A Systematic Review of Multisystemic Therapy in Adolescent Sex Offenders

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Multisystemic therapy (MST) is an intense, family-focused, community-based treatment designed for youth with criminal behaviors. Literature on its usefulness among juvenile sexual offenders (JSOs) remains limited. We conducted a systematic review of published studies assessing effectiveness of MST among JSOs. A comprehensive search of published studies, using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, was undertaken using multiple databases. Search terms included "multisystemic therapy" or "multisystemic family therapy." A total of 542 articles were obtained on initial search. After excluding duplicates, 297 articles were included in further analysis that yielded 48 articles for full-text analysis. Six randomized controlled trials of MST, comprising 231 juvenile sex-offenders, were assessed for final review. MST performed favorably relative to alternative treatments among juvenile sex offenders while also demonstrating lasting treatment effect on sustained follow-up.

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The appropriate management of juvenile sexual offenders (JSOs) remains a subject of considerable debate with consensus opinions limited by the scarcity of empirically validated treatment protocols. Multisystemic therapy (MST), an evidenced based intensive psychotherapeutic treatment employed in the management of conduct disorder, has been shown to be both reproducibly effective and useful at mitigating a diversity of antisocial and delinquent behaviors.[1,2] Literature has revealed varying treatment responses to MST in delinquent juveniles.[3] JSOs remain a particularly difficult group to treat. At present, limited literature has been published on the effectiveness of treatments for juveniles who commit sexual offenses, and guidelines on their management have been, to a substantial degree, extrapolated from nonoffender conduct disorder data.

MST is an intensive clinical treatment program assessing environmental factors associated with a participant's family, school, and community.[4] The basic principle of MST includes the involvement of caregivers to achieve and maintain positive outcomes. MST focuses on providing resources to address adverse factors in the juvenile's environment (financial stress, family functioning, negative peer influence, criminogenic determinants) and enable caregivers to develop certain desired skills. MST is delivered by a team composed of Master's level psychotherapists and Master's or Doctoral level supervisors and administrative support. Psychotherapists have a set caseload, routinely between four and six families, with treatment durations varying from three to six months. MST is designed as an individualized treatment with nine principles underlying its framework (Table 1).[4] If JSOs are responsive to MST, understanding the degree of responsiveness and related treatment characteristics may be useful to guide the clinical communities that deliver MST. It is important to assess the effectiveness of MST in JSOs to reevaluate current practices of treatment in this highly vulnerable population and address

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Table 1 Principles of MST[4]

Principles	Description
Finding the fit	An assessment is made to understand the "fit" between identified problems and how they manifest and make sense in the entire context of the family's environment. Assessing the fit of youth and parent successes also helps guide the treatment process.
Focusing on positives and strengths	MST emphasize the positives they find and use strengths as levers for positive change. Focusing on family strengths has numerous advantages, such as building on strategies the family already use, instilling hope, identifying protective factors, decreasing frustration, and enhancing caregivers' confidence.
Increasing responsibility	Interventions are designed to promote responsible behavior and decrease irresponsible actions by all family members.
Present-focused, action-oriented, and well-defined	Interventions deal with what's happening now in the family's life. Therapists look for action that can be taken immediately, targeting specific and well-defined problems. Family members are expected to work actively toward goals by focusing on present-oriented solutions, rather than gaining insight or focusing on the past. When the clear goals are met, the treatment can end.
Targeting sequences	Interventions target sequences of behavior within and between the various interacting systems (family, peers, teachers, home, school, and community) that sustain the identified problems.
Developmentally appropriate	Interventions are established appropriate to the youth's age and developmental needs.
Continuous effort	Interventions require daily or weekly effort by family members so that the youth and family have frequent opportunities to demonstrate their commitment and practice skills. Advantages of intensive regular efforts to change include more rapid problem resolution, earlier identification of when interventions need fine-tuning, continuous evaluation of outcomes, more frequent corrective interventions, and more opportunities for family members to experience success.
Evaluation and accountability	Intervention effectiveness is evaluated continuously from multiple perspectives, with MST team members being held accountable for overcoming barriers to successful outcomes. MST does not label families as "resistant, not ready for change or unmotivated." This approach avoids blaming the family and places the responsibility for positive treatment outcomes on the MST team.
Generalization	Interventions are designed to invest the caregivers with the ability to address the family's needs after the intervention is over. The caregiver is viewed as the key to long-term success. Family members drive the change process in collaboration with the MST therapist.

