1.4 (1)           |
| Frequency of NSSI screening (1 to 5)          | 1 = never        | 9.6 (12)          | 1.4 (1)          |
| 2 = rarely                                   | 18.4 (23)        | 5.8 (4)           |
| 3 = sometimes                               | 22.4 (28)        | 39.1 (27)         |
| 4 = often                                    | 28.0 (35)        | 30.4 (21)         |
| 5 = always                                   | 21.6 (27)        | 23.2 (16)         |
| Time assessing/addressing NSSI (1 to 4)       | 2.08 (.73)       | (Not asked)       | 2.41 (.55)       | 2.9 (2)           |
| 1 = I don’t specifically ask                 | 21.6 (27)        | 2.9 (2)           |
| 2 = I only screen for it                     | 49.6 (62)        | 53.6 (37)         |
| 3 = 1–5 min                                  | 28.0 (35)        | 43.5 (30)         |
| 4 = > 5 min                                  | 0.8 (1)          | 0.0 (0)           |

NSSI nonsuicidal self-injury
Changes in Self-Assessed Competence

Most residents (85.6%, n = 107) felt not at all competent or only somewhat competent in responding to patients who disclose a history of NSSI (Table 1). However, residents showed a significant increase in self-assessed competence following NSSI training compared to before the training, with large effect size (Table 2 (a)). A one-way repeated-measures ANOVA and post hoc comparisons revealed that residents retained these gains in competence at 6-month follow-up (Table 3). In fact, whereas 33.6% (n = 42) of participants endorsed feeling not at all competent at pretest, not a single participant endorsed feeling this way at posttest or 6-month follow-up.

Additional analyses revealed residents were significantly more likely to screen for NSSI and spend significantly more time assessing and addressing NSSI at 6-month follow-up compared to before the NSSI training, with small to medium effect sizes (Table 2 (b)), providing further evidence of sustained improvements in perceived competence.

Changes in Perception of Importance of NSSI Training

Twenty (16.0%) residents reported ever having been exposed to educational content related to NSSI (typically as a brief side note within training for how to screen for suicide), but none had ever received formal training in NSSI until now. Most (89.6%, n = 112) already believed that it is fairly important or very important that physicians receive training in responding to NSSI (Table 1). Nevertheless, residents were significantly more likely after the didactic to believe that training in NSSI for physicians is very important compared to before the training, with medium effect size (Table 2 (a)). A one-way repeated-measures ANOVA indicated a significant effect over time (Table 3). Post hoc comparisons revealed perceived importance of NSSI training decreased significantly (p = .009) from posttest to 6-month follow-up, but at 6-month follow-up, residents still endorsed perceiving NSSI training as significantly (p = .015) more important compared to before the training. No resident at any of the three datapoints reported believing that NSSI training was not at all important.

NSSI Knowledge Acquisition and Retention Over Time

Prior to the NSSI training, just 60.8% (n = 76) correctly identified the three most important questions of an NSSI risk assessment: assessing suicidality, aftercare, and reasons for NSSI [26]. At posttest, 100% (n = 109) correctly identified the three most important questions. Six months later, 91.3% (n = 63) of respondents retained this knowledge whereas only six responded incorrectly.

Helpfulness of NSSI Training

The majority (84.4%, n = 92) of residents rated the didactic as very helpful. Importantly, no residents at any point viewed the training as not at all helpful. Similarly, the majority (87.2%, n = 95) indicated at posttest that they believe it would be very feasible or fairly feasible to use SOARS to assess NSSI, with most (72.9%, n = 78) anticipating that they would use it often or always (two participants did not provide a response to this item on the posttest). At 6-month follow-up, 56.5% (n = 39) of respondents indicated it was very feasible or fairly feasible to use SOARS, and only 2 (2.9%) residents reported it was not at all feasible.

Finally, we asked participants to identify up to three of the most helpful aspects of training that should always be included in NSSI medical education curricula. Residents expressed particular appreciation for being provided with tips for brief counseling, being introduced to the SOARS model, and learning risk factors for suicide.

