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Clinical Research Article

Drug-facilitated sexual assault, impaired trauma memory, and implications for mental health treatment

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ABSTRACT

Background: Sexual assault (SA) is a highly prevalent global public health problem and a robust predictor of posttraumatic stress disorder (PTSD), substance use disorder (SUD), and suicidality. A large percentage are drug or alcohol facilitated (DFSA), impairing trauma memory and affecting the application of evidence-based treatments. Despite these problems, few have investigated DFSA-specific mental health (MH) needs.

Objective: Goals of this study were (1) to identify psychological sequelae characterizing DFSA towards explaining why symptoms have been treatment-refractory, comparing survivors with involuntary substance ingestion (forced, covert: DFSA-I), voluntary ingestion (DFSA-V), and non-DFSA; and (2) to determine how impaired trauma memory relates to the development of PTSD and depression symptoms.

Method: Data from a retrospective chart review of 74 adults receiving SA MH services at an outpatient trauma center are presented. The sample includes a 2-year cohort seen acutely at an urban rape treatment center. The study is one of the first to examine therapy records beyond case studies for DFSA. Logistic, Poisson, and negative binomial regression analyses of quantitative data and qualitative thematic analysis of trauma cognitions and treatment foci were conducted.

Results: DFSA-V had five times greater odds of SUD, and notable substance-related self-blame compared to DFSA-I. DFSA-I had prominent relationship distress and self-blame for missing danger of perpetrator drugging. Survivors with impaired trauma memory had significantly fewer hyper-arousal and overall PTSD symptoms, and specifically less hypervigilance. No differences were found in re-experiencing symptoms.

Conclusion: Impaired trauma memory is common in DFSA and is associated with fewer baseline hyper-arousal and overall PTS. Despite this, DFSA issues including re-experiencing symptoms that are particularly distressing without the ability to cognitively connect the intrusions contribute to increased treatment needs. Impaired memory limits the application of evidence-based treatments, and collectively these findings call for the development of trauma-specific treatment protocols to enhance recovery for DFSA survivors.

Agresión sexual facilitada por drogas, deterioro de la memoria traumática y sus implicaciones para el tratamiento en la salud mental

Antecedentes: La agresión sexual (AS) es un problema de salud pública mundial de alta prevalencia y es un sólido predictor del trastorno de estrés postraumático (TEPT), del trastorno por uso de sustancias (TUS) y de suicidalidad. Un gran porcentaje de AS son facilitadas por drogas o alcohol (ASFDA), deteriorando la memoria del trauma y afectando la aplicación de tratamientos basados en la evidencia. A pesar de estos problemas, pocos han investigado las necesidades de salud mental (SM) específicas de los ASFDA.

Objetivo: Los objetivos de este estudio fueron; primero, identificar las secuelas psicológicas que caracterizan a las ASFDA para explicar por qué los síntomas han sido refractarios al tratamiento. Para ello, se comparó a sobrevivientes a una ingestión involuntaria de sustancias (forzada, encubierta: ASFDA-I), a una ingestión voluntaria (ASFDA-V), y a una AS no-ASFDA; y, segundo; determinar cómo el deterioro de la memoria del trauma se relaciona con el desarrollo de síntomas del TEPT y depresión.

Método: Se presentan los datos de una revisión retrospectiva de las historias clínicas de 74 adultos que recibieron servicios de SM por AS en un centro de trauma para pacientes ambulatorios. La muestra incluye a una cohorte de 2 años en donde los casos de AS fueron vistos de forma aguda en un centro urbano de tratamiento para violación. El estudio es uno de los primeros, más allá de los estudios de casos, en examinar los registros de terapia por ASFDA. Se realizaron análisis de regresión logística, Poisson y binomial negativa de datos

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agresión sexual facilitada por drogas; tratamiento de la violación; memoria traumática; amnesia; trastorno por uso de sustancias; trastorno de estrés postraumático; cognición del trauma; violación incapacitada

关键词
药物诱发的性侵犯; 强奸治疗; 创伤记忆; 遗忘; 物质使用障碍; 创伤后应激障碍; 创伤认知; 无行为能力的强奸

HIGHLIGHTS

- Survivors of drug-facilitated sexual assault have prominent PTSD including reexperiencing, though trauma memory may not be encoded.
- Those absent trauma memory have less hyperarousal, but DFSA complications explain why it is treatment refractory and inform treatment development.

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cuantitativos y un análisis temático cualitativo de las cogniciones del trauma y los puntos clave del tratamiento.
Resultados: Los ASFDA-V tuvieron cinco veces más probabilidades de TUS y de un notable sentimiento de culpa relacionado con las sustancias comparado con los ASFDA-I. Las ASFDA tenían problemas de relación importantes y sentimientos de culpa por haber pasado por alto el peligro de que el agresor se drogara. Los sobrevivientes con deterioro de la memoria traumática tuvieron significativamente menos síntomas de hiperactivación y del TEPT en general y, específicamente, menos hipervigilancia. No se encontraron diferencias en los síntomas de reexperimentación.
Conclusión: El deterioro de la memoria traumática es común en las ASFDA y se asocia con menos hiperactivación de base y síntomas postraumáticos en general. A pesar de esto, los problemas de los ASFDA incluyen a los síntomas de reexperimentación que son particularmente angustiantes y que restan la capacidad de conectar cognitivamente las intrusiones, por lo que contribuyen a aumentar las necesidades de tratamiento. El deterioro de la memoria limita la aplicación de tratamientos basados en la evidencia y, en conjunto, estos hallazgos exigen el desarrollo de protocolos de tratamiento específicos para trauma para mejorar la recuperación de los sobrevivientes a las ASFDA.

药物诱发的性侵犯、创伤记忆受损以及对心理健康治疗的影响

背景：性侵犯 (SA) 是一个高度普遍的全球公共卫生问题，是创伤后应激障碍 (PTSD)、物质使用障碍 (SUD) 和自杀的稳健预测因素。很大一部分是药物或酒精诱发（DFSA），会损害创伤记忆并影响循证治疗的应用。尽管存在这些问题，很少有人考查 DFSA 特定心理健康 (MH) 需求。
目的：本研究旨在 (1) 确定表征 DFSA 的心理后遗症，以解释为什么症状具有难治性，比较幸存者与非自愿物质摄入（强迫、变相给药：DFSA-I）、自愿摄入（DFSA-V）和非 DFSA 者； (2) 确定受损的创伤记忆如何与 PTSD 和抑郁症状的发展相关。
方法：呈现了来自一个门诊创伤中心接受 SA MH 服务的 74 名成年人的回溯性图表综述的数据。样本包括在城市强奸治疗中心急性观察的 2 年队列。本研究是第一个考查除 DFSA 案例研究之外的治疗记录的研究之一。对定量数据进行逻辑、泊松和负二项式回归分析，对创伤认知和治疗焦点进行定性主题分析。
结果：与 DFSA-I 相比，DFSA-V 发生 SUD和物质相关自责的几率高出五倍。 DFSA-I 在精神痛苦和对于错过施暴者下药危险的自责上有显著相关。创伤记忆受损的幸存者有显著更少的高唤醒和整体 PTSD 症状，尤其是更少的过度警觉。在再体验症状方面没有发现差异。
结论：创伤记忆受损在 DFSA 中很常见，并且与较少的基线高唤起和整体 PTS 相关。尽管如此，DFSA 问题，包括特别令人痛苦并而无法在认知上连接闯入的再体验症状，导致治疗需求增加。记忆力受损限制了循证治疗的应用，这些发现要求制定针对创伤的治疗方案，以促进 DFSA 幸存者的康复。

1. Introduction

Sexual violence is a serious and highly prevalent public health problem with tremendous physical, psychological, social, behavioural, and economic consequences. Recent estimates indicate 43.6% of women and 24.8% of men experience sexual assault (SA) in their lifetime, which includes rape, being made to penetrate someone else, sexual coercion, and unwanted sexual contact (Smith et al., 2018). SA is the most robust predictor of posttraumatic stress disorder (PTSD) compared to other trauma types (Birkeland, Skar, & Jensen, 2021; Kessler et al., 2017) and is strongly associated with substance use disorders (SUD) and suicidality (Gilmore et al., 2018; Langdon et al., 2017). Physical impacts include injury, sexually transmitted infection, long-term health issues, and impairment in sexual functioning (Amstadter, McCauley, Ruggiero, Resnick, & Kilpatrick, 2011). Adverse psychological consequences include depression, anxiety, self-blame, mistrust, substance use, impulsivity and risk-taking (Basile & Smith, 2011). SA also incurs significant economic and social costs from use of medical, mental health (MH), forensic, criminal justice, and social services, and decreased relational and occupational functioning (Basile & Smith, 2011; Gilmore et al., 2018).