their complex treatment needs. Additionally, a considerable cost is associated with MST; hence the effectiveness of MST is a pertinent factor for policy makers and funding organizations to support this intensive therapy for rehabilitation of JSOs.

Methods

Search Strategy

A comprehensive search was performed adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[5] Authors (R.S. and K.S.) employed Covidence, a screening and data extraction tool for conducting systematic reviews, for this project with searches conducted following a consensus agreement on search terms by the authors.[6] The aim of this study was to pool the maximum number of articles published on MST. We utilized PubMed, CINAHL Complete, APA PsycInfo, Cochrane Library, and Embase databases. The search was conducted from inception through March 3, 2022, for the search terms: "multisystemic therapy" or "multisystemic family therapy." All types of peer reviewed articles published in English generated through the search were included in the screening and review process.

Study Population

The study population comprised youth (<18 years) experiencing problematic sexual behavior or illegal sexual conduct leading to sexual offense charges or a history of being adjudicated for sexual offenses or diversion because of a sexual offense.

Study Selection Criteria

The inclusion criteria were clinical trial designs with at least one comparator arm consisting of alternative psychological and psychosocial treatments; participants below age eighteen years; participant histories of sexual offenses or problematic sexual behaviors; primary outcome related to the treatment interventions (MST versus alternate treatment); and pre-/post-treatment measures and/or follow-up measures. The exclusion criteria were articles published in languages other than English and studies with a comparator arm consisting of medical treatments, such as medications or

chemical or physical castration, for a fair comparison with MST as a psychosocial treatment.

Psychological Treatments

Psychological treatments have emerged as valuable approaches in addressing the complex needs of JSOs. These interventions focus on modifying problematic behaviors and addressing the emotional, cognitive, and social factors contributing to their pathological behaviors. In this comprehensive exploration, various psychological treatments have been tried for rehabilitation of these youth. Among those, MST is an intensive, multi-month, community-based, psychosocial treatment pertinent to this project. All other types of psychological and psychosocial treatments that were investigated in different studies were considered for comparison purposes. These treatments included individual therapy (IT), cognitive behavioral therapy (CBT), group therapy (GT), family therapy (FT), and community treatment (CT). Where applicable, the treatment as usual (TAU) designation was included, and specifically clarified.

Data Extraction and Coding

The articles generated from the search process were screened independently by two reviewers (R.S. and K.S.) on Covidence. A total of 297 studies were selected for screening and review of their titles and abstracts following removal of 245 duplicates. Further analysis of title and abstract deemed that 251 studies were irrelevant based on inclusion-exclusion criteria. The conflicts resulting from the primary screening process (review of the title and abstract) were resolved by a third reviewer (A.B.), who served as a tiebreaker by full text review of the conflicted studies and discussion among authors. Published articles on 46 studies were obtained for full text review by the authors and one study was added to the full text review list from the review of the citations of the excluded studies, making 47 articles for full text review. The search process yielded six studies relevant to the scope and inclusion criteria of this systematic review. The 41 excluded studies were manually reviewed for relevant citation according to the inclusion criteria. The PRISMA flow diagram of this systematic review is elaborated in Figure 1

Each eligible study based on the inclusion criteria was coded by the first author (R.S.) on varying study components pertinent to author information, study design, sample characteristics, interventions studied, treatment characteristics, and study outcomes (see Table 2). Sample characteristics included sample size, mean participant age (years), sex composition, race distribution, and sexual offense history. The intervention characteristics, both for the MST and the comparator arm(s), included participant distribution ratio, treatment setting, treatment duration, and follow-up period. The effect size of MST in comparison to alternate intervention arms was the primary outcome for which data were sought from included studies.

