Becker TD, Rice TR, Ivanov I. Development of a brief inpatient curriculum to enhance trainee skills in assessment and treatment of adolescents with substance use and co-occurring mental health problems. *International J of Psychiatric Trainees*. Published online March 15, 2024. doi:10.55922/001c.94859

Original Research

Development of a brief inpatient curriculum to enhance trainee skills in assessment and treatment of adolescents with substance use and co-occurring mental health problems

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Keywords: adolescents, substance use disorders, inpatient psychiatry, training and education, co-occurring disorders

https://doi.org/10.55922/001c.94859

International Journal of Psychiatric Trainees

Background

Adolescence is a critical period for substance use intervention, yet few youth receive evidence-based treatment for both co-occurring substance use and mental health problems. Gaps in professional training limit adequate assessment and treatment of substance use problems among youth receiving psychiatric treatment.

Methods

We developed a two-session curriculum, integrated into a child/adolescent psychiatry inpatient rotation, to improve knowledge and skills in evidence-based practices for screening, brief intervention, psychoeducation, and care coordination, among multidisciplinary mental health clinicians. A pre/post survey evaluated perceived helpfulness, confidence in clinical skills, and intentions to engage in evidence-based practices.

Results

Trainees perceived the content as helpful and reported significant increases in confidence and intention to engage in the targeted evidence-based practices.

Conclusions

Implementation of a brief, focused, skills-based curriculum in clinical settings can effectively introduce trainees to core concepts not currently adequately covered in existing curricula.

INTRODUCTION

Substance use and mental health problems commonly co-occur in adolescents.[1,2] Studies of psychiatrically hospitalised older adolescents have found rates of co-occurring substance use disorders to exceed 60%.[3] Adolescents with substance use problems had high rates of conduct disorder (74%), attention-deficit/hyperactivity disorder (ADHD) (64%), depression (53%), traumatic distress (51%), and anxiety (25%) in one multi-site study.[4] Co-occurrence between substance use disorders (SUD) and mental illness likely result from a) common underlying psychological and biological vulnerabilities (e.g., impulsivity), b) efforts to self-manage psychiatric symptoms or side effects of medications, and c) adverse impacts of substances on neurodevelopment.[2,5,6]

Substance use appears to influence the trajectory of mental health problems and is a potential modifiable risk factor for poor mental health. For example, nicotine, the first substance used by many youth, has been longitudinally associated with later depression, schizophrenia, and other SUDs, and cannabis use has been associated with depression, psychotic disorders, and suicidality.[7-9] Most substance use starts in adolescence when adolescents are particularly vulnerable to adverse neurodevelopmental effects of substance use.[5,10] Substance use during adolescence appears to directly affect neural substrates underlying addictive vulnerability, likely worsening the trajectory of SUDs.[5]

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Having a SUD at a younger age has been associated with a worse SUD prognosis and greater psychiatric comorbidity.[5]

Adolescence is a critical period for intervention, but few adolescents receive treatment for both conditions.[4,11,12] Some clinicians believe that treatment of one problem (e.g., depression) will have "spill over" effects and reduce comorbid substance use (e.g., cannabis use). However, empirical evidence in adolescents suggests that spill over benefits are limited and that both conditions are best treated concurrently.[13,14] Evidence for integrated treatment approaches remains limited and professionals are generally not sufficiently trained to manage co-occurring substance use and mental illness in adolescents.[15]

Undertreatment of SUDs results from multiple factors, including gaps in professional training. Deficits in substance use education have been identified at all levels of medical education, including in child and adolescent psychiatry.[16,17] In a scoping review of 43 substance use training interventions, only one focused on adolescents, despite their unique neurobiology, epidemiology, screening thresholds, and best treatment practices differing from adults.[17] A recent child/adolescent psychiatry task force, composed of child and adolescent psychiatry training program directors and addiction psychiatry consultants, identified harm reduction, neurobiology, impact of substance use on the developing brain, evidence-based psychotherapy, pharmacotherapy, and a stages-of-change model as leading educational priorities.[16] To our knowledge, no prior published curricula have focused on treatment of co-occurring SUDs and mental health problems in adolescents.

In this curriculum development project, we focused on improving these competencies, specifically regarding nicotine, alcohol, and cannabis, when comorbid with depression or ADHD in adolescents. We focused on co-occurring ADHD and depression because they are common diagnoses in acute child/adolescent psychiatric settings[18,19] and have been the focus of approaches to integrated treatments.