1.1. Characteristics of drug-facilitated sexual assault

Substance use has been implicated in a large percentage of SAs and is considered a vulnerability factor as well as a resulting symptom or coping response (Caamano-Isorna, Adkins, Moure-Rodriguez, Conley, & Dick, 2021; Littleton & Ullman, 2013). Drug-facilitated sexual assault (DFSA) has been defined as 'a SA that is facilitated by the victim being rendered incapacitated or unable to consent by drugs' (including alcohol; Gauntlett-Gilbert, Keegan, & Petrak, 2004, p. 215). DFSA accounted for over half of SA cases in a rape treatment center (RTC) sample of 390 adults, and in the same study, forcible or covert drugging cases (DFSA-I: involuntary substance ingestion) increased from one quarter to one-third of the total SAs over a 2-year period (Richer et al., 2017). Substantial increases in DFSA cases have been reported globally (Fields, 2012). Classification criteria for SA subgroups are presented in Table 1.

Research on the treatment-seeking behaviours of DFSA survivors indicates they access acute RTC services less often than those who experienced NDFSA (Walsh et al., 2016). However, DFSA survivors who access acute RTC services are twice as likely to attend follow-up appointments afterwards and attend significantly more therapy sessions than NDFSA (Richer et al., 2017). The greater duration of treatment, in combination with the findings of a number of longitudinal studies, suggests that PTS arising from DFSA may be treatment refractory. Consistent findings indicate that DFSA may be associated with less severe acute stress symptomatology (Jaffe, Blayney, Bedard-Gilligan, & Kaysen, 2019; Jaffe, Hahn, & Gilmore, 2019) and shows a pattern of initially lower PTSD severity but a more chronic course of symptoms (Gong, Kamboj, & Curran, 2019). In their longitudinal study, Kaysen et al. (2010) assessed PTSD symptom clusters in a community sample of 60 women at 2–5 weeks post-assault. DFSA-V survivors had fewer re-experiencing symptoms initially, but showed less improvement than the non-DFSA group (NDFSA) at 6-month follow-up. Treatment studies similarly demonstrate that at 6-month follow-up post-treatment, both DFSA-I and DFSA-V were associated with more severe residual PTSD severity than NDFSA (Jaffe, Kaysen, Smith, Galovski, & Resick, 2021; Russell & Curran, 2002).

Research has shown that assault-related characteristics may be differentially associated with post-assault PTSD and depressive symptoms. In a national retrospective survey of 3001 women, Zinzow et al. (2010) found a greater likelihood of PTSD for DFSA-I and non-drug-facilitated assaults (NDFSA) compared to DFSA-V (voluntary substance ingestion), and that of the three assault types, only NDFSA predicted major depression. The authors consider the differences between DFSA subgroups as possibly due to DFSA-V survivors feeling they had more control in the situation with their voluntary substance ingestion, whereas DFSA-I had the additional trauma of premeditation and deceit of drugging which distinguishes the two assault types. Greater post-trauma symptomatology (PTS) for NDFSA survivors has previously been attributed to force and injury during the assault (Kilpatrick et al., 1989), while more recently, SA in which both substance intoxication and force were used to overcome the victim's resistance was shown to be associated with more severe PTSD than SA where only force was used (O'Callaghan & Ullman, 2020). In contrast, Littleton, McConnell, Messman, and Layh (2021) found that less use of force was associated with greater PTS, with data from their sample showing that perpetrators of these assaults were more likely to be acquaintances or friends, bringing in the additional aspect of betrayal.

1.2. Impaired trauma memory

Beyond the transient dissociative amnesia commonly seen after SA, DFSA survivors often have memory deficits due to the physiological effects of ingested substances. For example, benzodiazepines and other drugs implicated in DFSA have strong amnestic effects, and perpetrators choose these drugs for that reason. Benzodiazepines also tend to cause disinhibition, muscle relaxation, and loss of will to resist (Grela, Gautam, & Cole, 2018; Schwartz, Milteer, & LeBeau, 2000). Commonly used sedative-hypnotic drugs, including alcohol, specifically cause *anterograde* amnesia. Once ingested, information about experiences during and shortly after the assault may be initially encoded but fail to consolidate fully into long-term memory. Many of these drugs can also lead to what has been termed 'automatism amnesia', during which people appear to be functioning

Table 1. Sexual assault subgroup labels and classification criteria.

Subgroup label [synonyms[a]]	Classification criteria
DFSA-I: Drug-Facilitated Sexual Assault-Involuntary Ingestion [predatory DFSA; proactive DFSA; drug-or-alcohol- facilitated rape-DAFR]	(1) Survivor knew they were given substance(s) against their will, or (2) Survivor learned they were given substance(s) without their knowledge, or (3) Survivor suspected 1 or 2, and had at least one incapacitation symptom (4) Survivor may or may not have also ingested substances voluntarily
DFSA-V: Drug-Facilitated Sexual Assault-Voluntary Ingestion [opportunistic DFSA; non-predatory DFSA; incapacitated rape; impaired rape]	(1) Survivor had voluntary substance use, and (2) Survivor had at least one incapacitation symptom, and (3) Survivor did not know or suspect they were given additional substance(s) against their will or without their knowledge
NDFSA: Non-Drug-Facilitated Sexual Assault [forcible rape]	(1) Survivor may or may not have ingested substances voluntarily, and (2) Survivor did not know or suspect they were given substances against their will or without their knowledge, and (3) Survivor did not have incapacitation symptoms

Note: Incapacitation symptoms include partial/total amnesia, nausea/vomiting, drowsy, dizzy, altered motor function, loss of consciousness, hallucinations (adapted from Du Mont et al., 2009).
[a]Terminology utilized across SA research literature for each of the three types of SA.

normally and performing usual activities, including complex tasks such as driving, shopping, talking to people, or working (Goulle & Anger, 2004). Observers are often unable to detect abnormal behaviour in these people who subsequently develop anterograde amnesia. Furthermore, DFSA survivors often struggle greatly with issues regarding impaired trauma memory and assault-related memory retrieval is often a therapeutic focus as many survivors are preoccupied with imagined worst-case scenarios of events that occurred during the assault (Fields et al., 2018).

