

In Review

Treating Nonsuicidal Self-Injury: A Systematic Review of Psychological and Pharmacological Interventions

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Objective: Nonsuicidal self-injury (NSSI), the deliberate, self-inflicted damage of bodily tissue without the intent to die, is associated with various negative outcomes. Although basic and epidemiologic research on NSSI has increased during the last 2 decades, literature on effective interventions targeting NSSI is still emerging. Here, we present a comprehensive, systematic review of existing psychological and pharmacological treatments designed specifically for NSSI, or including outcome assessments examining change in NSSI.

Method: We conducted a systematic search of PsycINFO, MEDLINE, and ERIC databases to retrieve relevant articles that met inclusion criteria; specifically, uncontrolled and controlled trials that 1) presented quantitative outcome data on NSSI, and 2) clearly differentiated NSSI from suicidal self-injury (SSI). Consistent with the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, definition of NSSI, we excluded studies examining populations with developmental or intellectual disabilities, or with psychotic disorders.

Results: Several interventions appear to hold promise for reducing NSSI, including dialectical behaviour therapy, emotion regulation group therapy, manual-assisted cognitive therapy, dynamic deconstructive psychotherapy, atypical antipsychotics (aripiprazole), naltrexone, and selective serotonin reuptake inhibitors (with or without cognitive-behavioural therapy). Nevertheless, there remains a paucity of well-controlled studies investigating treatment efficacy for NSSI.

Conclusions: Structured psychotherapeutic approaches focusing on collaborative therapeutic relationships, motivation for change, and directly addressing NSSI behaviours seem to be most effective in reducing NSSI. Medications targeting the serotonergic, dopaminergic and opioid systems also have demonstrated some benefits. Future studies employing controlled designs as well as a clear delineation of NSSI and SSI will improve knowledge regarding treatment effects.



Traiter l'automutilation non suicidaire : une revue systématique des interventions psychologiques et pharmacologiques

Objectif : L'automutilation non suicidaire (AMNS), c'est-à-dire les dommages délibérés et auto-infligés aux tissus corporels sans intention de mourir, est associée à divers résultats négatifs. Bien que la recherche basique et épidémiologique sur l'AMNS ait augmenté au cours des 20 dernières années, la littérature sur les interventions efficaces ciblant l'AMNS est encore naissante. Ici, nous présentons une revue systématique exhaustive des traitements psychologiques et pharmacologiques existants conçus spécifiquement pour l'AMNS, ou incluant des évaluations de résultats examinant le changement de l'AMNS.

Méthode : Nous avons mené une recherche systématique dans les bases de données PsycINFO, MEDLINE, et ERIC pour extraire les articles pertinents qui satisfaisaient aux critères d'inclusion; spécifiquement, les essais incontrôlés et contrôlés qui 1) présentaient des données quantitative de résultats de l'AMNS, et 2) différenciaient nettement l'AMNS de l'automutilation suicidaire (AMS). En conformité avec la définition de l'AMNS du Manuel diagnostique et statistique des troubles mentaux, 5e édition, nous avons exclu les

études qui examinaient les populations souffrant de déficiences développementales ou intellectuelles, ou de troubles psychotiques.

Résultats : Plusieurs interventions semblent prometteuses pour réduire l'AMNS, dont la thérapie comportementale dialectique, la thérapie de groupe de régulation émotionnelle, la thérapie cognitive à l'aide d'un manuel, la psychothérapie dynamique déconstructive, les antipsychotiques atypiques (aripiprazole), le naltrexone, et les inhibiteurs spécifiques du recaptage de la sérotonine (avec ou sans thérapie cognitivo-comportementale). Néanmoins, il demeure que les études bien contrôlées sur l'efficacité des traitements de l'AMNS sont rares.

Conclusions : Les approches psychothérapeutiques structurées axées sur les relations thérapeutiques de collaboration, la motivation de changer, et qui abordent directement les comportements d'AMNS semblent être les plus efficaces pour réduire l'AMNS. Les médicaments ciblant les systèmes sérotoninergique, dopaminergique et opioïde ont également démontré des avantages. Les futures études employant des méthodes contrôlées ainsi qu'une nette délimitation entre AMNS et AMS amélioreront nos connaissances sur les effets des traitements.