METHODS

SETTING

The curriculum was implemented on the inpatient child/adolescent psychiatry unit at Mount Sinai Morningside hospital. Substance use problems are common among inpatients,[18] with rates of SUD found to exceed 60% among older adolescents in one study,[3] providing immediate opportunities to apply new skills. The unit hosts numerous trainees including five training programs, one medical school (Icahn School of Medicine at Mount Sinai), and other disciplines (psychology externs, advanced nursing externs, social workers receiving continuing education), enabling knowledge dissemination and feedback from trainees from varied backgrounds.

CURRICULUM DESCRIPTION

The curriculum content is derived from reviews and recommendation statements from the Substance Abuse and Mental Health Services Administration (SAMHSA), National Institute on Drug Abuse (NIDA), and the American Academy of Pediatrics.[5,14,20-24] It includes the priority concepts identified by the task force[16] and consists of two 30-45 minute sessions, which are delivered monthly, over two weeks, to trainees and staff on the inpatient unit. The initial curriculum was delivered with multidisciplinary groups of rotating trainees from February through June 2022, with 31 trainees attending at least one session. Curriculum development was led by a senior psychiatry trainee, with close mentorship from two senior faculty with expertise and institutional leadership roles in substance use disorders, acute child & adolescent psychiatry, and medical education. Additionally, the team received feedback and mentorship from a NIDA initiative focused on dissemination of evidence-based practices in management of SUDs among trainees.

Session one covers epidemiology, developmental context, screening brief intervention & referral to treatment (SBIRT), and assessment (see **Table 1**). We open with a few case vignettes drawn from the inpatient unit to engage learners in the salience of the topic. We overview the epidemiology of substance use in adolescence, rates of co-occurring mental health problems, how adolescent neurobiology influences substance use risk, and neuropsychiatric sequelae of substance use in adolescence. Next we develop skills with SBIRT practicing using the Screening to Brief Intervention (S2BI) tool for screening and risk stratification and discussing examples of brief interventions for each risk level.[25] Finally, we discuss evaluation of co-occurring substance use and mental health problems, including functional analysis and assessment of youth's goals and motivation using a stages-of-change framework.

Session two focuses on treatment of SUD in general and particularly when co-occurring with depression and ADHD. We summarise literature on prevention of substance use among youth with mental health problems.[29] Next, we briefly discuss core components of evidence-based psychosocial treatments for adolescent substance use, including cognitive behavioural therapy skills (CBT, e.g., coping with cravings, refusal, pro-social activities), motivational enhancement therapy, contingency management, and family therapies. We aim for trainees to develop basic skills that could be integrated into their work and confidence describing treatment to youth and their families post-discharge. We also review the evidence for pharmacotherapies (e.g., naltrexone, nicotine replacement)[20] and the evidence for treatments of co-occurring ADHD/SUD and depression/SUD.[23,24] A case discussion highlights the risks and benefits of prescribing stimulants for youth with substance use problems.[32] Challenges with care coordination among adolescent psychiatry, SUD, and primary care providers are considered.[14] Finally, we discuss adolescent SUD treatment resources available in our community, and how to choose the most appropriate treatment setting depending on the relative severity of each co-occurring problem. At the end of the sessions, trainees are provided with electronic resources, including a list of resources for additional reading (e.g., SBIRT, motivational interviewing, pharmacotherapy), psychoeducational resources, and a referral guide describ-