Whether trauma survivors with impaired trauma memory have a differential expression of PTS is an ongoing question. Traumatic brain injury (TBI) has served as a model for investigating trauma memory impairment and PTSD. Earlier studies found decreased PTSD with increased TBI severity, suggesting a 'protective' effect of amnesia (e.g. Sbordone & Liter, 1995). Subsequent TBI studies specifically assessing trauma memory impairment concurred that it does not prevent PTSD but is associated with fewer re-experiencing symptoms of PTSD (Bryant et al., 2009; Cnossen et al., 2017; Gil, Caspi, Ben-Ari, Koren, & Klein, 2005). A caveat in extending these findings is that TBI also incurs brain changes that may additionally influence PTS. Thus, DFSA trauma may provide a clearer perspective than TBI on differences in PTS when trauma memory is impaired. Limited studies have assessed impaired trauma memory and PTSD symptoms among SA survivors. In their large national retrospective survey, Zinzow et al. (2010) found that impaired memory of a SA was associated with increased lifetime PTSD risk. In contrast, Tiihonen Moller, Backstrom, Sondergaard, and Helstrom (2014) found no evidence that impaired trauma memory was associated with overall PTSD severity among a community sample of women seeking medical help after victimization. Two cross-sectional studies found no differences in any of the PTSD symptom clusters between those who did and did not lose consciousness at the time of the assault, in community samples of 340 and 161 adult SA survivors, respectively (Littleton, Grills-Taquechel, & Axsom, 2009; McConnell, Messman-Moore, Gratz, & DiLillo, 2017). The mixed findings from these studies may be attributable to the fact that they assessed PTS at a broad range of time points, from acute RTC presentation to lifetime retrospective report.

1.3. Current study rationale and aims

Research has demonstrated the treatment-refractory nature of DFSA PTS, including that survivors require significantly more sessions of MH treatment than NDFSA and have more severe residual PTSD post-treatment (Gong et al., 2019; Jaffe et al., 2021; Kaysen et al., 2010; Richer et al., 2017; Russell & Curran, 2002). The first aim of the present study was to explore reasons for DFSA being treatment-refractory by (1) quantitatively comparing DFSA-I, DFSA-V, and NDFSA survivors to see whether specific differences in sociodemographics, assault characteristics, prior sexual trauma, and substance use exist between groups; (2) quantitatively comparing post-trauma PTSD and depression symptoms (PTS) among the three SA groups, with hypotheses of fewer symptoms for DFSA given the early post-assault assessment timeframe in the present study and prior research indicating fewer PTS early on for DFSA; and (3) qualitatively identifying and comparing among the three SA groups, emergent treatment themes in trauma cognitions and treatment foci from the study clinic's psychotherapy records. Dysfunctional cognitions have been identified in the etiology and maintenance of PTSD in general (Ehlers & Clark, 2000), and are considered to mediate the development of PTSD after SA (Foa & Rothbaum, 2001; Gong et al., 2019). A second aim of the present study was to specifically explore whether there are differences in depression and PTSD symptoms among SA survivors absent trauma memory compared to those with intact trauma memory. DFSA trauma is often characterized by impaired trauma memory. The question of how PTSD may manifest in this case has been of ongoing interest to the field, as symptom expression influences treatment selection. Additionally, lacking access to trauma memory has implications for the application of evidence-based treatments. We were especially interested in understanding the presence of PTSD re-experiencing symptoms in those with impaired trauma memory as treating clinicians note associated treatment complications. Apart from TBI research, few studies have evaluated the relationship between impaired trauma memory and PTS, and findings conflict among those that have.

2. Method

2.1. Participants and procedure

We conducted a retrospective chart review of emergency room RTC records and outpatient MH records from a full 2-year cohort of 390 SA survivors seen for acute RTC treatment at an urban U.S. level-one trauma center hospital. Patients are scheduled for an RTC follow-up appointment after their acute RTC treatment at the affiliated MH clinic, usually conducted within a month post-assault. The present analysis includes the 74 patients who elected to begin MH treatment immediately subsequent to their acute SA services, upon their MH clinic RTC follow-up appointment. MH clinic eligibility criteria included living in the county of the hospital/RTC

clinic, not currently in MH services elsewhere, and not in need of intensive MH services.

Descriptive statistics for sociodemographic, prior sexual trauma, assault characteristics, and substance use variables for the full sample ($N = 74$) are presented in Table 2. The sample of 74 adults was ethnically diverse, with 11% identifying as African-American, 10% Asian-American/Pacific Islander, 50% Caucasian, 19% Latinx, and 8% other. They were primarily female (89.2%) with a mean age of 29.5 years ($SD = 8.8$; range = 18–51). Twenty per cent of participants identified as lesbian, gay, or bisexual. Approximately one third were unemployed. Those who engaged in treatment did not differ demographically from those who were referred but did not engage.

The outpatient MH clinic is a not-for-profit, community-based university outpatient trauma center serving diverse victims of violent crime, torture and gender-based violence. Clinic MH services include a comprehensive intake evaluation, weekly individual trauma-informed and trauma-focused psychotherapy, case management, and psychiatric medication. The timeline to complete intake evaluation, assign a therapist, and begin treatment is approximately 2 months post-assault. Psychotherapy is personalized to the needs of each survivor, with a range of foci that may include safety and stabilization as well as trauma processing interventions. Clinical services were provided by eight masters-level clinicians, three clinical psychologists, and two psychiatrists. Patients were offered 16 weeks of treatment, with a smaller subset provided additional services based on clinical needs. As reported in Richer et al. (2017), there were no significant differences among DFSA-I, DFSA-V, and NDFSA groups in MH treatment eligibility, treatment referral acceptance, attendance at initial intake evaluation, and starting psychotherapy. However, clients who experienced DFSA attended significantly more psychotherapy sessions, with the DFSA-V group averaging 15 sessions, DFSA-I 12 sessions, and NDFSA, 10 sessions.

Despite limitations inherent in retrospective chart review methods, their utility in identifying issues for further study has been noted, particularly when chart review protocols are standardized (Gilbert, Lowenstein, Koziol-McLain, Barta, & Steiner, 1996). To minimize errors in this chart review, we utilized the following approach: RTC and MH clinic database records and charts were reviewed by two trained senior medical student researchers who were familiar with the hospital and clinic records system. These clinician-researchers extracted and recorded results on a standardized abstracting form. Extracted data included demographics, assault characteristics, presence or absence of assault memory, assault-related cognitions, and treatment foci from all MH session notes for each participant. After initial training in coding and classification categories for the study, fidelity monitoring occurred through weekly ongoing meetings, consultation, and review of classification decisions with the two senior authors. Documentation of psychiatric symptoms, premorbid SUD, and past sexual trauma history were obtained from the MH intake evaluation report.

Ethics approval for this study, with approval number 302302, was granted by the Human Research Protection Program (HRPP) of the University of California San Francisco, UCSF Health. The study had a waiver of informed consent as per IRB guidelines and identifying information was not disclosed.

2.2. Measures

2.2.1. Sexual assault subgroup classification

SA subgroups were classified according to the presence of incapacitation symptoms and knowledge or suspicion of involuntary (forced or covert) drugging (Table 1). Data for classification included behavioural observations, medical and forensic documentation, and patient self-report at the time of the acute RTC visit. To study DFSA subgroups separately, we expanded Du Mont et al.'s (2009) definitional paradigm for DFSA-I (developed using a panel of experts via Delphi methodology) to include a separate DFSA-V operational definition. DFSA-I was coded for those *forcibly* or *covertly* incapacitated by substances. DFSA-V was coded for those incapacitated due to *voluntary* use of substances. NDFSA was coded for SA cases that did not involve incapacitation by substances.

2.2.2. Assault characteristics

Trauma memory. Medical and RTC forensic records were reviewed in order to establish whether participants had memories of the assault. Participants were categorized dichotomously according to whether they had any memory of the assault versus no memory of the assault.

Injury/force. From review of medical and RTC records, we classified the severity of injury into two categories: moderate/severe (e.g. lacerations, fractures, bleeding injuries), and none/mild (e.g. bruising, absent if no injury was noted).

Weapon use. Whether a weapon was used during the assault was also recorded from review of medical and RTC forensic records.

2.2.3. Prior sexual trauma

Past history of childhood sexual abuse and adult sexual assault prior to the index assault were obtained from the Carlson Trauma History Screen, developed to assess lifetime traumatic events. This measure is psychometrically reliable and valid with strong test–

retest reliability and convergent validity established in prior studies (Carlson et al., 2011).

