



Student-Run Teen and Tot Service: Increasing Medical Trainee Exposure to Pediatric Education while Providing Educational and Health Services to Teenage Mothers and their Children

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Abstract

Background: Student Run Teen and Tot Service (SRTTS) is a student-run, interdisciplinary service-learning program at Boston University School of Medicine (BUSM) and Boston Medical Center (BMC). In this paper, we describe the program, which aims to increase medical students' exposure to pediatrics while providing education and support to teenage mothers and their babies.

Methods: Medical students at BUSM learned developmental milestones and trained in communication, patient-centered education, and the pediatric interview and physical exam. SRTTS leaders recruited patients to free monthly service evenings held at BMC. The babies received medical exams and the teenage mothers received health and parenting education. Students filled out pre- and post-participation surveys rating their comfort with pediatric medicine and education, and patients completed demographic and satisfaction surveys. Both the patient and student surveys were analyzed using a descriptive approach.

Results: Analysis of pre- and post-participation student surveys demonstrated that the mean confidence level (reported on a 5-point scale, with 1=Not at all confident and 5=Extremely confident) increased for all measured domains, including interacting with children and adolescent mothers (from 2.46 to 4.08 and 2.08 to 3.92, respectively), giving anticipatory guidance (from 1.62 to 3.63), and performing a pediatric physical exam (1.08 to 2.85). Patients rated their experience with the program and the care they received highly, indicating that they would use the health education that they received in the future.

Conclusions: The supplemental care provided by SRTTS was well received by patients. Additionally, medical students improved their skills in a variety of pediatric medicine and education topics. SRTTS is limited by the number of patients and students who participated. Expanding SRTTS will further integrate adolescent mothers and children into the healthcare system and allow medical students to further increase their proficiency in pediatric medicine.

Introduction

The Student-Run Teen and Tot Service (SRTTS) is an interdisciplinary service-learning group created by medical students at the Boston University School of Medicine (BUSM) to provide care and services to adolescent mothers and their children. Pregnant and parenting teens face significant health and social challenges. Pregnant adolescents often receive inadequate prenatal care, with only 63.1% of teens aged 15-19 reported to receive adequate prenatal care compared to 80.5% of the overall pregnant patient population.¹ In addition, pregnant adolescents are at higher risk for poor pregnancy outcomes, including maternal anemia, preterm delivery, postpartum hemorrhage, and preeclampsia.² Furthermore, 82.4% of pregnant teens are publicly insured, indicating low income and dependence on government assistance. Following pregnancy, teenage mothers may face social isolation because pregnancy often causes teens to drop out of school and face employment difficulty. While Massachusetts has the lowest teen birth rate in the nation, 2017 data shows that teen births still occur at a rate of 7.2 per 1,000 teen females, and racial disparities exist.² According to data from the Massachusetts Department of Public Health, the 2016 adolescent birth rate per 1000 teens was significantly higher among Black teens (11.4 per 1000) and Hispanic teens (27.8 per 1000) than White teens (3.5 per 1000).²

SRTTS was created to help address the complex health and social needs of adolescent mothers and their children, in partnership with Boston Medical Center (BMC). SRTTS is a branch of BMC's Teen and Tot Clinic, which provides prenatal and postpartum primary care services to 638 mother (<24 years old) and child (<5 years old) pairings known as dyads. The patients are 62% Black, 15% White, 13% Hispanic, and 10% other. The majority are of low socioeconomic status (70% publicly insured), and many are from immigrant or undocumented working families. In addition to the routine healthcare provided, Teen and Tot Clinic physicians usually focus on addressing acute illness and developmental concerns, with less time for health and parenting education. SRTTS bridges this gap, with medical students providing personalized and age-appropriate developmental

milestone health education to parenting teens during supplemental visits that occur between regularly scheduled well-child visits. SRTTS clinic nights provide a unique space where young mothers and their babies are able to have basic health needs addressed simultaneously. The goals of SRTTS are to enhance adolescent mothers' knowledge of routine health maintenance for themselves, age-appropriate developmental milestones and parenting tips for their babies, to further integrate adolescent mothers and children into the healthcare system, and to address the social determinants of health affecting this population.

In addition to serving a vulnerable patient population, SRTTS aims to equip future health professionals with skills necessary to provide patient-centered care to adolescent mothers and their children. From an educational perspective, SRTTS addresses a deficiency in the preclinical curriculum. Students receive predominantly lecture-style classes for their first two years of medical school, with few focusing on pediatrics and limited clinical time spent primarily in settings with adult patients. As a multidisciplinary service consisting of medical, undergraduate, and public health students, SRTTS was designed to mirror the environment of an outpatient pediatrics clinic and to allow preclinical students to increase their knowledge of pediatric medicine.