Table 2 Changes in competence and NSSI training as a priority (a) and changes in NSSI screening and intervention practice (b)

| (a) | Pretest | Posttest | t | df | p   | d  |
|-----|---------|----------|---|----|-----|----|
| Competence | M (SD) | M (SD) |   |    |     |    |
| Importance of NSSI training | 1.78 (.71) | 3.11 (.59) | 15.92 | 106 | < .001 | 1.54 |
| (b) | Pretest | 6 months | | | | |
| | M (SD) | M (SD) | t | df | p   | d  |
| Frequency of NSSI screening | 3.29 (1.27) | 3.68 (.947) | 2.40 | 68 | .019 | .29 |
| Time assessing/addressing NSSI | 2.09 (.74) | 2.41 (.55) | 3.59 | 68 | .001 | .43 |

Number of participants: (a) 107, (b) 69

NSSI: nonsuicidal self-injury
Discussion

This is the first study to introduce and evaluate a single-session medical education curriculum for assessing and addressing NSSI within pediatric residency. Consistent with prior research [13], just 1 in 5 (21.6%) residents reported routinely inquiring about NSSI, and 1 in 3 (33.6%) reported feeling not at all competent to respond to patients who self-injure. We found that residents’ self-perceived competence in caring for adolescents who self-injure increased significantly following NSSI training and that this competence was sustained over time. They were also significantly more likely to screen for NSSI and spend significantly more time assessing and addressing NSSI after the training. Still, only 23.2% (n = 16) reported routinely inquiring about NSSI 6 months later. Although residents already believed that training in NSSI is important, the strength of this belief increased significantly following the training.

Most participants reported the curriculum was very helpful, indicating that residents appreciated gaining skills from specific training to address adolescent NSSI during their adolescent medicine rotation. Sixty minutes provided ample time to cover the material and allow for interactive discussion. When residents had many questions, 45 min proved just enough time to address their needs and cover all content, although sometimes not as in depth. We demonstrated that training in addressing NSSI can be delivered in a single, brief didactic with outcomes that are retained over time. We found longitudinal changes in both subjective (i.e., self-assessed) competence and objective knowledge. As pediatric residency programs seek ways to provide effective educational content online during and after the COVID-19 pandemic, this study shows that effective NSSI training can be delivered in person or virtually with results that are consistent across methods of delivery. This curriculum partly addresses the training gap in mental health [15] and suicide risk [16] that are central to the competency domains set forth by ABP [22] and SAHM [23]. It also highlights the importance of interprofessional training (here, with psychologists) [20] and competent patient care as outlined by ACGME pediatric residency milestones [24].

We offered the didactic just once each month, meaning that if a resident missed it during their monthlong clinical rotation, they were unable to learn the material. One strategy to address this would be to pre-record the content and have residents review the material at the start of their adolescent medicine rotation. Although they would miss opportunities for live discussion, such content might enhance access to otherwise inaccessible medical education curricula. One recent study found that delivering a 43-min video-based training for pediatric residents in identifying and managing pediatric anxiety disorders significantly improved their knowledge and confidence in evaluating anxiety disorders, regardless of whether the video training was delivered in a live group format or asynchronously online [29]. Such brief, video-based trainings may be especially desirable for training programs that continue to be negatively affected by COVID-19. Because we did not have a control group, it is possible that residents’ increased knowledge of and competence in treating NSSI was simply due to completing the adolescent medicine rotation. However, prior research has indicated that about 50% of pediatricians and family medicine physicians feel unprepared to address NSSI among adolescents [13], whereas 100% of the pediatric residents in our study reported feeling at least somewhat competent to address NSSI among adolescents 6 months after NSSI training, with the majority (69.6%) feeling fairly competent or very competent. It was also somewhat surprising that 60.8% (n = 76) of the residents answered the knowledge retention question correctly prior to the training, suggesting a possible ceiling effect in which the question may have been too easy.

Finally, survey questions were not validated, and we measured competence subjectively using single-item questions. Future research should examine if self-perceived competence correlates with objectively measured competence in treating adolescent NSSI. For instance, reviewing charts within the hospital’s electronic medical record would be one objective method of assessing whether NSSI training leads to utilization of best practices (e.g., screening, intervention) in adolescent medicine and other clinical settings. An Objective Structured Clinical Examination may also allow for more objective assessment of competence that can be compared to self-assessed competence. Virtual reality simulations for training pediatric residents in behavioral health anticipatory guidance have