2.2.4. Psychiatric symptoms and diagnoses

The structured Mini International Neuropsychiatric Interview (MINI) was used to broadly assess symptoms at the initial MH intake evaluation. The MINI is reliable, valid, and has strong convergence with other diagnostic interviews (e.g. Structured Clinical Interview for DSM and Composite International Diagnostic Interview for lCD-10; Sheehan et al., 1997). In the MINI, PTSD and depression symptoms were assessed dichotomously as either present or absent. These dichotomous symptom indicators were summed to create count variables for the total number of symptoms experienced in relation to PTSD (overall and by symptom cluster), dissociation, and depression. Three additional dissociation symptoms (being in a daze, derealization, and depersonalization) were included using the same format. SUD diagnoses were based on the DSM-IV-TR, which was the standard during the study period (American Psychiatric Association, 2000).

2.3. Statistical analyses

In order to explore premorbid distinctions among SA subgroups and to explore why DFSA survivors used MH services more than NDFSA, we analyzed both quantitative and textual chart data. Linear, logistic, Poisson and negative binomial regression (SAS PROC GENMOD) (SAS Institute Inc., 2013) were used to compare the three SA groups quantitatively on continuous, dichotomous, and count variables reflecting sociodemographic characteristics, prior sexual trauma, assault characteristics, and SUD diagnoses. Count variables were first analyzed using a negative binomial model that included a dispersion parameter. When the dispersion parameter was not statistically significant, indicating the absence of overdispersion and consistency with a Poisson distribution, the variable was analyzed using a Poisson regression model. In these analyses, SA group was the independent variable; analyses included planned, pairwise comparisons of the groups, which were interpreted if the overall group effect was statistically significant. All statistical tests were two-tailed. The threshold for statistical significance was set *a priori* at $p = .05$.

In order to test the hypotheses of fewer post-trauma depression and PTSD symptoms for DFSA groups, and to explore differences in PTS between impaired and intact memory groups, logistic, Poisson, and negative binomial regression models (SAS PROC GENMOD) (SAS Institute Inc., 2013), like those described above, were utilized to compare the three SA groups, and separately, the two memory groups, quantitatively on dichotomous and count variables reflecting PTSD and depression symptoms. To account for multiple comparisons involving individual symptoms, Benjamini-Hochberg adjusted p values were calculated separately for PTSD and depression symptoms (Benjamini & Hochberg, 1995; McDonald, 2014).

To evaluate the effect sizes associated with statistically significant group differences, odds ratios were evaluated in relation to standard Cohen's d values $d = .2$ (small), .5 (medium), .8 (large) based on the findings of Chen, Cohen, & Chen, 2010.

Qualitative analyses were conducted to compare the three SA groups on textual data from therapy records reflecting treatment foci or goals, and trauma cognitions. A single coder, who was independent of the data collection process, coded the textual data using thematic analysis, with interpretation and checks conducted by the senior authors to develop consensus and reduce reflexivity. This process involved pattern coding the data to identify repeating themes and then applying the identified themes systematically across the data (Braun & Clarke, 2006). Each theme and supporting evidence was discussed with the senior authors to establish as a repeating theme. Discrepancies in interpretation were resolved through discussion and consensus, and the coded themes were systematically applied for each SA group. The frequencies of codes were tabulated, similar to content analysis approaches, to analyze trends in themes. In the absence of a prospective design, descriptive percentages were calculated as the portion of total data points for each content theme from chart review for each SA subgroup (Mayring, 2004).

3. Results

3.1. Sexual assault group analyses

The sample was divided into three SA groups. Forty-two cases (57% of the sample) were classified as some type of DFSA, and 32 cases (43%) were classified as NDFSA (see Table 2). Twenty-six DFSA-I cases accounted for 35% of the sample and 16 DFSA-V cases accounted for 22% of the sample.

3.1.1. SA group sociodemographic, SUD, sexual trauma history, and assault characteristics comparisons

Statistically significant group differences were observed for gender and health insurance. All the males were in the DFSA groups. Those in the DFSA-V group were more likely to be uninsured than DFSA-I ($OR = 4.57$, $z = 2.14$, $p = .03$) and NDFSA ($OR = 5.71$, $z = 2.48$, $p = .01$; see Table 2). DFSA-V survivors were significantly more likely than both DFSA-I ($OR = 4.95$, $z = 2.33$, $p = .02$) and

Table 2. Logistic regression analyses comparing assault groups on sociodemographics, assault characteristics, substance use, and SA history.

	Total *N* (*N* = 74)		DFSA-I (*n* = 26)		DFSA-V (*n* = 16)		NDFSA (*n* = 32)		Overall group effect			Pairwise group comparisons		
												DFSA-I vs. DFSA-V	DFSA-I vs. NDFSA	DFSA-V vs. NDFSA
Variable	*n*	%	*n*	%	*n*	%	*n*	%	$x^2(2)$	*p*	*V*[a]	*OR* (95% CI) *p*	*OR* (95% CI) *p*	*OR* (95% CI) *p*
Gender (male)	**6**	**8.1**	**4**	**15.4**	**2**	**12.5**	**0**	**0.0**	**7.20**	**.03**	**.21**	**1.18 (.19–7.37) .86**	**– – –**	**– – –**
Lesbian/Gay/Bisexual	15	20.3	6	23.1	2	12.5	7	21.9	1.57	.46	.18	2.63 (.45–15.16) .28	1.02 (.28–3.65) .98	0.39 (.07–2.16) .28
Ethnicity														
African American	8	10.8	2	7.7	3	18.8	3	9.4	1.14	.57	.11	0.38 (.06–2.56) .32	0.81 (.13–5.28) .83	2.15 (.38–12.15) .38
Asian/Pacific Islander	7	9.5	4	15.4	2	12.5	1	3.1	3.05	.22	.15	1.33 (.21–8.29) .76	5.71 (.6–54.82) .13	4.29 (.36–51.32) .25
Caucasian	37	50.0	13	50.0	9	56.3	15	46.9	0.27	.87	.08	0.84 (.24–2.98) .79	1.16 (.40–3.32) .79	1.37 (.41–4.61) .51
Latinx	14	18.9	4	15.4	1	6.3	9	28.1	4.12	.13	.17	2.86 (.29–28.20) .37	0.47 (.12–1.75) .26	0.16 (.02–1.42) .10
Other	6	8.1	2	7.7	1	6.3	3	9.4	0.17	.92	.07	1.30 (.11–15.69) .83	0.81 (.13–5.28) .83	0.62 (.06–6.51) .69
Unemployed	24	32.4	5	19.3	8	50.0	11	34.4	5.09	.08	.24	0.21 (.05–.85) .03	0.46 (.13–1.54) .20	2.18 (.63–7.61) .22
Uninsured	**24**	**32.4**	**7**	**26.9**	**10**	**62.5**	**7**	**21.9**	**7.35**	**.03**	**.24**	**0.22 (.05–.88) .03**	**1.25 (.36–4.31) .72**	**5.71 (1.44–22.6) .01**
Weapon used during assault	6	8.1	1	3.9	1	6.3	4	12.5	0.98	.61	.17	0.85 (.05–15.16) .91	0.39 (.04–3.84) .42	0.46 (.05–4.59) .50
Moderate or severe injury	13	17.6	3	11.5	5	31.3	5	15.6	2.26	.32	.22	0.30 (.06–1.49) .14	0.60 (.13–2.82) .52	2.00 (.48–8.40) .34
Intact **memory** of assault	**56**	**75.7**	**16**	**61.5**	**11**	**68.8**	**29**	**90.6**	**7.68**	**.02**	**.31**	**0.73 (.19–2.72) .63**	**0.17 (.04–.69) .01**	**0.23 (.05–1.12) .07**
Childhood sexual abuse	38	51.4	10	38.5	10	62.5	18	56.3	3.47	.18	.22	0.31 (.08–1.19) .09	0.49 (.17–1.40) .18	1.56 (.43–5.60) .50
Prior adult assault	29	39.2	9	34.6	6	37.5	14	43.8	0.85	.66	.13	0.79 (.21–2.95) .73	0.61 (.21–1.78) .36	0.76 (.22–2.68) .67
Any substance use diagnosis	**27**	**36.5**	**8**	**30.8**	**11**	**68.8**	**8**	**25.0**	**8.82**	**.01**	**.27**	**0.20 (.05–.78) .02**	**1.28 (.40–4.07) .68**	**6.33 (1.68–23.8) <01**
Substance abuse diagnosis	11	14.9	4	15.4	3	18.8	4	12.5	0.28	.87	.10	0.79 (.15–4.09) .78	1.23 (.28–5.48) .79	1.56 (.30–8.00) .60
Substance dependence diagnosis	**19**	**25.7**	**6**	**23.1**	**8**	**50.0**	**5**	**15.4**	**6.89**	**.03**	**.24**	**0.26 (.07–1.03) .05**	**1.56 (.42–5.85) .51**	**5.94 (1.47–24.0) .01**