Research on how to effectively treat NSSI is urgently needed. Defined as the deliberate, self-inflicted destruction of body tissue without suicidal intent and for purposes not socially sanctioned,¹ common forms of NSSI include self-cutting, burning, scratching, and self-hitting, with resulting injuries ranging from superficial wounds to severe and permanent mutilation. Recent efforts to address gaps in the current knowledge have culminated in the inclusion of NSSI in section III of the DSM-5² as a condition for future study, and emerging research^{3,4} supports this classification. This official recognition in the psychiatric nomenclature reflects the prominent and serious nature of the behaviour.

NSSI occurs in both clinical and nonclinical populations.⁵ Between 4% and 5.9% of adults in community samples have self-injured at least once in their lives.^{6,7} Rates of NSSI are notably elevated among younger people,

including pre-adolescents (7.7%)⁸ and adolescents (13.9% to 35.6%).⁹⁻¹³ A recent study, using the suggested DSM-5 criteria, indicated that 6.7% of adolescents potentially qualify for a diagnosis of NSSI disorder.¹² Prevalence estimates of NSSI in clinical populations range from 12% to more than 80% in psychiatric patients.¹⁴⁻¹⁷ Given that comprehensive reviews have documented the demographic, epidemiologic, and diagnostic features associated with NSSI,^{5,15} this information is not presented here.

Despite the clinical seriousness and prevalence of NSSI in medical and mental health settings, no current treatment for NSSI qualifies as empirically supported, efficacious, or well-established, according to criteria from the American Psychological Association Task Force^{18,19}; see also Nock,⁵ Klonsky and Muehlenkamp,¹⁵ and Muehlenkamp.²⁰ This relatively underdeveloped empirical base regarding treatment for NSSI is concerning, particularly as this behaviour is associated with various negative outcomes. One particular area of concern is the concurrent²¹⁻²³ and

Abbreviations

| | |
|------|---|
| BPD | borderline personality disorder |
| CBT | cognitive-behavioural therapy |
| DBT | dialectical behavioural therapy |
| DDP | dynamic deconstructive psychotherapy |
| DSM | Diagnostic and Statistical Manual of Mental Disorders |
| ERGT | emotion regulation group therapy |
| MACT | manual-assisted cognitive therapy |
| MBT | mentalization-based therapy |
| NSSI | nonsuicidal self-injury |
| RCT | randomized controlled trial |
| SFT | schema-focused therapy |
| SNRI | serotonin-norepinephrine reuptake inhibitor |
| SSI | suicidal self-injury |
| SSRI | selective serotonin reuptake inhibitor |
| TAU | treatment as usual |
| TFP | transference-focused psychotherapy |
| VMT | voice-movement therapy |

Clinical Implications

- Brief psychotherapeutic and pharmacological interventions can be effective for reducing NSSI.
- It may be necessary to treat comorbid disorders before using medication to directly address self-injury.
- Whenever possible, interventions that have been supported by level-1 evidence should be offered before trying other interventions.

Limitations

- There is a dearth of well-controlled studies investigating treatment efficacy for NSSI.
- Many treatment studies have relied on very small samples, possibly limiting generalizability of their findings.
- Many treatment studies conflate operational definitions and measurement strategies of NSSI and SSI, obscuring knowledge regarding NSSI-specific outcomes.

prospective^{24,25} associations of NSSI with suicidal thoughts and behaviours. Between 55% and 85% of people with a history of NSSI also report suicidal behaviour,^{26,27} and higher frequencies of NSSI are associated with an increased risk of suicide attempts.²⁸ Further, the overall functional impairment and psychopathology associated with NSSI is significant.⁴

Although NSSI and suicidal behaviour have similar behavioural features, several researchers have argued for the importance of a distinction between self-injury with and without suicidal intent.^{29–31} Acts of NSSI and SSI can be distinguished along several facets, including intention, frequency, medical severity, and methods.^{32–34} Additionally, NSSI characteristically occurs without suicidal ideation.^{7,35}

Despite growing recognition that NSSI and SSI are distinct (albeit related) phenomena, most intervention studies focused on self-injury have used definitions and assessment methods that fail to differentiate between these behaviours. As a result, the target of treatment in these studies is often unclear.¹⁷ Terms such as parasuicide, deliberate self-harm, and self-injurious behaviour sometimes refer to NSSI and sometimes to a broader category of behaviours, including both SSI and NSSI. This lack of consistent terminology hampers comparability across studies, and makes it difficult to determine whether treatment results in changes in NSSI, SSI, or both.