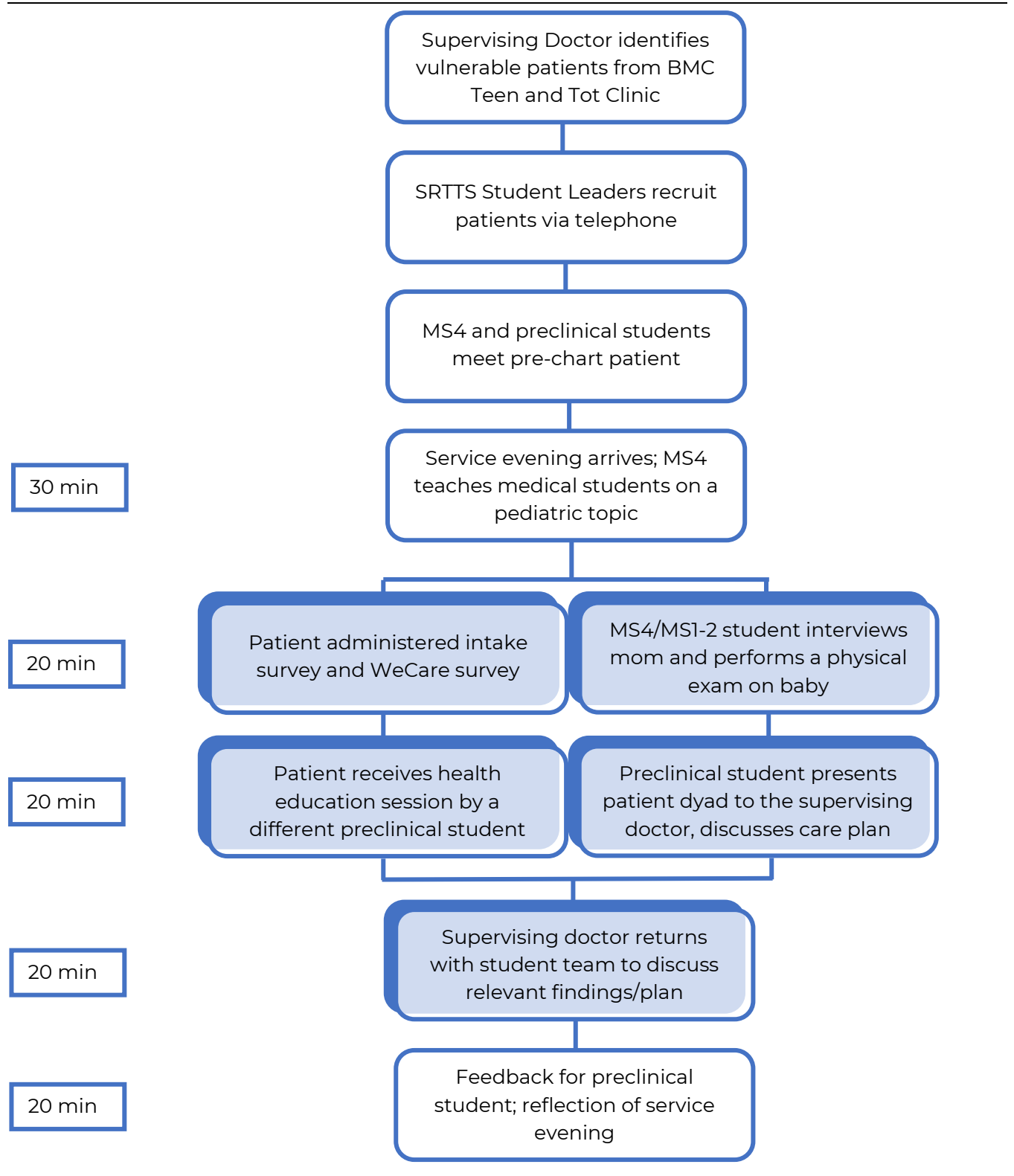
Assessing the impact of SRTTS in improving patient outcomes and student education builds upon the work of prior studies that demonstrated the value of student-run groups in medical education. Recent studies have shown that student-run clinics may enhance student learning by improving presentations, basic physical exam maneuvers, and advocacy skills.^{3,4} Likewise, student-run clinics have demonstrated success in providing patients with meaningful health education.⁵ Our research approach utilizes both patient satisfaction surveys and pre- and post-participation medical student surveys to assess the efficacy of SRTTS. In this paper, we discuss the structure, successes, challenges, and outcomes of SRTTS.