Note: Participants were on average 29.51 years old (SD = 8.81); participant age did not differ by group.
DFSA-I = drug-facilitated sexual assault, involuntary ingestion; DFSA-V = drug-facilitated sexual assault, voluntary ingestion; NDFSA = non-drug-facilitated sexual assault. Some pairwise group comparisons could not be calculated because there were no males in the NDFSA group.
[a]Cramer's *V*.

NDFSA (*OR* = 6.33, *p* = .007) to have a SUD. DFSA-V survivors had nearly six times greater odds of having a substance *dependence* diagnosis than NDFSA (*OR* = 5.94, *z* = 2.50, *p* = 0.01). There were no statistically significant group differences in experiences of prior sexual trauma, use of a weapon during the assault, or injury severity. Relative to the NDFSA group, fewer DFSA-I and DFSA-V survivors had intact memories of the assault; this difference was statistically significant for DFSA-I survivors (*OR* = 0.17, *z* = −2.47, *p* = .01). All of the statistically significant group differences represent a medium effect size in the range of Cohen's *d* = .5.

3.1.2. Assault group trauma cognitions and treatment foci comparisons

Themes identified from thematic and content analysis of textual data, and the percentage endorsement of themes by SA group are shown in Table 3 to demonstrate the broad trends for descriptive purposes. Although all three SA groups struggled with memory-related cognitions including confusion and labelling what happened, DFSA groups were the only ones that included treatment foci involving trauma memory impairment, including, for example 'I am upset trying to remember what happened', and 'I can't remember anything so I don't know how I would talk about it.' DFSA-V survivors noted heavily depressive cognitions (e.g. low self-esteem, hopeless), and elevated fears about safety: 'Client reports staying in house when not at work because everything else drives me into a safety nightmare.' Notably, DFSA-V survivors' treatment goals included substance use problems almost three times more often than other SA groups. DFSA-I survivors emphasized negative cognitions about others, including prominent relationship concerns (e.g. preoccupation with judgment, trust difficulties). For example, one therapist noted, 'Client is worried her family will find out about the assault and blame her; client expressed feeling sad over the

Table 3. Trauma cognitions and treatment goals coded from chart review.

Trauma cognitions	Code description	DFSA-I *n*	DFSA-I %	DFSA-V *n*	DFSA-V %	NDFSA *n*	NDFSA %
Self-blame	Demonstrating hindsight bias; anger towards oneself; guilt and responsibility	25	33.3	21	28.6	22	29.7
Anger	Anger towards perpetrator and other trauma-related reminders	2	2.6	7	9.5	8	10.8
Difficulties in relationships	Trust issues; internalized stigma and fear of judgment; preoccupation with others' perceptions; loss of interest in sex	49	66.7	18	23.8	18	24.3
Memory difficulties	No/partial memory; questioning what happened; difficulty labelling the event	6	7.7	4	4.8	4	5.4
Fear/safety concerns	Safety concerns; desire to feel independent and OK; generalized fear towards a group; Loss of power and control	19	25.6	32	42.9	4	5.4
Depressive thoughts	Lowered self-worth; feeling violated; suicidal ideation; lack of motivation; hopelessness; self-sabotage	8	10.3	21	28.6	10	13.5
Emotion regulation	Difficulty regulating emotions; dramatic mood swings; minimizing/numbing	0	0	7	9.5	6	8.1
Treatment goals	**Code description**	**DFSA-I *n***	**DFSA-I %**	**DFSA-V *n***	**DFSA-V %**	**NDFSA *n***	**NDFSA %**
Trauma and emotional processing	Desire to deal with distressing emotions (e.g. trapped pain), stabilize mood swings, anxiety and depression, expressing a desire to 'deal with trauma' and not avoid anymore/accept	36	48.3	38	51.0	42	56.4
Address substance use	Desire to decrease substance use; acknowledgement that substances may have played a role	4	5.8	14	19.2	6	7.5
Improve safety	Reduce risk of re-victimization; feel psychologically safe	3	3.5	8	10.6	9	11.7
Improve relationships	Trust issues; generalized negative views of others; desire for connectedness/struggling with loneliness; boundaries	14	18.4	17	23.4	13	17.0
Self-esteem	Desire to 'go back to normal'; Gain confidence, become independent, address violated aspects of self (moral injury); worthlessness; distressing shame/guilt	12	16.0	8	10.6	9	11.7
Memory concerns	Trying to remember; trying to accept lack of memory; confusion	2	2.3	2	2.1	0	0
Other goals	Improving quality of life, secondary benefits, getting a job	13	17.2	9	12.8	4	5.3

Note: DFSA-I = drug-facilitated sexual assault involuntary ingestion; DFSA-V = drug-facilitated sexual assault voluntary ingestion; NDFSA = non-drug-facilitated sexual assault; *n* = frequency of chart mentions on each trauma cognition theme; % = portion of total mentions for each SA subgroup that met that theme criteria, e.g. '50%' would mean that half of all the trauma cognitions documented for an SA subgroup were on that content theme. Content themes are not mutually exclusive.

distrust and distancing by others since the assault.' Self-blame cognitions were present in all SA groups, but their specific content was quite different across groups. For DFSA-V, self-blame was discussed in terms of decisions to use substances voluntarily, whereas most DFSA-I survivors blamed themselves for not recognizing danger of perpetrator drugging beforehand. In contrast, NDFSA survivors tended to blame themselves for a broader range of concerns (e.g. perceptions that they were at fault for being attractive, having bad judgement, attracting stressful experiences, doing something that triggered a DV perpetrator, 'letting' themselves be harmed by a perpetrator).

3.1.3. Assault group post-trauma symptom comparisons

Logistic, Poisson, and negative binomial regression analyses tested the hypothesis that DFSA survivors would have fewer post-trauma PTSD and depression symptoms than NDFSA. As shown in Table 4, there were no statistically significant assault group differences in individual symptoms of PTSD. DFSA-V survivors had fewer total dissociation symptoms than NDFSA ($z = -2.42$, $p = .02$), and specifically, less depersonalization than NDFSA (59.4%) ($OR = .05$, $z = -2.75$, $p = .006$). This difference equates to a large effect size (Cohen's $d > .8$). SA groups did not differ in terms of depression symptoms.

3.1.4. Memory group post-trauma symptom comparisons

In order to examine symptom differences among assault survivors specifically related to the absence of trauma memory, the sample was divided into two groups. As shown in Table 5, a total of 18 cases (24%) were classified as having no memory of the assault, with 54 cases having intact memory (76%).