Previous empirical treatment reviews typically have provided separate coverage of pharmacological and psychological treatments,^{20,36,37} and some are limited to particular (for example, adolescent)^{38,39} populations. These previous reviews highlight the following:

- 1) a lack of well-established pharmacological treatments for NSSI,^{36,37}
- 2) a failure to maintain improvements on treatment termination,^{20,40} and
- 3) the lack of consistently superior outcomes for specific interventions, compared with TAU.^{5,39}

However, to date, most reviews have included studies that conflate NSSI with SSI. Therefore, there is a pressing need for a current snapshot of the findings on treatments' effects specific to NSSI.

Here, we provide a comprehensive, systematic review of the empirical literature on psychological and pharmacological treatments for NSSI in both adolescent and adult populations. Given the emerging nature of NSSI research, terminological clarity is essential for guiding appropriate assessment and intervention.^{33,41} As such, we employed a conservative definition of NSSI to ensure that our findings pertain specifically and uniquely to NSSI. Further, we evaluated the relative strength of support for various treatments to provide practical recommendations for clinical practice and research.

Method

Literature Search

We used MEDLINE, ERIC, and PsycINFO search engines to identify sources of interest. Search terms included one of the following: “self-injur*,” “self-harm*,” “self-mutilat*,” “self-wound*,” or “parasuicid*”; and one of the following: “intervention,” “*therapy,” “treatment,” or “medication.” We limited results to empirical or quantitative studies. To identify additional sources, we consulted reference lists of recent review articles investigating treatments for NSSI.^{5,17,20,36–40,42–51} Given the frequent co-occurrence of BPD and NSSI, we also screened published studies of psychotherapies that have garnered support in populations with BPD, including DBT, MBT, TFP, and SFT, by conducting literature searches in the same databases, and by examining a list of studies examining DBT compiled by Behavioral Tech, LLC.⁵²

Inclusion and Exclusion

Studies were included in this review if they were published in the English language, included human subjects, presented quantitative outcome data on NSSI, used an uncontrolled (pre–post) or controlled-trial design, and clearly differentiated NSSI from SSI in the operationalization and measurement of NSSI. We excluded unsystematic clinical case reports, owing to potential bias and lack of experimental control. To maximize comprehensiveness, we included studies of treatments directly targeting NSSI, as well as those in which the treatment addressed other mental health problems (for example, depression and BPD), but outcomes related to NSSI were assessed. Consistent with the DSM-5 definition of NSSI,² we excluded papers focusing on populations with developmental or intellectual disabilities, or with psychotic disorders. We also excluded articles focusing on acute care for NSSI (for example, wound care, and emergency department or psychiatric assessment). Finally, we excluded any study that conflated NSSI and SSI, including studies that operationally defined self-injury as including all acts of self-injury regardless of the behavioural intention, that employed one metric to assess both outcomes (for example, counts or rates that included but did not distinguish between these types of self-injury), or that used measures that failed to distinguish between NSSI and SSI (for example, the Overt Aggression Scale⁵³).

Levels of Evidence

Once a preliminary set of articles had been identified, we categorized the level of evidence presented in each paper using the United States Preventive Services Task Force criteria.⁵⁴ According to this schematic, level I evidence denotes having at least one well-designed RCT supporting a treatment's possible efficacy. Level II-1 requires a well-designed controlled trial without randomization, level II-2 requires at least one well-designed cohort or case–control study, and level II-3 requires a multiple time series design. We excluded level III evidence (opinions of respected

authorities based on clinical experience or descriptive studies) from our review.

Results

Search Results

A flow chart diagramming our systematic review process is presented in Figure 1. Online eTable 1 summarizes results from the 40 unique studies (including 3 sets of 2 articles reporting on overlapping samples) included in this review.

Levels of Evidence

We identified 15 sources that presented level I evidence, 3 that presented level II-1 evidence, 18 that presented level II-2 evidence, and 3 that presented level II-3 evidence.

Psychotherapy for Nonsuicidal Self-Injury

Empirical evidence was available for 6 types of psychotherapy: DBT, ERGT, MACT, TFP, DDP, and VMT. We excluded several studies of well-known, manualized treatments (for example, MBT and SFT) owing to consistent use of operational definitions or outcome measures that failed to clearly differentiate between NSSI and SSI.