Results

Four randomized controlled clinical trials assessing the effectiveness of MST in comparison to another treatment were generated from this review process.[7–10] Two additional studies comprising longitudinal follow-up of two of the four primary studies were also collected.[11,12] A descriptive summary of our findings is given in Table 2.

The four primary studies derived from the review represented 231 youth (mean age range: 13.4 to 14.6 years; weighted mean: 14.34 years). Males represented a majority of the sample in each study (range: 95.8% to 100%; weighted mean: 97.25%). Caucasians and Blacks comprised the leading racial groups among the included studies (range: Blacks: 27.1% to 54%, Caucasians: 44% to 72.9%; weighted means: Blacks: 45.73%, Caucasians: 51.52%).

The studies differed in their sexual offense outcomes. Letourneau and colleagues[8] investigated the problematic sexual behaviors through the Adolescent Sexual Behavior Inventory (ASBI) and collected data on youth's deviant sexual interests and sexual risk/misuse subscales by their self-reports and caregivers reports at 6 and 12 months. The MST group showed significant reduction ($P < .001$) on both the subscales at month 12 on both self and caregivers report relative to their TAU counterparts. A second-year follow-up study on the same cohort revealed that both youth and their caregivers in the MST arm reported fewer problematic sexual behaviors (divergent sexual interest and sexual risk or misuse) when compared with their TAU counterparts.[11] Borduin and colleagues[9] considered arrests for sexual offenses as a primary outcome measure. The MST cohort showed 83 percent fewer arrests for sexual crimes and 80 percent fewer days in detention facilities than the comparison group participants. In an 8.9-year follow-up period, 45.8 percent of participants had been arrested at least once for sexual crime in the community