Table 3 Long-term changes in competence and NSSI training as a priority among residents completing the NSSI curriculum (number of participants = 69)

|                        | Pretest M (SD) | Posttest M (SD) | 6 months M (SD) | F(2,134) | p    |
|------------------------|----------------|-----------------|-----------------|----------|------|
| Competence             | 1.75 (.70)     | 3.13 (.57)      | 3.04 (.81)      | 95.35    | < .001 |
| Importance of NSSI     | 3.29 (.67)     | 3.76 (.55)      | 3.52 (.68)      | 13.65    | < .001 |

NSSI nonsuicidal self-injury

*a Number of participants = 68. One participant completed the pretest and 6-month follow-up but not the posttest.
shown promise [30]. One innovative strategy utilizes a virtual learning environment (VLE) designed to augment the existing NSSI curriculum outlined in the present study [31]. In this VLE simulation, resident learners engage with an adolescent patient avatar with an active history of NSSI that is “puppeteered” by a single trained human operator and educator, which allows for objective assessment of knowledge and skill acquisition, real-time verbal and nonverbal response feedback from the patient avatar, and feedback to the learner after each practice session about their interactions during the simulation. Preliminary results of a study combining this VLE practice session with the curriculum presented here revealed increased objective NSSI competence and knowledge [32].

In conclusion, following a single-session training to address NSSI, pediatric residents demonstrated objectively measured increase in knowledge and subjectively measured increase in confidence related to caring for adolescents who engage in NSSI. This study highlights the value of integrating an NSSI medical education curriculum within residents’ adolescent medicine rotation. Not only do results provide promising evidence of the efficacy of this training for medical providers, it also exemplifies how to successfully integrate the expertise of allied health professionals, such as psychologists, to meet ACGME pediatric residency competency milestones while also improving patient care quality. Pediatric residency programs should incorporate dedicated training in NSSI as part of the medical education curriculum.

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References

1. Gillies D, Christou MA, Dixon AC, Featherston OJ, Rapti I, Garcia-Anguita A, Villasis-Keever M, Reebye P, Christou E, al Kabir N, Christou PA. Prevalence and characteristics of self-harm in adolescents: meta-analyses of community-based studies 1990–2015. J Am Acad Child Adolesc Psychiatry. 2018;57:733–41.

2. International Society for the Study of Self-Injury. What is non-suicidal self-injury? 2022. Available at: https://www.itriples.org/what-is-nssi. Accessed 5 Apr 2022.

3. Monto MA, McRee N, Deryck FS. Nonsuicidal self-injury among a representative sample of US adolescents, 2015. Am J Public Health. 2018;108:1042–8.

4. Gandhi A, Luyckx K, Baetens I, Kiekens G, Sleuwaegen E, Berens A, Maitra S, Claes L. Age of onset of non-suicidal self-injury in Dutch-speaking adolescents and emerging adults: an event history analysis of pooled data. Compr Psychiatry. 2018;80:170–8.

5. Heath NL, Toste JR, Nedecheva T, Charlebois A. An examination of nonsuicidal self-injury among college students. J Ment Health Couns. 2008;30:137–56.

6. Ammerman BA, Jacobucci R, Kleinman EM, Uyeji LL, McCloskey MS. The relationship between nonsuicidal self-injury age of onset and severity of self-harm. Suicide Life Threat Behav. 2018;4:31–7.

7. Muehlenkamp JJ, Xhunga N, Brausch AM. Self-injury age of onset: a risk factor for NSSI severity and suicidal behavior. Arch Suicide Res. 2019;23:551–63.

8. Ribeiro JD, Franklin JC, Fox KR, Bentley KH, Kleinman EM, Chang BP, Nock MK. Self-injurious thoughts and behaviors as risk factors for future suicide ideation, attempts, and death: a meta-analysis of longitudinal studies. Psychol Med. 2016;46:225–36.

9. Klonsky ED. Non-suicidal self-injury in United States adults: prevalence, sociodemographics, topography and functions. Psychol Med. 2011;41:1981–6.

10. Kerr PL, Muehlenkamp JJ, Turner JM. Nonsuicidal self-injury: a review of current research for family medicine and primary care physicians. J Am Board Fam Med. 2010;23:240–59.

11. Foy JM. for the American Academy of Pediatrics Task Force on Mental Health, Introduction. Pediatrics. 2010;125:S69–74.

12. Fox F, Stallard P, Cooney G. GP’s role identifying young people who self-harm: a mixed methods study. Fam Pract. 2015;32:415–9.