DBT involves a combination of individual and group treatment, in addition to a therapist consultation team and the availability of therapists between sessions for coaching and assistance with effective skill use.^{55,56} DBT prioritizes reducing life-threatening behaviours, and several studies have demonstrated that DBT leads to greater reductions in NSSI and SSI (considered together), compared with TAU.⁵⁷⁻⁶⁰ We identified several empirical investigations of DBT (including 4 RCTs, 2 non-RCTs, and 10 uncontrolled trials) that distinguished NSSI from SSI in their outcome measures. However, results regarding the efficacy of DBT in treating NSSI have been mixed. Although uncontrolled trials generally suggest that DBT reduces rates, frequency, and urges to engage in NSSI,^{34,61-66} 2 RCTs found that reductions in NSSI frequency were not statistically greater than those achieved in active control conditions.^{67,68} Conversely, however, 2 other RCTs demonstrated that DBT led to greater reductions in NSSI frequency than TAU.^{69,70} Regarding NSSI rates, whereas one RCT⁷⁰ noted greater reductions in rates of NSSI in DBT, compared with TAU, another study did not detect any such differences.⁶⁹ When reductions in NSSI are achieved during DBT, they are often sustained 6 to 12 months after treatment.^{67,69,70} Although we identified several uncontrolled studies investigating adaptations of DBT across various populations (for example, adolescents and patients with eating disorders) and settings (for example, inpatient and forensic), RCTs have thus far been limited to predominantly female adult outpatients with BPD. Thus it is unclear at this time whether the promising results achieved in uncontrolled trials of DBT are related to differences in the efficacy of DBT for NSSI across populations, or to differences in research designs, particularly given that controlled studies have used active treatment rather than wait-list control conditions. Investigations regarding potential mediators and moderators

of treatment outcome for NSSI may help to clarify these contradictory findings. Currently, the available evidence suggests that while DBT confers considerable benefits in reducing BPD symptoms and associated psychopathology, findings are mixed on whether DBT outperforms active control conditions in the reduction of NSSI specifically.

ERGT is the only other psychotherapy that has been evaluated for its effects on NSSI in more than one controlled trial. Administered in a 14-week group format, ERGT focuses on the development of emotion regulation and acceptance skills, as well as on strategies to identify and pursue important goals and values.⁷¹ We identified 2 RCTs indicating that ERGT resulted in significantly greater reductions in NSSI frequency, compared with TAU.^{71,72} Further, 47% of the patients who received ERGT abstained from NSSI throughout a 9-month follow-up, supporting the durability of treatment effects.⁷² An uncontrolled ERGT trial also demonstrated significant reductions in NSSI frequency and increased rates of NSSI abstinence from pre- to posttreatment.⁷³ All of the women in these clinical samples had a history of NSSI, and most (74% to 100%) met criteria for BPD.

Investigations of the other 4 psychotherapies reviewed (MACT, VMT, DDP, and TFP) are each limited to a single study; as such, confidence in their findings is contingent on further replication. MACT is a brief (typically 6 sessions), structured, problem-solving treatment, including individual therapy and bibliotherapy.⁷⁴ Although MACT has been evaluated in 2 major RCTs,^{74,75} the outcome measures did not differentiate NSSI from SSI, and thus the studies were not included in our review. However, a smaller RCT indicated a significant advantage of MACT, compared with TAU, in reducing NSSI frequency among female adults with BPD.⁷⁶

VMT is an integrated expressive arts therapy that aims to reduce emotion dysregulation and increase self-awareness via sound-making, singing, expressive writing, massage, movement, and drama activities.⁷⁷ An uncontrolled, within-group, time-controlled trial suggested that female young adults engaged in less frequent NSSI while receiving 10 weeks of VMT, compared with during the 10-week pretreatment period.⁷⁸ The diagnostic characteristics of this sample were not reported.

DDP is a manualized psychodynamic treatment for BPD patients with challenging co-occurring conditions that uses weekly individual sessions to increase clients' capacity to describe affective and interpersonal experiences in coherent narratives.⁷⁹ In a small RCT of adults with BPD and co-occurring substance disorders, in which only 7 participants reported engaging in NSSI prior to treatment, 3 (57.1%) reported abstaining from NSSI during the final 3 months of DDP.⁸⁰ Moreover, among these participants, the frequency of NSSI within the final 3 months of DDP treatment was significantly less than the frequency in the 3 months prior to treatment.⁸⁰ Unfortunately, comparisons of NSSI-related outcomes in the DDP and the control group were not carried out.