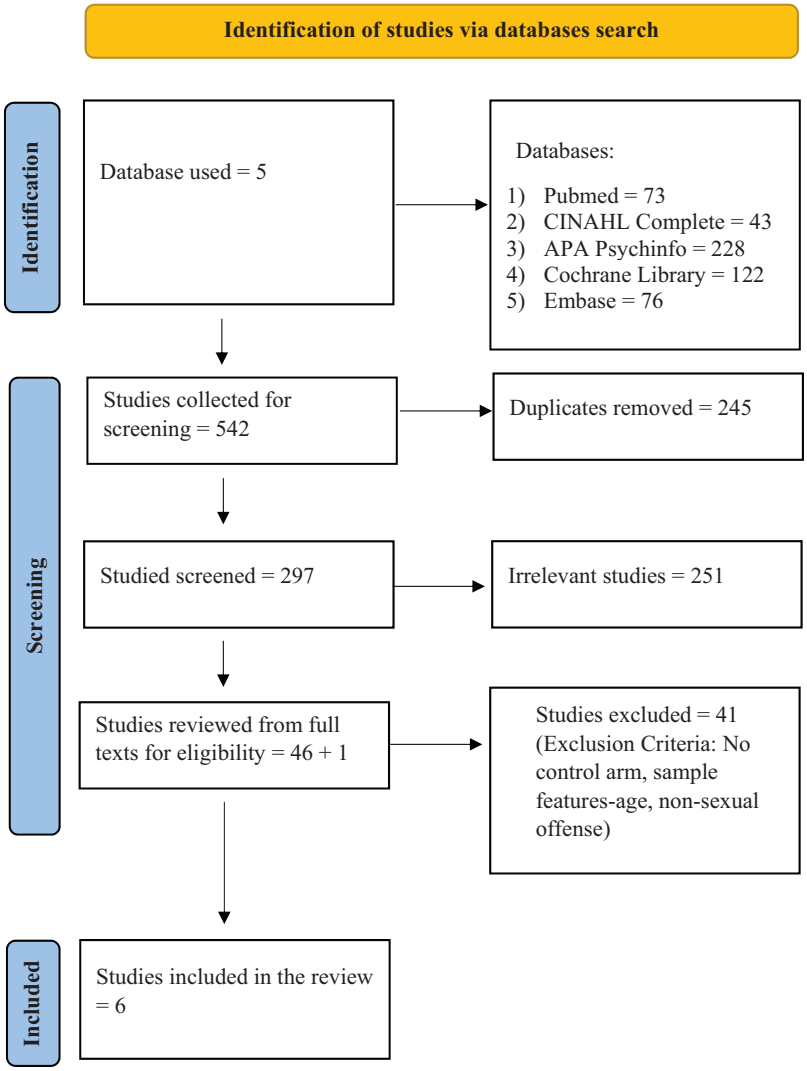

Figure 1. Results of the systematic review according to Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guideline.

service group compared with only 8.3 percent of participants in the MST group. A long-term follow-up study (24.9 years) for the same participants revealed that the rates of sexual offenses (sexual charges or crimes) were 13.13 times higher for participants in the comparison group, who were 8.27 times more likely to have an arrest for sexual offenses.[12] Another study by the same author in 1990 compared MST with IT in adolescent sexual offenders and found MST superior to IT with respect to recidivism (MST versus IT: 12.5% versus 75% ($P < .04$)) and rearrest frequency (MST vs. IT: mean = .12 vs. 1.62 ($P < .027$)).[7] This study utilized the recidivism for sexual offenses as an outcome, which was determined from the rearrest history obtained from the records of juvenile court, adult court, and the state police following referral for treatment; the rearrest frequency was not defined distinctly by the authors.

Discussion

To our knowledge, this is the first literature review assessing the effectiveness of MST in clinical trials of JSOs. Our findings, which are based on the literature and included six randomized controlled trials (two of which are extensions of primary studies), yielding 403 observations of 231 participants, have important clinical and research implications. We found significant differences in juvenile sexual offense measures between MST and the alternative treatments reviewed. CBT and IT were found to be no better than TAU for the measures studied. MST was shown to outperform TAU, CBT, and IT.

Table 2 Summary of Studies on MST

	Study Details		Sample Characteristics					Treatment Characteristics					
No.	Study	Design	Sample Size	Mean Age (SD) (Yrs)	% Male	Race Distribution (White/Black/ Hispanic)	Sexual Offense Criterion (Mean)	Comparison Arm	Participant Distributions: Comparison/MST	Treatment Setting	Treatment Duration (Mean (SD))	Follow-up	Outcome
1	Borduin *et al*. 1990 (USA)[7]	RCT	16	14	100%	62.5%/37.5%	Sexual Offense (1.8)	Individual therapy	Comp = 8, MST = 8	Outpatient	MST = 37h, IT = 45h	36 mos	Sexual offenses - Recidivism rates: MST vs. IT: 12.5% vs. 75% ($P < 0.04$), Rearrest frequency: MST vs. IT: Mean = 0.12 vs. 1.62 ($P < 0.027$)
2	Letourneau *et al.* 2009 (USA)[8]	RCT	127	14.6 (1.7)	97.6%	44%/54%/31%	Diverted or adjudicated for sexual offense	Treatment as usual	Comp = 60, MST = 67	Community based	MST = 7.1 mos (2.8), TAU = 14.6 mos (11) (A), 8.2 mos (5.5) (B)	6, 12 mos	MST youth had significantly greater reduction in problematic sexual behavior over time (on ASBI).
3	Borduin *et al.* 2009 (USA)[9]	RCT	48	14 (1.9)	95.8%	72.9%/27.1% /2.1%	Arrests for sexual offense (1.6)	Community service (CBT and IT)	Comp = 24, MST = 24	Community based	MST = 7 mos (2.8), CS = 6.9 mos (4.14)	8.9 yrs	MST participants had 83% fewer arrests for sexual crimes and spent 80% fewer days in detention facilities.
4	Fonagy *et al*. 2015 (UK)[10]	RCT	40	13.4	90%	43%/43%	Problematic sexual behaviors	Treatment as usual	Comp = 19, MST = 21	Community based	MST = 6 mos (1)	8, 12, and 20 mos	Both interventions suggested improvements in problematic sexual behavior (on ASBI and police record)[a]
5	Letourneau *et al*. 2013[b] (USA)[11]	RCT	124	14.7 (1.7)	100%	44%/54%/30%	Diverted or adjudicated for sexual offense	Treatment as usual	Comp = 58, MST = 66	Community based	MST = 7 mos (3), TAU = 12.5 mos (9.9)	18, 24 mos	MST treatment effects were sustained during second year follow up for youth with problematic sexual behavior (on ASBI).
6	Borduin *et al*. 2021[c] (USA)[12]	RCT	48	14 (1.9)	95.8%	72.9%/27.1% /2.1%	Arrests for sexual offense (1.6)	Community service (CBT and IT)	Comp = 24, MST = 24	Community based	MST = 7.1 mos (2.8), CS = 6.9 mos (4.1)	24.9 yrs	MST group: 13.13 times lower rates for sexual offense ($P < 0.01$) and 8.27 times fewer arrests for sexual offenses ($P = 0.02$)