Methods

Clinical Setting

SRTTS operates its student-run clinic

Figure 1. Flow of patient recruitment and service evening



Boxes with shaded background indicate times where patient dyad is actively involved.
 BMC: Boston Medical Center; SSRTS: Student-Run Teen and Tot Service; MS: Medical student

Table 1. Demographic characteristics of participants (N=10)

Demographic	N (%)
Language (N=9)	
English	5 (55.5)
Spanish	1 (11.1)
Haitian-Creole	3 (33.3)
Self-reported race or ethnicity of mother (N=9)	
White	4 (44.4)
Latino/Hispanic	1 (11.1)
Black	3 (33.3)
Other: Haitian	1 (11.1)
Highest education level of child's primary caregiver (N=9)	
Less than high school	5 (55.5)
High school or GED	3 (33.3)
Technical/trade school	1 (11.1)
Risk of homelessness (N=8)	
At risk	2 (25.0)
Not at risk	6 (75.0)
If no, desires help with this	1 of 2 (50.0)
Have enough food for the family (N=10)	
Yes	9 (90.0)
No	1 (10.0)
If no, desires help with this	1 of 1 (100)
Trouble paying for heating bill (N=8)	
Yes	0 (0.0)
No	10 (100)
If no, desires help with this	0 of 0 (0.0)
Goes to school (N=10)	
Yes	10 (100)
No	0 (0.0)
Has a job (N=9)	
Yes	4 (44.4)
No	5 (55.5)
If no, desires help with this	1 of 4 (25.0)
Household Income (N=4)	
<\$15,000	3 (30.0)
\$15,000-\$30,000	0 (0.0)
\$30,000-\$60,000	1 (10.0)
>\$60,000	0 (0.0)
Self-described overall health rating (N=10)	
Excellent	5 (50.0)
Very good	3 (30.0)
Good	2 (20.0)
Fair	0 (0.0)

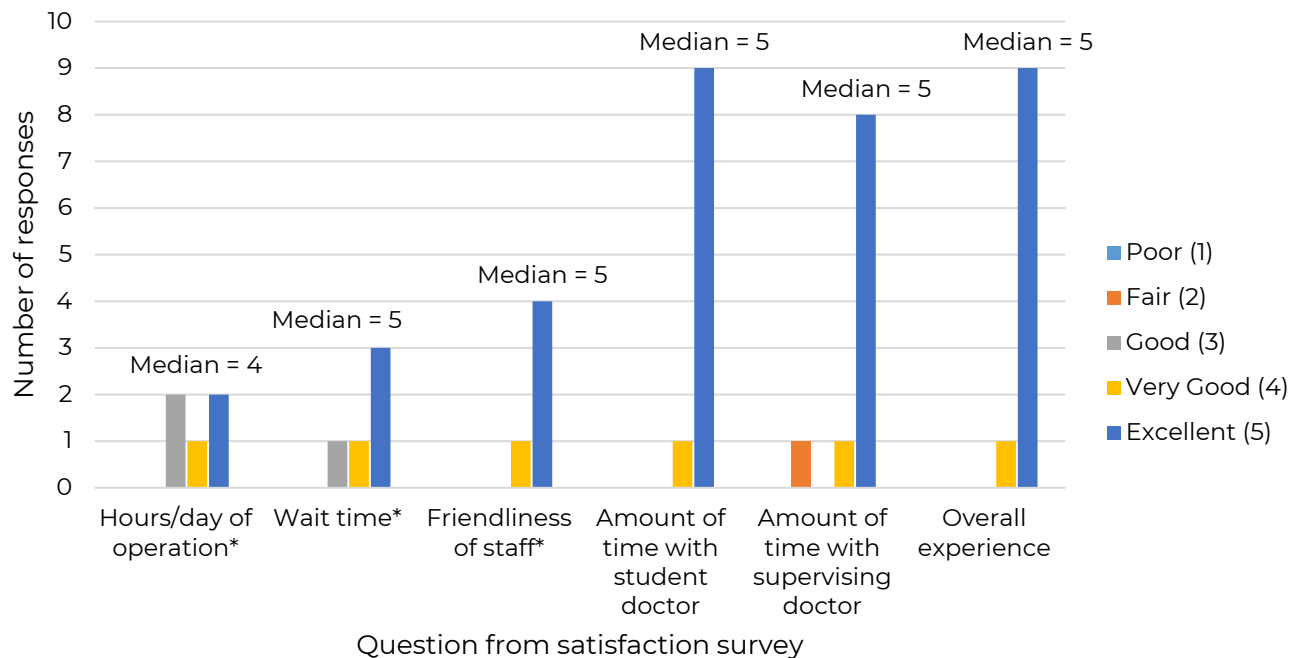
Poor	0 (0.0)
Self-described overall mental health rating (N=10)	
Excellent	5 (50.0)
Very good	3 (30.0)
Good	2 (20.0)
Fair	0 (0.0)
Poor	0 (0.0)
Self-described overall healthcare received in prior 12 months (N=10)	
Excellent	3 (30.0)
Very good	1 (10.0)
Good	5 (50.0)
Fair	1 (10.0)
Poor	0 (0.0)