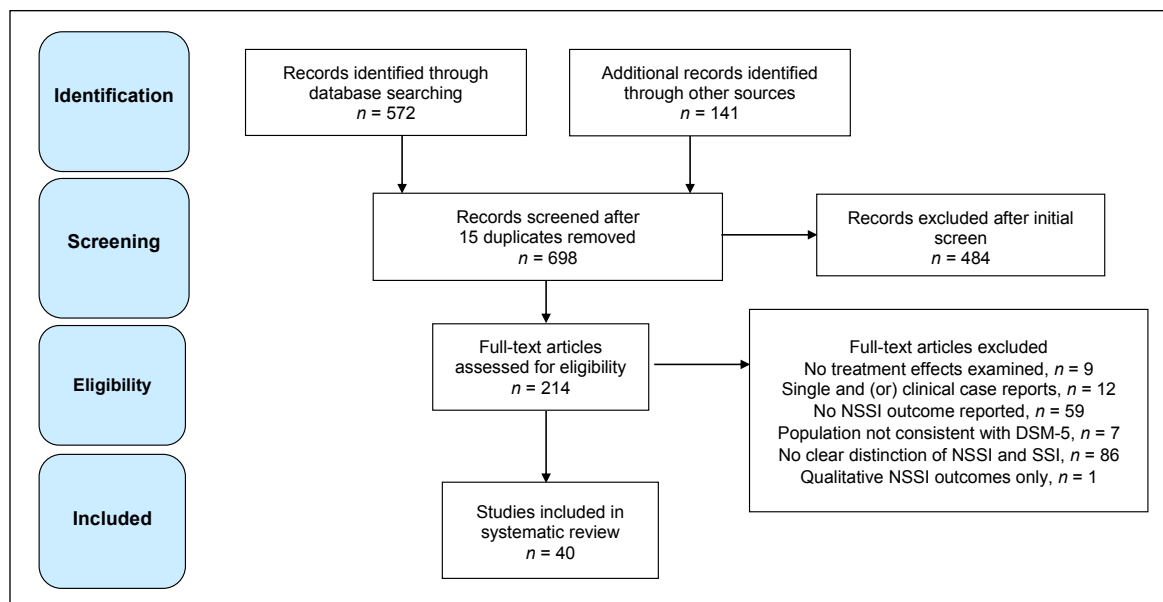
Figure 1 Flow chart depicting inclusion and exclusion process

Figure adapted from Moher et al¹⁰⁸; the PRISMA Statement and the PRISMA Explanation and Elaboration document are distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DSM-5 = Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; NSSI = nonsuicidal self-injury; SSI = suicidal self-injury

TFP is a psychodynamic treatment involving twice-weekly individual treatment using transference in relationships (therapeutic and other) as a vehicle for therapeutic change.⁸¹ Results from one uncontrolled trial of TFP for females with BPD indicated significant pre- to posttreatment reductions in the severity, but not frequency, of NSSI.⁸² Unfortunately, controlled studies of TFP^{83,84} did not meet our inclusion criteria, as NSSI was not clearly differentiated from SSI in these trials.

Pharmacotherapy for Nonsuicidal Self-Injury

Empirical evidence regarding psychopharmacological effects on NSSI was available for 5 drug classes: SSRIs (for example, fluoxetine), atypical antipsychotics (for example, aripiprazole and ziprasidone), SNRIs (venlafaxine), opioids (buprenorphine), and opioid antagonists (naltrexone).

Only 1 RCT has evaluated the efficacy of medication for reducing NSSI specifically, demonstrating that, among adults with BPD, more participants abstained from NSSI during treatment with aripiprazole and at the 18-month follow-up, compared with those receiving a placebo.^{85,86} Specifically, only 2 of the 26 patients engaged in NSSI during 8 weeks of aripiprazole treatment, and 4 engaged in NSSI during the 18-month follow-up (compared with 5 from the placebo group who engaged in NSSI during treatment, and 11 reporting NSSI during follow-up). Similarly, a non-RCT⁸⁷ found that another atypical antipsychotic (ziprasidone) resulted in lower rates and frequency of NSSI in self-injuring adolescents, compared with alternative neuroleptic medications (for example, risperidone, olanzapine, chlorpromazine, and promethazine).