[a]Statistical analysis was not feasible given limited sample strength.
[b]Extension of Letourneau *et al.* 2009[8].
[c]Extension of Borduin *et al.* 2009[9].
Abbreviations: A, probation youth; ASBI, Adolescent Sexual Behavior Inventory; B, diverted youth; CBT, cognitive behavioral therapy; Comp, comparison; h, hours; IT, individual therapy; mos, months; MST, multisystemic therapy; TAU, treatment as usual; UK, United Kingdom; USA, United States of America; yrs, years.

For the measures employed, the beneficial effect of MST was substantial. Among the six studies reviewed, five showed significant reductions in the measures used for sexual offense outcomes. A single study of forty participants, in which 52.5 percent received MST, did not separate from TAU ($n = 40$; MST: 21, TAU: 19) in problematic sexual behaviors as measured by the ASBI and police records.[10] One study revealed 83 percent fewer arrests for sexual crimes as well as 80 percent fewer days in detention facilities.[9] Another study found 13.13 times fewer sexual offenses ($P < .01$) and 8.27 times fewer arrests ($P = .02$) for MST recipients.[12]

While the scope of this project was to assess the effectiveness of MST in a particular cohort of JSOs, one question raised by these robust findings is how MST faired among the non-JSO conduct disorder population. A metanalysis assessing the efficacy of MST in a heterogeneous population of conduct disordered individuals revealed surprisingly modest treatment effects compared with that observed among the JSO population studied here.[3] One explanation for this may be the heterogeneity of measurements. Measures of substance use, theft, and nonsexual violence are difficult to compare with many of the JSO measures. In instances in which the measures were similar, as was the case for arrest and detention, the authors theorize that authorities may be more inclined to pursue arrest and detention of JSOs, as well as to impose longer durations of confinements, than for non-JSOs. If such an idea is valid, we would anticipate untreated JSOs would show higher counts on arrests and other measures than their non-JSOs counterparts, and hence exhibit a pronounced opportunity for MST treatment to demonstrate its effectiveness, as opposed to ineffective treatments or placebo. One means of addressing this question may be for authors to publish MST findings with a secondary analysis comparing these two populations. Barring that, the authors theorize MST may be more effective for JSOs than for CD patients in general.