Logistic, Poisson, and negative binomial regression analyses were conducted to explore memory group differences in post-trauma depression and PTSD symptoms. SA survivors with intact memory endorsed a significantly greater total number of different PTSD symptoms ($X^2(1, N = 74) = 6.57$, $p = .01$, Cohen's $d = .58$, a medium-sized effect) and a greater number of hyper-arousal symptoms ($X^2(1, N = 74) = 4.61$, $p < .05$, Cohen's $d = .81$, a large effect) (Table 5). The PTSD hyper-arousal symptom of hypervigilance was less common among survivors with impaired memory than among those with intact memory ($X^2(1, N = 74) = 11.07$, $OR = .13$, $p = .02$, a large effect, equating to a Cohen's $d > .8$). Survivors with impaired trauma memory were also less likely to endorse the depression symptom of anhedonia ($X^2(1, N = 74) = 7.96$, $OR = .21$, $p = .04$, a medium effect, equating to a Cohen's d of approximately .5). No other group differences were observed in PTSD or depression symptoms.

Table 4. Logistic, Poisson and negative binomial regression analyses comparing sexual assault groups on post-trauma psychiatric symptoms.

	Total *N* (*N* = 74)		DFSA-I (*n* = 26)		DFSA-V (*n* = 16)		NDFSA (*n* = 32)		Overall group effect			Pairwise group comparisons					
												DFSA-I vs. DFSA-V		DFSA-I vs. NDFSA		DFSA-V vs. NDFSA	
Symptom	*n*	%	*n*	%	*n*	%	*n*	%	$x^2(2)$	p^a	V^b	*OR* (95% CI)	*p*	*OR* (95% CI)	*p*	*OR* (95% CI)	*p*
PTSD symptoms																	
Re-experiencing																	
Memories	55	74.3	20	76.9	10	62.5	25	78.1	1.43	.65	.14	2.00 (.51–7.81)	.32	0.93 (.27–3.22)	.91	0.47 (.13–1.74)	.26
Nightmares	44	59.5	12	46.2	9	56.3	23	71.9	4.08	.50	.23	0.67 (.19–2.33)	.53	0.34 (.11–1.00)	.05	0.50 (.14–1.76)	.28
Flashbacks	29	39.2	9	34.6	5	31.3	15	46.9	1.45	.66	.14	1.17 (.31–4.41)	.82	0.60 (.21–1.74)	.35	0.52 (.15–1.83)	.30
Emotional distress	51	68.9	17	65.4	10	62.5	24	75.0	1.02	.63	.12	1.13 (.31–4.14)	.85	0.63 (.20–1.96)	.43	0.56 (.15–2.02)	.37
Physical distress	30	41.1	11	42.3	3	18.8	16	51.6	5.06	.40	.25	3.18 (.73–13.92)	.13	0.69 (.24–1.96)	.48	0.22 (.05–.91)	.04
Avoidance																	
Cognitive	36	49.3	12	46.2	6	40.0	18	56.3	1.25	.64	.13	1.29 (.35–4.67)	.70	0.67 (.24–1.89)	.44	0.52 (.15–1.80)	.30
Behavioural	56	75.7	21	80.8	9	56.3	26	81.3	3.84	.50	.24	3.27 (.82–13.0)	.09	0.97 (.26–3.62)	.96	0.30 (.08–1.12)	.07
Numbing																	
Amnesia	44	60.3	21	80.8	10	62.5	13	41.9	9.30	.10	.35	2.52 (.62–10.28)	.20	5.82 (1.74–19.47)	<01	2.31 (.67–7.96)	.19
Loss of interest	43	58.1	12	46.2	10	62.5	21	65.6	2.39	.58	.18	.51 (.14–1.84)	.31	0.45 (.16–1.30)	.14	0.87 (.25–3.04)	.83
Detachment	55	74.3	21	80.8	9	56.3	55	78.1	3.30	.48	.22	3.27 (.82–13.09)	.09	1.18 (.33–4.26)	.80	0.36 (.10–1.32)	.12
Emotional numbing	15	20.3	4	15.4	5	31.3	6	18.8	1.53	.70	.15	0.40 (.09–1.79)	.23	0.79 (.20–3.15)	.74	1.97 (.50–7.83)	.34
Foreshortened future	8	11.0	4	15.4	2	12.5	2	6.5	1.25	.64	.13	1.27 (.21–7.89)	.80	2.64 (.44–15.72)	.29	2.07 (.26–16.27)	.49
Hyper-arousal																	
Insomnia	57	78.1	16	61.5	13	81.3	28	90.3	6.98	.20	.31	0.37 (.08–1.63)	.19	0.17 (.04–.72)	.02	0.46 (.08–2.62)	.38
Irritability	58	78.4	21	80.8	12	75.0	25	78.1	0.20	.91	.05	1.40 (.31–6.24)	.66	1.18 (.33–4.23)	.80	0.84 (.21–3.43)	.81
Concentration	57	77.0	21	80.8	10	62.5	26	81.3	2.25	.53	.18	2.52 (.62–10.28)	.20	0.97 (.26–3.62)	.96	0.39 (.10–1.48)	.16
Hypervigilant	57	78.1	19	73.1	10	66.7	28	87.5	3.28	.48	.21	1.36 (.34–5.39)	.66	0.39 (.10–1.51)	.17	0.29 (.06–1.28)	.10
Hyperstartle	42	57.5	12	46.2	9	60.0	21	65.6	2.27	.53	.18	0.57 (.16–2.07)	.39	0.45 (.16–1.30)	.14	0.79 (.22–2.78)	.71
Dissociation																	
Dazed	15	20.3	6	23.1	1	6.3	8	25.0	2.85	.53	.16	4.20 (.45–38.84)	.21	0.86 (.26–2.91)	.81	0.21 (.02–1.82)	.16
Derealization	33	44.6	10	38.5	7	43.8	16	50.0	1.01	.63	.13	0.80	.73	0.59	.32	0.73	.61

(*Continued*)

Table 4. Continued.