13. Taliaferro LA, Muehlenkamp JJ, Hetler J, Edwall G, Wright C, Edwards A, Borowsky JW. Nonsuicidal self-injury among adolescents: a training priority for primary care providers. Suicide Life Threat Behav. 2013;43:250–61.

14. Muehlenkamp JJ, Claes L, Quigley K, Proser E, Claes S, Jans D. Association of training on attitudes towards self-injuring clients across health professionals. Arch Suicide Res. 2013;17:462–8.

15. McMillan JA, Land M, Leslie LK. Pediatric residency education and the behavioral and mental health crisis: a call to action. Pediatrics. 2017;139:e20162141.

16. Cooper MT. A call to reorient pediatric residency education to address the emerging threat of suicide. J Adolesc Health. 2019;65:173–4.

17. Schoen LE, Bogetz AL, Hom MA, Bernert RA. Suicide risk assessment and management training practices in pediatric residency programs: a nationwide needs assessment survey. J Adolesc Health. 2019;65:280–8.

18. Ruedinger E, Carlin K, Inwards-Breland D, McCarty CA. Effectiveness of the adolescent medicine rotation in improving pediatric residents self-assessed skill and confidence caring for youth. J Adolesc Health. 2019;64:530–6.

19. Colburn MD, Harris E, Lehmann C, Widdice LE, Klein MD. Adolescent depression curriculum impact on pediatric residents’ knowledge and confidence to diagnose and manage depression. J Adolesc Health. 2020;66:240–9.

20. Reese JM, Hofmann S, Barone MA, Servint J. Training residents in adolescent depression. Med Educ. 2021;55:1328–9.

21. American Board of Pediatrics. Entrustable Professional Activities: EPA 9 for general pediatrics. 2013. Available at: https://www.abp.org/sites/abp/files/pdf/gen_peds_epa_9.pdf. Accessed 5 Apr 2022.

22. American Board of Pediatrics. Content outline: General pediatrics. 2017. Available at: https://www.abp.org/sites/abp/files/gp_contentoutline_2017.pdf. Updated: September 2017. Accessed 5 Apr 2022.

23. Society for Adolescent Health and Medicine, Education Committee. Adolescent medicine resident curriculum. 2020. Available at: https://www.adolescenthealth.org/Training-and-CME/Adolescent-Medicine-Resident-Curriculum.aspx. Updated: March 25, 2020. Accessed 26 Oct 2021.

24. Accreditation Council for Graduate Medical Education. ACGME program requirements for graduate medical education in pediatrics. 2020. Available at: https://www.acgme.org/Portals/0/PFAssets/
25. Stancin T, Perrin EC. Psychologists and pediatricians: opportunities for collaboration in primary care. Amer Psychol. 2014;69:332–43.
26. Westers NJ, Muehlenkamp JJ, Lau M. SOARS model: risk assessment of nonsuicidal self-injury. Contemp Pediatr. 2016;33:25–31.
27. Joiner TE. Why people die by suicide. Cambridge, MA: Harvard University Press; 2005.
28. Van Orden KA, Witte TK, Cukrowicz KC, et al. The interpersonal theory of suicide. Psychol Rev. 2010;117:575–600.
29. Mian ND, Pincus DB, Perin EC, Bair-Merritt M. Identifying and making recommendations for pediatric anxiety disorders in primary care settings: a video-based training. MedEdPORTAL. 2020;16:11033.
30. Herbst R, Rybak T, Meisman A, Whitehead M, Rosen B, Crosby LE, Klein MD, Real FJ. A virtual reality resident training curriculum on behavioral health anticipatory guidance: development and usability study. JMIR Pediatr Parent. 2021;4:e29518.
31. Ingraham K, Hughes CE, Taliaferro L, et al. Using digital puppetry to prepare physicians to address non-suicidal self-injury among teens. In: Antona M, Stephanidis C, editors. Universal access in human-computer interaction. Theory, methods and tools. Switzerland: Springer International; 2019. p. 555–68. https://doi.org/10.1007/978-3-030-23560-4.
32. Matsumiya B, Westers NJ, Muehlenkamp JJ, Hughes C, Ingraham K, Taliaferro L. Evaluation of an NSSI training with pediatric residents. Oral presentation at: International Society for the Study of Self-Injury Annual Meeting; June, 2021; Virtual.

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