Demographics of mother patients served over 16 service nights at SRTTS (n=10). Demographics were self-reported by patients on an intake survey and a WeCare social determinants survey. Some surveys were incompletely filled out; the title for each question indicates how many responses were recorded. If the patient indicated a desire for access to resources, they were provided with an appointment with a social worker to follow up on their need. GED: General Educational Development

according to Figure 1 in the Adolescent Department of BMC, New England's largest safety net hospital. Patient dyads are composed of a mother <24 years old and a child <5 years old. All Teen and Tot program patients who would benefit from supplemental health education and support are invited to attend SRTTS. An electronic list of patients is kept by SRTTS' supervising physician, and medical student leaders recruit potential patients by telephone. Patients attend SRTTS in between regularly scheduled pediatric visits set by the American Academy of Pediatrics (AAP).

SRTTS clinic evenings are held once per month. Two to four mother-baby dyads are scheduled for each service night. An undergraduate student facilitates patient rooming and administers intake and WeCare Surveys to screen for unmet social needs.⁶ The medical student team, consisting of one preclinical and one fourth-year student, meets with the patient dyad for history-taking. The history focuses on the baby's history of present illness and developmental milestones, the mother's sexual history, and the family's social history and safety considerations. Mothers complete the Edinburgh postpartum depression screen⁷ and a full Home, Education, Activities, Drugs, Sex, Suicide⁸ (HEADSS)

Figure 2. Patient evaluation of student run teen and tot service evening (N=10)



Patient satisfaction ratings following their visit with medical students and the supervising physician on service evenings. Patients were asked to evaluate clinic logistics as well as their overall experience on a 5-point scale (1=Poor, 2=Fair, 3=Good, 4=Very Good, 5=Excellent).

*N=5 due to an incompletely filled out survey

psychosocial assessment. Afterward, another medical student spends 20 minutes teaching the mother about age-appropriate parenting and developmental milestones using the Centers for Disease Control and Prevention Milestone Checklist and AAP Bright Futures Guidelines.^{9,10} Patients reporting unmet social needs are connected with a social worker. The medical student team re-visits the patient dyad with the supervising physician, who confirms physical exam findings and gives patient-specific health advice. Before leaving, the patient/mother is asked to fill out a post-visit satisfaction survey and is given donated clothes, toys, diapers, and formula.

Medical Student Training

Medical students attend a series of training sessions to prepare for clinic evenings. The first session presents the general format of service nights and includes interactive activities focused on improving communication and interviewing skills, increasing knowledge of adolescent development, and addressing issues of confidentiality with adolescents.¹¹ In their second training