Regarding nonantipsychotics, a case-controlled, multiple-baseline trial showed that the rates and frequency of NSSI decreased significantly during augmentive naltrexone treatment in adults with BPD, compared with at baseline.⁸⁸ Several uncontrolled trials have also reported benefits for venlafaxine, buprenorphine, fluoxetine, and naltrexone in reducing NSSI frequency and (or) increasing rates of NSSI abstinence,⁸⁹⁻⁹² but replication with controlled designs is necessary to support these findings.

Combination Treatments for Nonsuicidal Self-Injury

Two RCTs have evaluated the incremental benefit of adding CBT to antidepressants (SSRI or SNRI) in treating adolescent major depressive disorder. Both studies concluded that adjunctive CBT did not reduce the likelihood of engaging in NSSI, compared with antidepressants alone,^{25,93,94} and may even increase risk for engaging in NSSI.⁹³ Regarding the supplementation of CBT-oriented treatment with medication, one RCT evaluating DBT + olanzapine, compared with DBT + placebo, for women with BPD identified no incremental benefit of medication for reducing NSSI frequency.⁹⁵

Comprehensive Therapeutic Programs for Nonsuicidal Self-Injury

Two uncontrolled studies have examined the effects of comprehensive treatment programs for adults with BPD or mixed personality disorders.^{96,97} These specialized programs included psychoeducation, pharmacotherapy, and group and individual therapy, and both incorporated DBT skills

training as a component of treatment. Both studies detected significant reductions in rates of NSSI, postintervention (more than 50% and 17% to 25%, respectively).

Other Interventions for Nonsuicidal Self-Injury

Numerous studies have evaluated the effects of treatments that are not formalized as psychotherapy or pharmacotherapy. One recent RCT found that a structured postcard intervention following deliberate self-poisoning significantly reduced suicide-related outcomes; however, it did not reduce the rate or frequency of self-cutting.⁹⁸ Likewise, one naturalistic follow-up study investigated brief (8 to 15 minutes), biweekly psychiatrist-facilitated assertiveness training sessions aimed at helping patients increase their self-acceptance and ability to calmly express their needs and desires. Among the 13 patients with BPD who were treated, 4 (30.7%) reported no NSSI during the final week following 1 to 4 years of treatment.⁹⁹ Finally, one naturalistic, uncontrolled study reported that auricular acupuncture was associated with significant decreases in NSSI frequency among 9 depressed adolescents.¹⁰⁰ Importantly, however, both of these uncontrolled studies were based on very small samples ($n < 15$).

Discussion

Our systematic review highlighted an emerging empirical literature pertaining to psychological and pharmacological interventions for NSSI, and identified several sources of evidence that have not been included in recent NSSI treatment reviews.^{17,38,39} We identified 15 RCTs—widely considered the gold standard in treatment research¹⁹—that evaluated NSSI treatment effects. Our results encourage cautious optimism regarding the possible efficacy of ERGT, MACT, atypical antipsychotics, and SSRIs for reducing NSSI. Additionally, we found that, although DBT is often associated with reduced rates and frequency of NSSI in uncontrolled trials and reduced rates of self-harm more generally (SSI and NSSI considered together), further research is necessary to substantiate its advantage over active control conditions for NSSI specifically.

Although we have provided a comprehensive picture of the current treatment research, more empirical work is required before we can confidently appraise the efficacy or effectiveness of NSSI interventions. Replication is particularly critical, as most of the treatments identified in this review have been investigated in a single study, by a single research team, using small samples and (or) using exclusively BPD samples. Nonetheless, we believe that this review can provide useful guidance for clinicians, as well as directions for future research.

While our results do not identify a clear front-runner treatment for NSSI, there are numerous commonalities among the treatments identified as potentially efficacious. Among psychotherapeutic treatments demonstrating benefits for NSSI, each stipulate that 2 preconditions for treatment are essential: a supportive, collaborative therapeutic relationship; and motivation for treatment.