Of the studies in our review, two employed arrest for sexual offense as an outcome measure, another two employed adjudication or diversion, one used problematic sexual behavior (measured by Adolescent Sexual Behavior Inventory), and one used subsequent commission of a sexual offense. The measures employed are both heterogeneous and display varying advantages. In the circumstances in which offense behavior or problematic sexual behavior is employed, the report of the participant is typically the source. While participant reports may be acceptable for some diagnoses, the JSO population is particularly challenging in this regard, and any intervention which increases underreporting may be misinterpreted as treatment response. When utilizing the report of a family member or guardian, a potential bias of concealment of sexual offenses should be expected and would likely have a similar effect. Alternatively, when employing any law enforcement activity as a surrogate, the equity, partiality, and priorities of the criminal justice system become independent variables. Complicating this, many of the studies employ search of electronic police records as the source. Generally, the legal reporting mechanisms and law enforcement procedures may influence the data's integrity. Any activity which undermines accurate or uniform entry by law enforcement may alter the findings. We acknowledge that there are limited data on these measures and no widely accepted "gold standard" measure. Clinicians may wish to be mindful of the precise measure employed in a study when comparing findings across studies, interpreting study findings, or generalizing findings to their practice setting.

The enduring nature of MST effects on JSOs is also notable. Among those receiving MST, the mean treatment course approximated seven months across studies (7.0 to 7.8 months; weighted mean: 6.84 months) with each study employing a post-treatment assessment at the conclusion of the treatment course. The earliest measure for the studies reviewed occurred at month six while the longest occurred at 24.9 years following treatment conclusion. The beneficial effects of MST relative to the comparator arm were evident by six months in all but one of the studies and continued to separate statistically as much as decades later.[10] One may reason that MST has a relatively rapid onset of action, while also demonstrating a sustained benefit following treatment cessation. As the studies employed a six-to-seven-month treatment duration, an intensive treatment structure, and a single treatment course, it is unclear whether lengthier, more intensive, or repetitive MST would yield any further benefit. Research employing MST of different durations, repeated courses of MST or MST administered with varying degrees of intensity may be informative. Clinicians might consider extended, intensive, or repeated MST courses for repeat offenders or those with severe symptoms because of a lack of conclusive data on optimal MST duration. The literature suggests the treatment timeframe of four to six

months.[13] While most studies observed an average MST duration of seven months, the effectiveness of prolonged MST remains undocumented. It is important to note the financial and logistical challenges posed by MST's intensity, potentially affecting the feasibility of extending this treatment approach. When examining study design and methodology, employing a cross-over study design might pose challenges. Starting with TAU, CBT, or IT before transitioning to MST is plausible. But the reverse could be problematic because of MST's prolonged onset and lasting treatment impact. The significant duration for which MST remained effective, years or decades following treatment conclusion, may make a treatment wash-out period impractical.

The sample studied is notable in several respects. There was a significant representation of Blacks and Caucasians, as well as males, in these studies (range: Blacks: 27.1% to 54%, Caucasians: 44% to 72.9%; weighted means: Blacks: 45.73%, Caucasians: 51.52%). This sample mirrored that of broader literature on juvenile delinquents.[14] While sexually offensive behaviors, convictions, or arrests were significant events, studies of sexual offenders have revealed these to be relatively infrequent for any given offender. Based on these observations, there seems to be a need for creation of more refined measures for assessing sexual offense treatment, including the use of long catchment periods to observe for sentinel measures, assessing the practices of law enforcement over time and across regions, and conducting further research assessing whether, and to what degree, race and gender factor into juvenile sexual offense metrics. Effective assessment of sexual offense treatment requires a multifaceted approach, blending individual evaluations with broader societal indicators. Direct measures capture changes in deviant sexual interests, while risk assessment tools predict reoffending probabilities. Other scales gauge the offender's understanding of the impact on victims. Feedback from therapists and the community adds depth to the evaluations, and monitoring post-treatment behavior gives insights into reintegration success. A combination of these ensures a holistic understanding of treatment outcomes.