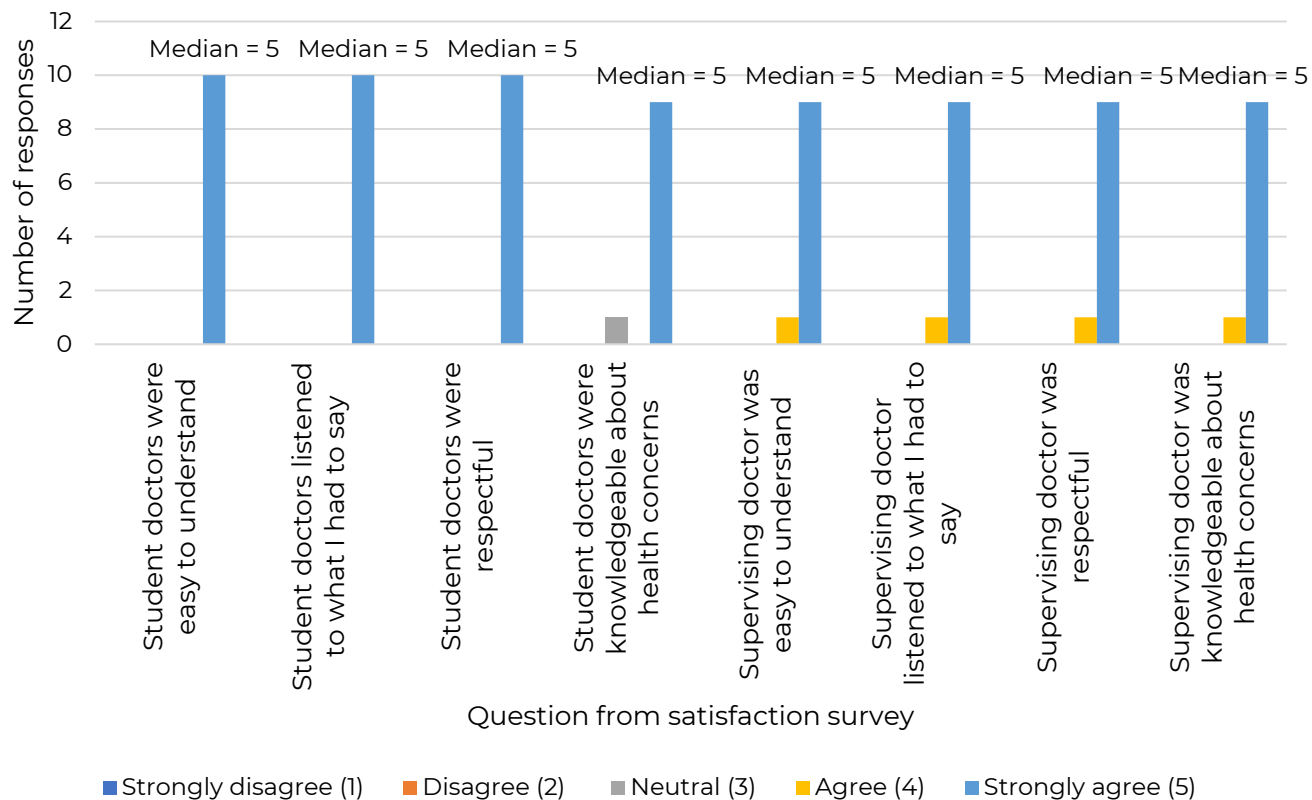
session, students learn about childhood developmental milestones using the AAP Bright Futures Guidelines and role-play with each other, with one person acting as a patient and the other as a student provider, to practice history-taking and giving age-appropriate anticipatory guidance.¹² For the last part of their training, newly recruited students shadow at a SRTTS service night.

Data Collection

Student providers and the supervising physician obtain the patients' informed consent for the IRB-approved research component of SRTTS. Consented patients are given an intake questionnaire (Appendix A) to record their demographics, education, and income level as well as the previously described WeCare Survey (Appendix B) to screen for unmet social needs, such as housing and food insecurity.

Following their visit, the patient is asked to anonymously complete a Satisfaction Survey (Appendix C) to assess their visit, interactions with students and the physician, and quality of health information provided at SRTTS. An

Figure 3. Patient evaluation of student doctors and supervising doctor (N=10)



Patient satisfaction ratings for interactions with student doctors and the supervising physician. Patients were asked to respond to various statements about the care they received on a 5-point scale, with 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree.

encrypted code linked to the patient’s medical record number is placed on each survey, and an electronic file is stored on an encrypted, restricted drive on a password-protected computer accessible only to researchers.

To assess SRTTS impact on medical education, students are asked to complete pre- and post-participation surveys using Likert scales. Survey questions (Appendix D) focus on the student’s comfort level with a variety of pediatric clinical skills such as advising parents, doing a physical exam and interview with a pediatric patient, and working with an interdisciplinary team. Students complete the survey prior to beginning SRTTS training and are invited to complete the same survey after participating in SRTTS for one academic year. The preclinical students had received minimal pediatric-focused lectures and no standardized pediatric patient training during the academic year outside of SRTTS.