Table 1. Outline of Curriculum Content

Session	Topic	Key Content	Key References
1	**Epidemiology of adolescent SUDs**	• Epidemiology of substance use in adolescents- rates of use by age, risk factors • Rates of co-occurring mental health problems	4,10,26
	Adolescent neurodevelopment and SUD	• Adolescent neurobiology and its relationship to substance use risk • Neuropsychiatric sequelae of substance use in adolescence- e.g., impacts on attention, memory, psychomotor speed	5,10,27
	Screening, brief intervention & referral to treatment (SBIRT)	• **Activity**: Using case vignettes to practice using the Screening to Brief Intervention (S2BI) tool for screening and risk stratification • Reviewing examples of brief interventions for each risk level	25
	Assessment of co-occurring SUD and mental health problems	• Assessment of use patterns, timeline of substance use and psychiatric symptoms, functional behavioural analysis, and assessment of youth's goals and motivation using a stages-of-change framework	28
2	**Prevention of SU in youth with mental health problems**	• Although evidence is limited, studies have suggested that early treatment of ADHD and ODD may help prevent later development of SUDs	29
	Core components of evidence-based psychosocial treatments for adolescent SUD	• Examples of core CBT elements- e.g., functional analysis, coping with cravings, alternative activities, mood regulation, practicing refusal skills • Briefly discuss key elements and roles of family therapies, motivational enhancement therapy, and contingency management	22,30
	Evidence for pharmacologic treatment of SUD in adolescents	• Review existing evidence for: nicotine replacement therapy for nicotine use disorder, naltrexone for alcohol use disorder, N-acetylcysteine for cannabis use, buprenorphine for opioid use disorder, discussion of how risk/benefit balance in adolescents may be different than in adults	20,31
	Treatment of ADHD/SUD	• Stimulants generally improve ADHD, even in the context of SUD, and generally are not thought to increase the risk of SUD • Non-stimulant medications currently have minimal evidence in youth with co-occurring ADHD/SUD • **Activity- case discussion**: highlighting the risks and benefits of prescribing stimulants for youth with substance use problems, with attention to techniques to minimise risk: confirming the ADHD diagnosis with collateral information, using formulations that have relatively lower abuse potential (e.g., long-acting methylphenidates or lisdexamfetamine which is a prodrug), providing anticipatory guidance to parents and youth about safe storage, always discussing any changes dosing/timing with prescriber, the importance of minimising substance use while taking stimulants, and preparing to refuse peer requests for diversion	24,32
	Treatment of depression/SUD	• SSRIs have beneficial effects of depression but minimal effect on the co-occurring SUD • Integrated CBT, with motivational enhancement therapy and contingency managements helps improves depression, with mixed results for SUD	23,33
	Care coordination among adolescent mental health, SUD, and primary care providers	• *Challenges*: Under detection of rapidly evolving clinical problems, insufficient or inappropriate treatment, and conflicting recommendations • *Implications*: Importance of communicating regularly about symptoms, diagnosis, and functioning, and jointly considering level-of-care transitions, referrals, and barriers to engagement	14
	Choosing most appropriate treatment setting	• Relative severity of SUD and mental health problems can be used to focus treatment in primary care, mental health clinic, substance use clinic, or intensive program • Guide to services provided at different SUD clinics/programs in our community	14

Note: ADHD= attention deficit/hyperactivity disorder, CBT= cognitive-behavioural therapy, ODD= oppositional defiant disorder, SSRI= selective serotonin reuptake inhibitor, SUD= substance use disorder

ing local programs (e.g., evidence-based treatments, levels of care, ages).

DATA COLLECTION

Trainees were invited via email to complete an anonymous online survey several days prior to the first curriculum session. The survey included an information sheet describing the potential risks and benefits of the survey and emphasising that the survey was optional and would not affect academic standing at the hospital. Trainees who attended at least one session were invited to complete a follow-up survey within a week following the second curriculum session. Response rates were 88% and 67% for pre- and post-surveys, respectively. The survey was designed to assess the attitudes, confidence, and behaviours of trainees regard-

ing the core content of the curriculum. They were asked to respond to a series of Likert-scale items regarding a) confidence in core clinical skills (e.g., screening an adolescent for a SUD using a validated tool), b) the frequency at which they engage in best-practices (e.g., offering a brief intervention after screening for substance use), c) attitudes about substance use education, and d) basic demographics (discipline, level of training). Trainees were instructed select "N/A" for survey items not within their scope of practice or regarding content they missed (e.g., if only able to attend a single session). In the post-survey, trainees were also invited to provide suggestions for improving the curriculum. No incentive was provided for study completion.

DATA ANALYSIS

Bivariate analyses (e.g., t-test) were used to compare mean responses to survey items assessing confidence in skills and frequency of engaging in core practices prior to and following the intervention. Normal distribution of variables was confirmed by examining skewness, with a value of less than 2 considered sufficiently normal.[34] STATA 15.1 was used to conduct all analyses.