Regarding the role of gender, some have argued that females may be under recognized because of societal tendencies to dismiss women as potential victimizers, among other factors.[15,16] Additionally, sex offenders have historically been overwhelmingly thought to be males, a finding consistent with the sample studied.[16] While the literature highlights male-predominant samples in studies, gender as an independent factor influencing the treatment outcomes should be considered when interpreting the results.[17] Blacks have historically been highly represented in literature on conduct disorder and some have argued that diagnostic bias has increased the likelihood of clinicians making the conduct disorder diagnosis in that race.[18] Racial disparities pervade numerous areas of mental health and the justice system. Historically, diagnostic practices have sometimes differed across racial lines, potentially leading to misdiagnoses or over-diagnoses among certain racial groups. Additionally, within the juvenile justice system, Black and Hispanic youth often face disproportionate rates of prosecution and more severe sentencing compared with their White counterparts.[19]

A less controversial factor of note is the requirement for involvement by family or guardians in MST. The presence of accessible familial support may serve as a potential confounder in evaluating MST participant outcomes. We note that our sample mirrored that of the literature on the subject generally, and that some caution may be needed when applying these findings to populations poorly represented in the samples reviewed (such as youth from geographic regions other than those studied and certain racial groups), as well as to populations from the regions with varying sociopolitical attitudes toward the rehabilitation of sex-offending youth.[14]

Additionally, age of study participants was reviewed and was notably uniform (mean age range: 13.4 to 14.6 years; weighted mean: 14.34 years). Given the uniformity of age, it is unclear whether, and to what degree, participant age may be an independent factor in treatment response. Among the studies reviewed, precise data on individual study participants was unavailable. Although a consistent age range is evident in multiple studies, the justification for selecting a specific age bracket is not elaborated in the literature. It could be hypothesized that as adolescents approach adulthood, the impending transition to independence and the potential for adult court evaluations regarding offenses may factor into the considerations for study parameters. Furthermore, younger children may be more susceptible to being victims rather than offenders because of their developmental immaturity. Considering that numerous offenders have experienced victimization in their past, such experiences may influence them to display offending behaviors, as suggested by our mean

age group data. Consequently, definitive age-response relationships cannot be ascertained from this dataset. Moreover, the representation of participants in any given age is unclear aside from participants uniformly being under 18 years of age at study initiation. Subsequent research may benefit from authors employing secondary analysis of age-response relations, including data for specific age populations in their studies and sampling of participants of varying ages.

Both MST and community-based treatment showed improvement with problematic sexual behavior in one of the studies cited.[10] This study was notable in several respects. The MST arm outperformed the TAU arm, though to a degree later determined not to separate statistically. While out of home placement was comparable in both the MST ($n = 2$) and TAU groups ($n = 2$), the MST group showed no conviction of sexual offense in comparison to TAU ($n = 1$; P value calculation not published). The TAU arm demonstrated some improvement over that of the pretreatment level of impairment. This study had the second smallest sample size of the six studies reviewed (MST: 21, TAU: 19). While caution should be applied whenever interpreting neutral results in a positive light, we suggest withholding judgment on this study until it reaches completion, and hypothesize that the small sample size, duration, choice of primary outcome measure, and possibly other factors may make this study underpowered. Clinicians are encouraged to examine further data if it becomes available from Fonagy, *et al.*[10]

Our conclusions are limited by the availability of studies. Despite employing the MST as the sole initial search criteria, an orthodox inclusion-exclusion criteria, and utilizing five databases to broaden the literature pool, only six citations in total were found, of which two were extensions of an initial group of four. We limited searches to articles published in English, though no articles were found in other languages which otherwise met our search criteria. One may reasonably argue that there are presently limited data on MST in JSOs and that further research is indicated generally. Despite these limitations, our review suggests MST is an effective treatment for JSOs. Additionally, the published studies highlight the strength of sample size, which is often a limitation in clinical trials. While efficacy remains an important feature when assessing any treatment, other factors such as treatment availability and cost were not assessed.