Data Analysis

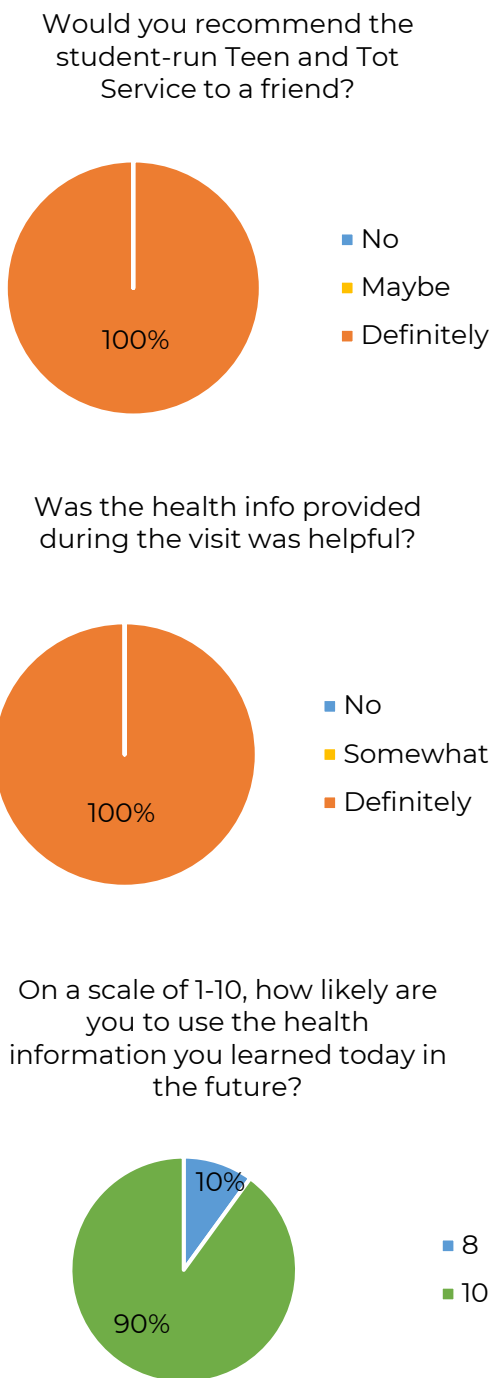
Descriptive statistical analysis was utilized for both the patient and student data due to small sample sizes. The student data was analyzed using a complete-case approach, omitting missing responses. The mean Likert scale responses to each question were compared between pre- and post-participation surveys. All statistical analyses were performed using Excel (v16.0, Microsoft, Redmond, WA).

Results

Study Population

A total of 10 teenage mothers over 12 monthly service evenings attended the SRTTS program and responded to surveys. The approximate no-show rate per clinic was 75%, with an average of one patient dyad attending each service evening. The intake and WeCare surveys demonstrate that the patients were diverse in terms of

Figure 4. Patient response to additional satisfaction survey questions (N=10)



Patients were asked to whether they would recommend the SRTTS to a friend (1=No, 2=Maybe, 3=Definitely), if the health information provided was useful (1=No, 2=Somewhat, and 3=Definitely), and how likely they were to use the health information in the future (on a scale of 1-10, with 10=extremely likely).

SRTTS: Student Run Teen and Tot Service

race/ethnicity, age, and primary language, with multiple reporting a desire for help addressing unmet basic needs including housing, food, and employment (Table 1).

Patient Feedback

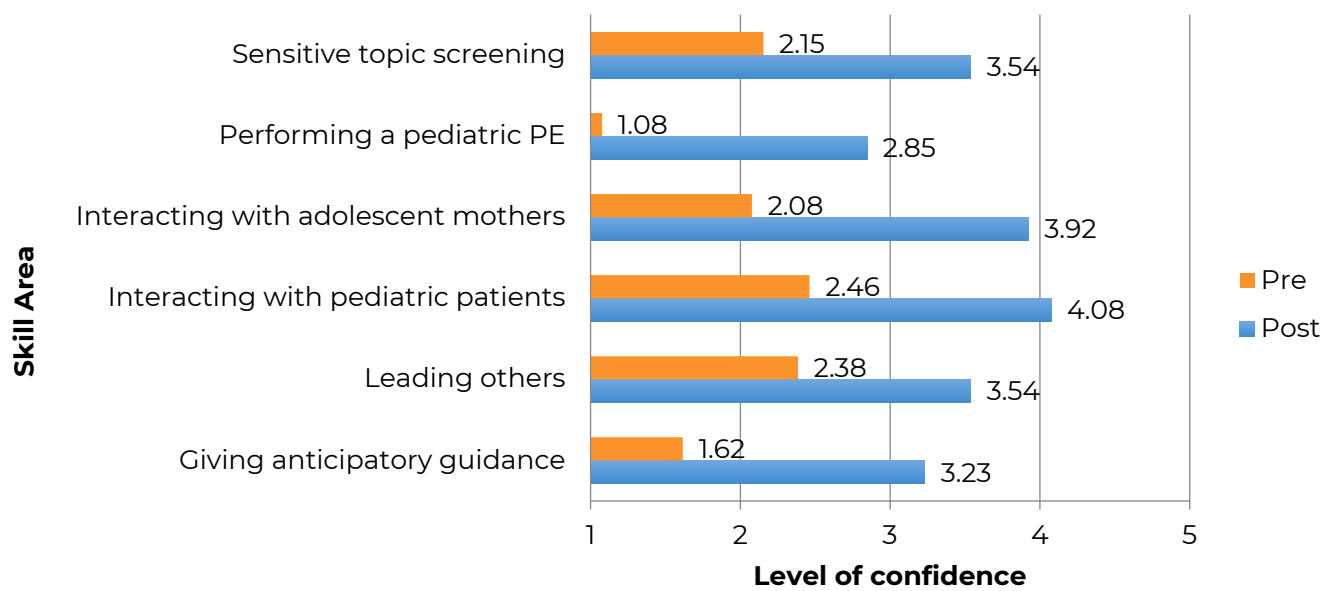
Ten patients completed post-visit satisfaction surveys. They rated SRTTS highly in a number of domains, including clinic flow and overall experience (Figure 2) and interactions with students and the supervising physician (Figure 3). Patients most enjoyed the welcoming environment, education that helped them to better understand their babies' needs, student attentiveness, and quality of teaching. Patients would change the timing of the clinic, with a preference for daytime clinics. All mothers reported they would "definitely" recommend the service evenings to their peers and that they learned new health information that they would use in the future (Figure 4).