RESULTS

We collected curriculum feedback from two unique groups of learners via online surveys before and after the curriculum sessions in May and June 2022 (n=14 pre-course and n=12 post-course). Respondents included psychiatry trainees/fellows (n=6), medical students (n=4), psychology trainees (n=3), and one social worker. Baseline attitudes toward substance use education were positive, with 100% of trainees reporting that they "agree" or "strongly agree" that substance use is an important topic for child and adolescent psychiatrists to be knowledgeable about and that they were interested in learning more about the management of adolescent substance use problems. However, at baseline trainees reported low levels of confidence in core clinical skills (See **Table 2A**)

Overall feedback was positive, with participants rating all six curricular components "moderately" to "extremely helpful," with the treatment-focused components rated most helpful, and no significant differences between trainees/fellows and other learners (See **Table 3**). Participant confidence in all clinical skills increased significantly following the curriculum (See **Table 2A**). Participants described rarely engaging in the target clinical practices (e.g., brief interventions, referrals, and anticipatory guidance) prior to the curriculum, with significantly greater intention to engage in these practices after the curriculum (**Table 2B**).

Participants were also invited to provide free-text feedback. Four participants provided feedback: 2 commented on the interactive and engaging nature of the curriculum, and 3 commented that the curriculum and accompanying resources were informative and helpful. One trainee suggested providing more information specifically about cannabis, and another suggested discussion of treatment of SUD when co-occurring with bipolar disorder and personality disorders.

DISCUSSION

Substance use is commonly encountered in acute child/adolescent psychiatry settings, but trainees often receive little training on approaches to substance use with adolescents. Integrated treatment may be further limited by beliefs about "spill over benefits" of just treating one disorder[13] and hesitations about prescribing stimulants to youth with ADHD who also have a history of using substances. We developed a brief (two 30-minute sessions) curriculum covering fundamental skills in screening, brief intervention, and referral, and overviewing evidence-based SUD treatments in adolescents, and implemented it into a child/adolescent psychiatry unit.

In general, trainees found the curriculum salient to their clinical work and often brought up case material during sessions. Anecdotally, they reported that much of the content was new to them (e.g., they had never heard of SBIRT). Survey data showed they found the curriculum helpful, rating all curriculum components highly, with self-reported increases in confidence in key adolescent substance use clinical skills and increased intention to engage in best practices with this population. These findings highlight the relevance of SUD training to trainees and the importance of ongoing efforts to integrate SUD education in medical training curricula. Very few adolescent substance use curricula exist in the published literature,[17] and we did not identify any existing curricula organised around treating co-occurring substance use and mental health problems. A prior study focused on teaching screening, brief intervention, and referral to treatment (SBIRT) to paediatrics and child and adolescent psychiatry trainees.[35] Although the authors found high levels of training satisfaction, confidence, and use of targeted skills following the training, knowledge and confidence waned over time.[35]

The results of the study should be considered in the context of several limitations and further research is needed to advance medical education around adolescent substance use, particularly with co-occurring with mental health problems. Further research should examine the impact of training in these skills on clinical processes and outcomes (e.g., discharge plans including SUD treatment, prescription of pharmacotherapy for addiction when indicated). Since adolescent substance use is insufficiently covered in many different training programs (e.g., medical school, psychiatry training, child & adolescent psychiatry fellowship, social work), we chose to develop a curriculum that would be relevant to all levels of learners, which could potentially be implemented into various existing curricula. The core concepts covered in this brief curriculum are foundational and could be grasped by trainees with different backgrounds. We did not identify any difference between trainees/fellows and non-trainees/fellows on post-intervention ratings of helpfulness of different curricular components; however, the study was not powered to detect such differences. Perhaps further research with a larger