	Total *N* (*N* = 74)		DFSA-I (*n* = 26)		DFSA-V (*n* = 16)		NDFSA (*n* = 32)		Overall group effect			Pairwise group comparisons					
												DFSA-I vs. DFSA-V		DFSA-I vs. NDFSA		DFSA-V vs. NDFSA	
Symptom	*n*	%	*n*	%	*n*	%	*n*	%	$x^2(2)$	p^a	V^b	*OR* (95% CI)	*p*	*OR* (95% CI)	*p*	*OR* (95% CI)	*p*
												(.23–2.85)		(.20–1.69)		(.22–2.45)	
Depersonalization	**30**	**40.5**	**10**	**38.5**	**1**	**6.3**	**19**	**59.4**	**13.65**	**.02**	**.32**	**8.75** (.99–77.19)	**.05**	**0.43** (.15–1.23)	**.12**	**0.05** (.01–.42)	**<01**
Depression Symptoms																	
Depressed mood	59	80.8	18	72.0	14	87.5	27	84.4	1.92	.57	.16	0.37 (.07–2.05)	.25	0.48 (.13–1.74)	.26	1.30 (.22–7.55)	.77
Anhedonia	45	61.6	11	44.0	12	75.0	22	68.8	5.16	.24	.27	0.26 (.07–1.04)	.06	0.36 (.12–1.06)	.06	1.36 (.35–5.29)	.65
Appetite	42	58.3	10	40.0	10	66.7	22	68.8	5.31	.24	.27	0.33 (.09–1.27)	.11	0.30 (.10–.91)	.03	0.91 (.25–3.36)	.89
Insomnia	58	80.6	16	66.7	14	87.5	28	87.5	4.21	.27	.25	0.29 (.05–1.58)	.15	0.29 (.07–1.10)	.07	1.00 (.16–6.14)	.99
Fatigue	44	60.3	12	48.0	7	43.8	25	78.1	7.93	.18	.32	1.19 (.34–4.19)	.79	0.26 (.08–.82)	.02	0.22 (.06–.80)	.02
Concentration	52	72.2	19	76.0	10	62.5	23	74.2	.95	.80	.12	1.90 (.49–7.45)	.36	1.10 (.33–3.73)	.88	0.58 (.16–2.11)	.41
Psychomotor	20	27.8	4	16.0	5	31.3	11	35.5	2.90	.41	.20	0.42 (.09–1.89)	.26	0.35 (.10–1.27)	.11	0.83 (.23–3.00)	.77
Guilt	39	54.2	13	52.0	8	50.0	18	58.1	0.35	.84	.07	1.08 (.31–3.80)	.90	0.78 (.27–2.26)	.65	0.72 (.22–2.43)	.60
Death thoughts	17	23.6	5	20.0	5	31.3	7	22.6	0.69	.80	.10	0.55 (.13–2.33)	.42	0.86 (.24–3.12)	.82	1.56 (.40–6.02)	.52
Symptom counts	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	$x^2(2)$	***p***		***z***	***p***	***z***	***p***	***z***	***p***
# PTSD	10.0	3.5	9.7	3.5	8.9	3.7	10.7	3.3	3.76	.15		0.88	.38	−1.13	.26	−1.86	.06
# Re-experiencing	2.8	1.5	2.7	1.6	2.3	1.5	3.2	1.4	3.54	.17		0.68	.50	−1.24	.21	−1.73	.08
# Avoidance	1.3	0.7	1.3	0.8	0.9	0.8	1.4	0.7	1.71	.42		0.96	.34	−0.35	.73	−1.26	.21
# Numbing	2.3	1.1	2.4	0.9	2.3	1.2	2.1	1.1	0.55	.76		0.28	.78	0.74	.46	0.35	.73
# Hyper-arousal	3.7	1.3	3.4	1.3	3.4	1.4	4.0	1.2	1.67	.43		0.04	.97	−1.13	.26	−0.98	.33
# Dissociation	**1.1**	**1.1**	**1.0**	**1.1**	**0.5**	**0.6**	**1.4**	**1.1**	**7.23**	**.03**		**1.55**	**.12**	**−1.22**	**.22**	**−2.42**	**.02**
# Depression	5.2	2.3	4.3	2.5	5.3	2.39	5.7	2.0	5.56	.06		−1.43	.15	−2.31	.02	−0.56	.57

Note: *DFSA-I* = drug-facilitated sexual assault, involuntary ingestion; DFSA-V = drug-facilitated sexual assault, voluntary ingestion; NDFSA = non-drug-facilitated sexual assault.
[a]Benjamini-Hochberg adjusted *p*-values were used to account for multiple tests involving individual PTSD and depression symptoms.
[b]Cramer's *V*.

Table 5. Logistic, Poisson, and negative binomial regression analyses comparing assault survivors with impaired and intact trauma memory on post-trauma symptoms.

	Impaired trauma memory ($n = 18$)		Intact trauma memory ($n = 56$)		Group effect			Impaired vs. intact trauma memory	
Symptom	*n*	%	*n*	%	$x^2(1)$	p^a	V^b	*OR*	95% CI
PTSD symptoms									
Re-experiencing									
Memories	11	61.1	44	78.6	2.06	.43	.17	0.43	.14–1.34
Nightmares	8	44.4	36	64.3	2.19	.43	.17	0.44	.15–1.31
Flashbacks	5	27.8	24	42.9	1.34	.38	.13	0.51	.16–1.64
Emotional distress	10	55.6	41	73.2	1.91	.40	.16	0.46	.15–1.38
Physical distress	6	33.3	24	42.9	0.60	.59	.11	0.65	.21–1.97
Avoidance									
Cognitive	9	50.0	27	48.2	0.00	.95	.07	1.04	.36–3.01
Behavioural	12	66.7	44	78.6	1.00	.46	.12	0.55	.17–1.76
Numbing									
Amnesia	13	72.2	31	55.4	2.56	.44	.27	2.62	.76–9.04
Loss of interest	8	44.4	35	62.5	1.81	.36	.16	0.48	.16–1.41
Detachment	9	50.0	46	82.1	6.80	.06	.32	0.22	.07–.69
Emotionally numb	4	22.2	11	19.6	0.06	.85	.03	1.17	.32–4.26
Foreshortened future	4	22.2	4	7.1	2.73	.44	.22	3.64	.81–16.44
Hyper-arousal									
Insomnia	12	66.7	45	80.4	1.71	.35	.17	0.44	.13–1.47
Irritability	13	72.2	45	80.4	0.51	.59	.08	0.64	.19–2.16
Concentration	13	72.2	44	78.6	0.30	.68	.06	0.71	.21–2.39
Hypervigilant	**8**	**44.4**	**49**	**87.5**	**11.07**	**.02**	**.45**	**0.13**	**.04–.44**
Hyperstartle	5	27.8	37	66.1	7.20	.06	.37	0.21	.07–.70
Dissociation									
Dazed	2	11.1	13	23.2	1.52	.37	.17	0.39	.08–1.95
Derealization	9	50.0	24	42.9	0.22	.71	.09	1.29	.45–3.75
Depersonalization	5	27.8	25	44.6	1.81	.35	.17	0.46	.15–1.47
Depression symptoms									
Depressed mood	12	66.7	47	83.9	2.83	.23	.22	0.34	.10–1.17
Anhedonia	**6**	**33.3**	**39**	**69.6**	**7.96**	**.04**	**.34**	**0.21**	**.07–.64**
Appetite change	9	50.0	33	58.9	0.68	.57	.14	0.64	.22–1.86
Insomnia	12	66.7	46	82.1	2.72	.23	.22	0.35	.10–1.20
Fatigue	7	38.4	37	66.1	4.49	.14	.26	0.31	.10–.93
Concentration	12	66.7	40	71.4	0.03	.86	.10	0.90	.27–2.99
Psychomotor	6	33.3	14	25.0	0.61	.57	.14	1.60	.50–5.12
Guilt	11	61.1	28	50.0	1.01	.56	.15	1.77	.57–5.45
Death thoughts	5	27.8	12	21.4	0.40	.60	.12	1.49	.44–5.08
Symptom counts	***M***	***SD***	***M***	***SD***		***p***		***z***	
# PTSD	**8.33**	**4.24**	**10.48**	**3.10**	**6.57**	**.01**		**−2.51**	
# Re-experiencing	2.22	1.80	3.02	1.33	3.22	.07		−1.74	
# Avoidance	1.17	0.86	1.27	0.71	0.12	.72		−0.35	
# Numbing	2.11	1.02	2.27	1.09	0.15	.70		−0.39	
# Hyper-arousal	**2.82**	**1.63**	**3.93**	**1.04**	**4.61**	**.03**		**−2.07**	
# Dissociation	0.89	0.96	1.11	1.08	0.66	.42		−0.79	
# Depression	4.44	2.94	5.38	2.08	2.39	.12		−1.52	

[a]Benjamini-Hochberg adjusted *p*-values were used to account for multiple tests involving individual PTSD and depression symptoms.
[b]Cramer's *V*.

4. Discussion

We explored psychological sequelae of two types of DFSA trauma relative to NDFSA, in a two-year cohort of SA survivors seen acutely at an urban RTC. We identified issues unique to DFSA not fully captured by gross symptom assessment, that inform the treatment-refractory nature of DFSA. We also investigated whether impaired trauma memory, which often characterizes DFSA, is differentially related to post-trauma depression and PTSD symptoms. We found all three SA groups were experiencing similarly high levels of PTSD and depression symptoms, including re-experiencing symptoms. DFSA-V had fewer dissociation symptoms and less depersonalization than other SA groups, consistent with hypotheses based on prior longitudinal research showing lower PTS at baseline for DFSA (Gong et al., 2019; Kaysen et al., 2010). Group differences in PTS severity in the present study may have been obscured by the dichotomous symptom ratings in the available chart data. Qualitative findings and survivor characteristics reveal different underlying issues for DFSA subgroups that may help to explain why they have a poorer recovery trajectory than NDFSA.