Student Results

A total of 21 preclinical students have participated in the program, and 17 responded to pre-participation surveys (81% response rate) and 13 responded to post-participation surveys (62% response rate). A total of six students worked as student leaders over the course of two academic years. An average of six preclinical students participated per service evening, with each student participating in an average of five service evenings per school year.

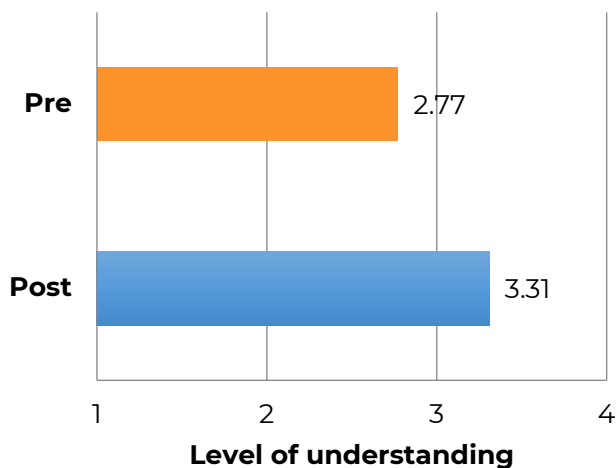
A total of 13 students completed both the pre- and post-participation surveys. Confidence in a variety of pediatric skills was self-reported on a 5-point Likert scale (1=Not at all confident, 2=Somewhat confident, 3=Confident, 4=Very confident, 5=Very confident) in Figure 5. Prior to participating in SRTTS, students felt least confident in their ability to perform a pediatric exam (mean = 1.08), provide anticipatory guidance (mean = 1.62), and interact with pediatric patients (mean = 2.08). On the post-participation survey, the mean confidence level increased for every topic, with the largest increases in performing a pediatric exam (1.08 to 2.85), interacting with pediatric patients (2.46 to 4.08), and interacting with adolescent mothers (2.08 to 3.92) (Figure 5).

Figure 5. Preclinical medical students' mean level of confidence with pediatric skills before and after participating in SRTTS (N=13)



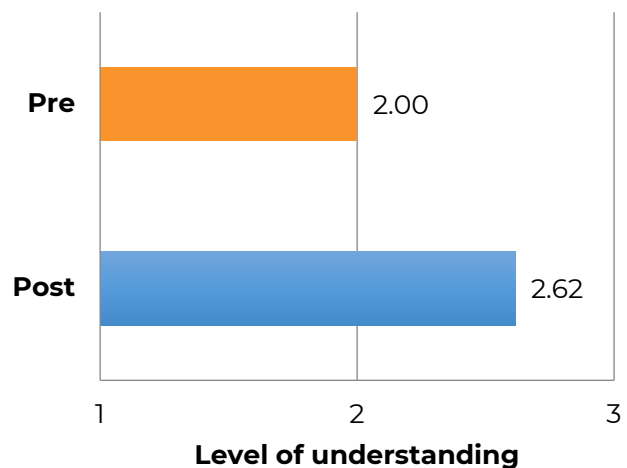
Students rated their confidence on a 5-point Likert scale (1=Not at all confident, 2=Somewhat confident, 3=Confident, 4=Very confident, 5= Extremely confident) and answers from the pre-and post-surveys were averaged across the group SRTTS: Student Run Teen and Tot Service; PE: Physical Exam

Figure 6. Understanding of healthcare team roles by preclinical medical students after SRTTS participation (N=13)



Students rated on a 4-point Likert scale (1=I don't know anything about roles, 2=I know what some members do, 3=I know what most members do and 4=I know what everyone does) and answers from the pre-and post-surveys were averaged across the group. SRTTS: Student Run Teen and Tot Service