Consistent with these principles, patients who perceived their therapist as warm and protecting reported fewer episodes of NSSI during the course of DBT.¹⁰¹ Second, and congruent with current theory suggesting that NSSI serves to regulate unwanted experiences,¹⁰² several psychotherapeutic approaches recognized as beneficial in this review incorporate skills acquisition, particularly in the domain of emotion regulation. Although mechanisms of change in treatments for NSSI remain largely unknown, some evidence indicates that the use of DBT skills may mediate a reduction in NSSI during the course of DBT.¹⁰³ It is possible that the use of behavioural skills may similarly mediate the link between other interventions and reductions in NSSI. Third, many advantageous therapies incorporate idiographic functional assessments of the factors that precipitate and maintain NSSI, and directly monitor and target NSSI on an ongoing basis. Supporting these approaches, research has shown that adolescents presenting to emergency services with NSSI respond favourably to a specific, structured assessment strategy.¹⁰⁴

Regarding pharmacological interventions, studies demonstrating the possible benefits of atypical antipsychotics, SNRIs, SSRIs, and naltrexone in reducing NSSI are consistent with neurobiological models implicating disruptions in the dopaminergic, serotonergic, and endogenous opioid systems in NSSI.³⁶ However, conviction in the effectiveness of these medications must be moderated in light of the very small sample sizes for these medication trials. Some previous reviews have advised initially targeting disorders that co-occur with NSSI before using medication to directly address self-injury.^{36,105} Consistent with this recommendation, results of our review suggest that pharmacological treatment of a co-occurring disorder may reduce NSSI, at least in depressed adolescents.^{25,93,94} Unfortunately, there is a paucity of research on clinical decision making regarding which medication to try first, and (or) when psychotherapy should be preferred as a first-line treatment (however, see Plener et al³⁶). This is an important domain for future research to address.

Encouragingly, our results suggest that reductions in NSSI can be achieved with treatments that are relatively brief in nature (ERGT: 14 weeks, MACT: 6 sessions, atypical antipsychotics: 8 weeks, and SSRI with and without CBT: 12 weeks), even among populations that are challenging to treat (for example, BPD and depressed adolescents). Moreover, some studies^{70,76} suggest that initial treatment effects may persist up to 6 months beyond termination. Although cost analyses specific to NSSI have not yet been pursued, treatments that attenuate inpatient admissions and emergency department visits are often cost-effective.⁵⁸ Given that more than one-half of patients who present to the hospital following NSSI or SSI are hospitalized,¹⁰⁶ the development of brief and effective interventions for NSSI holds considerable promise for reducing health care expenditures.

To our knowledge, this review is one of the first to systematically exclude treatment studies that have not clearly differentiated NSSI from SSI. As such, it provides an unambiguous picture of the state of treatment research for NSSI. In addition, this review underscores the pervasiveness of studies conflating NSSI and SSI in their operational definitions and measurement strategies. Nearly 40% of the full-text articles reviewed were excluded because a clear distinction between NSSI and SSI was not made. This highlights a crucial need for future studies to use clear operational definitions, as well as measures that disentangle SSI from NSSI. While many interventions demonstrating benefits for reducing broader classes of self-injury (NSSI and SSI) may also be effective for reducing NSSI specifically, research must directly address this possibility. It is our hope that the inclusion of NSSI disorder as a condition for further research in the DSM-5² will provide additional impetus for such work.

In addition to the use of consistent terminology, we believe 3 considerations are most essential as research on treatments for NSSI progresses. Of primary importance, studies must employ controlled, experimental designs that maximize internal validity to unequivocally demonstrate treatment efficacy in the absence of confounding factors, such as passage of time.¹⁹ Additionally, trials based on larger samples will improve statistical power, generalizability, and the ability to investigate mediators and moderators of treatment outcome. Finally, given that the preponderance of treatment research has been conducted in BPD samples (18 of the 40 studies reviewed here), it is essential to investigate treatment efficacy in other populations that exhibit high rates of NSSI, such as those with depression, anxiety, and (or) eating disorders.

Conclusions

Overall, our systematic review uncovered encouraging evidence of an emerging empirical literature investigating treatments effects for NSSI. Unfortunately, it also highlights systematic problems with terminology and nomenclature that make the literature on self-harm difficult to navigate. Fortunately, as the treatment literature on disorders such as BPD and depression have revealed,¹⁰⁷ building scientific knowledge to guide treatment can occur relatively quickly once potentially effective therapeutic frameworks are formalized and subjected to empirical evaluation.

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