In assessing the cost-benefit of MST, several approaches may be considered. Sheidow *et al.*[20] examined the impact of MST on overall health-care utilization. In their cohort, Medicaid enrollees receiving MST experienced fewer hospitalizations, less utilization of emergency services and less overall medical care utilization. An inflation adjusted, per participant yearly savings of $1,617 was observed in their cohort. The current inflation adjusted cost would be $2,410 per participant per year and the corresponding inflation-adjusted savings would be approximately $2,410 for each youth in their cohort. There are also law enforcement, judiciary, and detention costs incurred among the population appropriate for MST. Dopp *et al.*[21] revealed a net savings to taxpayers for these services, showing a savings of $3.31 for every $1 of MST treatment cost. Some caution may be required when assessing cost estimates. At present, however, there are no cost-benefit studies available related to use of MST in JSOs, and, besides those cited, few studies assess MST's cost-benefit features. Alternatively, the psychological impact of sexual offenses on society defies easy measure and may justify even substantial costs.

Choosing treatment methods for sexual offenders prominently involves fairness considerations. If our findings are true of MST in general, some caution may be needed when devising subsequent research. From our findings, CBT, IT, and TAU provide minimal benefit to the participants studied. Alternatively, MST appears to be reproducibly effective. Assuming each treatment adheres to its standard practices, our comparison evaluates them based on their typical administration. MST is commonly applied over six to seven months, whereas the duration for CBT and IT can fluctuate related to clinician or patient preferences. Even if the time frames differ, it is pertinent to contrast them based on real-world application standards, ensuring the comparison is representative of practical scenarios. Future research will need to consider whether failing to apply MST, as may transpire in a prospective randomization, is ethical, given the existing evidence base for MST and its alternatives. We suggest that quasi-experimental MST studies, retrospective cohorts, or, when resources are limited, comparators with a waitlist, may be ethical solutions.

Of the studies reviewed, three were conducted in the United States (South Carolina, Missouri, and Maryland) and one in Europe (Great Britain). As each study employed a law enforcement measure, it is unclear if the findings from one region may be generalizable to another. The study conducted in Great Britain revealed no difference between MST

and TAU, while the other three studies showed similar positive results with MST.[10] In the Great Britain study, 40 individuals were enrolled, approximately half of whom received MST. Consequently, the study lacked sufficient statistical power to conclusively demonstrate the efficacy of MST compared with alternative treatment offered. The difference was not significant enough to establish a statistical significance, although no *P* value was reported in the study. Our primary contention is that the limited sample size makes it challenging to draw definitive conclusions from this study. A more robustly powered investigation might have yielded different results or provided greater confidence in confirming the effectiveness of MST compared with other treatments. Moreover, several differences between this study and the other five reviewed studies were identified, possibly influenced by variations in law enforcement, legal justice system practices, and health-care delivery among countries. In Sweden and Norway, youth offenders are primarily assisted through a child welfare approach, where legal sanctions are not imposed on individuals.[4] Instead, they are referred to social services, leading to more frequent utilization of in-home services. This differs from the United States, where youth offenders are processed within the juvenile justice system. Hence, we propose caution about generalizing our findings to regions other than those studied.[22] Clinicians who wish to employ MST should be aware that the specific practices or epidemiology of juvenile sexual offenses may be a factor in treatment effectiveness.

Conclusions

Most of the available evidence depicts MST as an effective treatment for JSOs. The onset of action of MST appears to be rapid, perhaps as little as months following treatment initiation, while the beneficial effects of MST are long-lasting, perhaps years to decades following termination of treatment. Measures commonly used in studies of the use of MST for conduct disorder were applied in presently available studies of the use of MST with juvenile sex offenders, although additional measures of effectiveness are likely warranted because of the limitations described. This review provides a comprehensive summary of the limited existing literature on MST in JSOs and identifies areas for additional research. Until further data become available, the present state of knowledge suggests MST as a best practice for the management of juvenile sex offenders.

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