Figure 7. Understanding of routine pediatric care by preclinical medical students after SRTTS participation (N=13)



Students rated on a 3-point Likert scale (1=No understanding, 2=Some understanding, 3=Good understanding) and answers from the pre-and post-surveys were averaged across the group. SRTTS: Student Run Teen and Tot Service

Students reported understanding of healthcare team roles using a 4-point Likert scale (1=I don't know anything about roles, 2=I know what some members do, 3=I know what most members do and 4=I know what everyone does) and reported understanding of routine pediatric care using a 3-point Likert scale (1=No understanding, 2=Some understanding, 3=Good understanding). The average level of understanding for both domains improved from the pre-participation survey to the post-participation survey; from 2.77 to 3.31 for healthcare team roles (Figure 6), and 2.00 to 2.62 for routine pediatric care (Figure 7).

Discussion

SRTTS addresses the gap in health education faced by adolescent mothers as well as to provide exposure to and increase preclinical students' interest in pediatric medicine. With many SRTTS patients indicating a desire for help with social needs such as housing or employment, the need for increased support for this vulnerable population is evident. All patients indicated that they were likely to use the health information they received, suggesting that SRTTS provides a valuable health service that can supplement standard pediatric clinic visits. Previous studies have shown that even a brief parenting or life skills intervention incorporated as part of medical care has positive effects on teen mother self-esteem and future reproductive outcomes.^{13,14} While our study does not include long-term physical and mental health outcomes, all patients rated their experience with the service positively, demonstrating the potential value of interventions such as SRTTS.

One of the continued challenges of SRTTS is how to best make its services available to adolescent mothers. By operating in the evenings, SRTTS allows parents to remain in school or at work during the day. However, timing of the service seemed to pose a significant barrier for patient attendance. Many patients noted that they were dependent on public transportation or rides from friends, which were often harder to obtain at night. These challenges most likely contributed to SRTTS's high no-show rate of 75%. In order to address this transportation barrier, SRTTS applied for and received an Uberhealth Grant

from BMC to provide patients with free, reliable transportation to clinic nights. Additionally, SRTTS began providing educational services at a local shelter that houses many of SRTTS's patients, eliminating the transportation barrier altogether.

Analysis of the pre- and post-participation surveys for preclinical medical students participating in SRTTS demonstrated increases in students' confidence in all measured areas. While the sample size was too small to determine if these differences were statistically significant, the results are promising, suggesting the value of SRTTS in providing an opportunity for preclinical medical students to gain early exposure to and increased comfort with pediatric medicine. Previous studies have shown the increased efficacy of small-group learning compared to large lecture-style learning, further corroborating the value of interventions such as SRTTS to medical education.¹⁵ SRTTS has already taken steps to expand the educational program by creating a Maternal Child Health elective lecture series.

The main limitation of this study is low sample size, both for patients and students, which limits the power of the study and may decrease generalizability of study findings for adolescent mothers and medical students in other settings. It is also possible that, despite giving patients privacy when filling out the satisfaction surveys, observer bias could impact patient responses given a desire to want to appear appreciative of the free services provided. In addition, the leaders' lack of expertise in running a student-run clinic during its initial years limits extrapolation of findings to other well-established student-run clinics.

Despite its limitations, the SRTTS program structure and research design offer value to other institutions seeking to implement similar interventions. Adolescent mothers and their children have complex medical and social needs that are important to address, and there is great educational value in exposing students to vulnerable patient populations.^{3,4} SRTTS was developed in Massachusetts, which reports the lowest incidence of adolescent childbirth.² Therefore, medical schools in other regions of the country, especially where the incidence of adolescent childbirth is higher, would also benefit from developing similar student-run clinics. Additional studies

at other institutions would help to further explore this important topic.

Future SRTTS development includes creating robust pre- and post-teaching quizzes for patients to assess the efficacy of the health education provided. In addition, the frequency of service nights will be increased to allow for more medical students to participate in SRTTS and for each student to participate in a greater number of sessions. We plan to assess the impact of this expansion and the addition of the Maternal Child Health lecture series on student education. Finally, future analysis will examine the impact of the Uberhealth Grant on patient attendance at SRTTS service evenings. By increasing the number of students and patients participating in the future, we hope to draw statistically significant conclusions in further analyses. Overall, our findings suggest that SRTTS models an effective student-run intervention for both addressing the challenges faced by pregnant and parenting adolescents and educating future leaders in pediatric medicine

Acknowledgements

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Disclosures

The authors have no conflicts of interest to disclose.

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