Table 2. Pre- and Post-curriculum clinical skill outcomes

A. Rate Confidence in the following clinical skills			
(1= not at all confident, 2= slightly confident, 3= somewhat confident, 4= moderately confident, 5= extremely confident)	**Pre-survey** (Mean, SD)	**Post-survey** (Mean, SD)	**One-sided t-tests**
Screening an adolescent for substance use disorders (SUDs) using a validated tool (e.g., S2BI or CRAFFT)	2.43 (1.16)	3.44 (1.24)	p<0.05
Delivering brief interventions with adolescents based on screening risk level	1.86 (0.86)	3.22 (1.20)	p<0.05
Describing evidence-based psychosocial treatments for SUDs to adolescents and their families	1.76 (0.73)	3.80 (1.23)	p<0.01
Prescribing medications for SUD to adolescents in appropriate clinical scenarios	1.5 (0.85)	3.38 (1.41)	p<0.01
Providing anticipatory guidance around safe use of therapeutic stimulants to youth the ADHD	1.92 (1.00)	3.25 (1.39)	p<0.05
Selecting the most appropriate level of care for youth with comorbid substance use and mental health problems	2.07 (0.83)	3.50 (0.97)	p<0.01
B. **Clinical practices**			
(1= never, 2= seldom, 3= about half the time, 4= usually, 5= always)	**Pre-survey: Thinking about your clinical interactions over the past month, please rate how often you have taken the following actions?** (Mean, SD)	**Post-survey: In the future how often do you anticipate taking the following actions?** (Mean, SD)	**One-sided t-tests (**degrees of freedom, test statistic, p-value)
Offered a brief intervention after screening an adolescent for substance use	1.73 (0.90)	3.67 (0.71)	p<0.001
Offered a referral to SU treatment after identifying high-risk SU problems	2.00 (1.05)	4.10 (0.74)	p<0.001
Provided anticipatory guidance to minimise diversion after prescribing an adolescent a stimulant	1.42 (0.53)	3.75 (0.89)	p<0.001

Note: ADHD= attention deficit/hyperactivity disorder, CRAFFT= Car Relax Alone Forget Friends Trouble, S2BI=Screening to Brief Intervention, SD= standard deviation, SU= substance use, SUD= substance use disorder

sample could seek to stratify the educational outcomes by trainee background to optimise curricula for different audiences, but curricula focused on fundamental concepts are successfully used to train interdisciplinary teams with varied levels of training and experience in other areas of medicine.[36] We focused on substance use when co-occurring with ADHD and depression, which have been studied more extensively than other commonly co-occurring conditions, such as trauma-related disorders[37] or bipolar disorder, but future more extensive curricula should seek to include other comorbidities as further evidence becomes available.

The curriculum provides a foundation to improve existing acute treatment practices. Clinicians who treat youth with co-occurring conditions often encounter difficulties prioritising treatment components, managing common additional high-risk behaviours (e.g., self-injury, high-risk sexual behaviour), managing family conflict, and coping with feelings of frustration and helplessness,[38] which requires further training and supervision. This pilot study suggests that implementation of brief, skill-based curricula in clinical settings can effectively introduce trainees of various levels to core concepts that are not adequately covered in existing curricula.

ETHICAL CONSIDERATIONS

This manuscript reports on results of a study that was determined to be exempt human research as defined by DHHS

Table 3. Ratings of curricular components

Please rate the helpfulness of the following curriculum components *(1= not at all helpful, 2= slightly helpful, 3= somewhat helpful, 4= moderately helpful, 5= extremely helpful)*	**Post-course survey** (Mean, SD)
Overview of epidemiology and developmental considerations	4.20 (0.79)
Screening and brief interventions (SBIRT)	4.40 (0.84)
Psychosocial treatments for SUD (e.g., CBT)	4.44 (1.13)
Medication treatments for SUD in adolescents	4.56 (0.88)
Treatment of comorbid ADHD/SUD, MDD/SUD	4.56 (0.88)
Referrals and care coordination	4.30 (1.06)

Note: SUD= substance use disorder, ADHD= attention deficit/hyperactivity disorder, MDD= major depressive disorder

regulations 45 CFR 46.101(b)(1) by the Institutional Review Board at Icahn School of Medicine at Mount Sinai.

DISCLOSURES

All authors have received support for the project from the AACAP-NIDA Resident Training Award in Substance Use Disorders. The authors report no additional relevant disclosures.

FUNDING SOURCE DECLARATION

This curriculum was supported by the Resident Training Award in Substance Use Disorders, sponsored by the American Academy of Child & Adolescent Psychiatry (AACAP) and National Institute on Drug Abuse (NIDA). Views expressed do not reflect positions of AACAP or NIDA.

AUTHOR CONTRIBUTIONS

TDB, TRR, and II conceptualised the study and analysed the data. TDB wrote the initial draft of the manuscript. TRR and II reviewed and edited the manuscript.

ACKNOWLEDGEMENTS

Authors wish to thank all staff and trainees who participated in the curriculum and survey. This project was previously presented at the NIDA Clinical Trials Network Steering Committee Meeting, held virtually on April 28, 2022, and the AACAP Annual Meeting in October 2022 in Toronto.

Submitted: January 14, 2024 CET, Accepted: March 08, 2024 CET

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