4.1. SUD severity and DFSA-V as a vulnerable group

We found much greater SUD severity for DFSA-V, consistent with findings by Caamano-Isorna et al. (2021). DFSA-V survivors were more often uninsured, in line with a trend for over double the unemployment rate of DFSA-I. Another notable trend is that almost two-thirds of DFSA-V had childhood sexual abuse compared to just over one-third for DFSA-I. All three SA groups struggled with using more substances since the assault

to cope with distress, insomnia, discomfort with sex, and social anxiety. However, DFSA-V had prominent substance-related self-blame and their treatment goals often focused on SUD. Additionally, DFSA-V had prominent depressive and fear-related cognitions, and emotion regulation and improving relationships were often identified as treatment foci. The DFSA-V group comprised the smallest percentage (21.6%) of the total sample, yet these data indicate they have some of the greatest need and help to explain why this subgroup required fifty per cent more therapy sessions relative to NDFSA (Richer et al., 2017). Indeed, the confluence of severe SUD with PTSD and depression can be treatment-resistant and may require a longer course of treatment (Kaplan & Klinetob, 2000).

4.2. DFSA-I: self and relational disruption

DFSA-I survivors had prominent distressing shame, guilt and self-blame for being deceived by perpetrators who drugged them, believing they were to blame because they did not identify this danger beforehand. It is well established that DFSA pulls for increased self-blame and victim blame (Littleton et al., 2009); our findings extend prior research by distinguishing specific self-blame cognitions for subgroups. We found DFSA-I survivors had prominent distress about the myriad ways their relationships were affected by the assault. Russell and Curran (2002) noted that DFSA survivors' stories are met with skepticism by police and partners because their impaired memory does not provide a convincing account, and we found DFSA-I had the largest percentage of trauma memory impairment of the three SA groups. DFSA survivors have been shown to be perceived by others as blameworthy when substances are involved and memory is impaired, leading to more negative disclosure reactions and less support from family and friends (Lichty & Gowen, 2021). Relationship-related treatment issues, partly increased by negative disclosure reactions, as well as betrayal, deceit, and premeditation of drugging for DFSA-I, may take longer to show clinical improvement.

4.3. Impaired trauma memory

We found that survivors absent trauma memory had significantly fewer PTSD and hyper-arousal symptoms, less hypervigilance, and less anhedonia. Although the direction of effects is similar, our findings differ from TBI research findings of fewer re-experiencing symptoms for those absent trauma memory (Bryant et al., 2009; Cnossen et al., 2017), and are also inconsistent with SA studies that found either greater lifetime PTSD with impaired memory (Zinzow et al., 2010) or no differences (Littleton et al., 2009; McConnell et al., 2017). TBI findings may differ due to additional injury impacts to the brain. Zinzow et al.'s (2010) SA study had a retrospective timeframe as opposed to our acute SA sample. Given prior DFSA research findings of lower initial but greater residual symptoms, differences between our findings and theirs may be explained by whether PTS were assessed more acutely versus years later. In the present study, more NDFSA survivors had intact memory, and some studies have found greater use of force, threat or injury for NDFSA that could explain greater PTS for this group (Abbey, Clinton, McAuslan, Zawacki, & Buck, 2002; Masters et al., 2015). However, we found no differences among SA or memory groups for injury severity nor for use of a weapon. We consider that those with intact memory have greater initial PTS because they remember the assault, but may complete treatment sooner and resolve symptoms because access to trauma memories enables greater benefit from trauma-focused therapies. The finding of fewer hyper-arousal symptoms for those absent trauma memory suggests survivors may not need as much assistance with decreasing hyper-arousal in their treatment. Distress arising from issues related to missing assault memory may not necessarily be captured by PTS assessments. Missing memory can be distressing due to concerns about what occurred during the time victims cannot remember, what someone was doing to their body, or shame about what they themselves did given the disinhibiting effects of substances (Zinzow et al., 2010). During sex crimes investigations, survivors often feel great frustration and shame in not having memory of the SA or the perpetrator, causing inherent prosecutorial challenges. Survivors have heightened and more generalized safety concerns without knowing the perpetrator(s)' identity. We found that amnestic survivors reported re-experiencing symptoms at similar levels to those with intact memory, although trauma memories may not be encoded when incapacitated. Prior studies found *relatively* fewer re-experiencing symptoms for DFSA, and our categorical assessment may account for this difference, but their findings and ours indicate re-experiencing symptoms are present nonetheless. Re-experiencing symptoms can occur in ways that are particularly distressing without the ability to cognitively connect the intrusions to their experiences. Clearly, understanding how these occur has important clinical implications for treating DFSA as well as other trauma types in which memory is impaired. Re-experiencing symptoms in amnestic survivors may result from portions of trauma memory surfacing as intrusive recollections when triggered by a trauma-related stimulus (Jaffe et al., 2019; Jaffe et al., 2019). Survivors may re-experience disturbing emotional and physical sensations, which can occur without conscious memory of an event. Even with extensively impaired explicit memory, case studies note distressing somatic memory intrusions

such as feeling a heavy weight, inability to awaken, or feeling limp and paralyzed (Padmanabhanunni & Edwards, 2012). These phenomena have been termed 'affect without recollection' and 'sensory memories' (Ehlers & Clark, 2000; Gauntlett-Gilbert et al., 2004; King, 2001). Bryant (1996) proposed that TBI patients may reconstruct an account based on communicated or imagined events, forming pseudo-memories along the lines of confabulation that cause distressing intrusions. Similarly, Rynearson (1984) found that for family survivors of homicide victims, the lack of knowledge about the violent death often results in the construction of vivid imagery surrounding the death and becomes central to the development of intrusive symptoms. Alway, Gould, Johnston, McKenzie, and Ponsford (2016) proposed these intrusive 'memories' are gradually constructed, which may explain the frequent delayed onset of PTSD for TBI patients and persistent distress for traumatic loss victims. Additionally, DFSA case-study findings highlight the manner in which peri-traumatic memories (i.e. last/first memory), though not necessarily traumatic in and of themselves, can take on traumatic proportions and become intrusive and triggering (Padmanabhanunni & Edwards, 2013).

4.4. Limitations and future directions

In addition to the small sample size, this sample was limited to survivors who initially engaged in acute RTC services, met the center's eligibility criteria, and presented to treatment when offered. Although SA groups did not differ in accepting and entering treatment, the sample was limited to those who self-selected into treatment. Caution should be taken in generalizing these findings to non-treatment seeking survivors. It is possible that those declining treatment were higher in avoidance, which is inherent in PTSD, varies among trauma survivors, and may well contribute to treatment avoidance. The help-seeking nature of the current sample makes it difficult to generalize to community and college samples, who may not recognize their experience as assault/rape, let alone seek services for it. Second, the retrospective chart review methodology limited the study to data documented in charts, including a cross-sectional intake assessment, DSM-IV-TR symptom measures using a dichotomous response format, and dichotomous memory classification that did not allow consideration of partial memory effects. Heterogeneity in the intact memory group may have affected findings or the interpretation of findings. Qualitative data was limited by the unstandardized format inherent in charting across therapists and it is possible that trauma cognitions and treatment goals were influenced by the clinician recording the data. Qualitative data content was limited to trauma-related cognitions (self, others, world), and treatment goals written in the plan by the treating clinician. Finally, because all males were in the DFSA groups, there is a potential confound in comparing SA groups. Findings from a quantitative review and from a large treatment-seeking military SA sample showed no overall gender difference in PTSD, and few differences in symptoms post-assault for male versus female survivors (Sexton, Raggio, McSweeney, Authier, & Rauch, 2017; Tolin & Foa, 2006). This suggests results would not differ a great deal if no males were included. Because the percentage of males was quite small in this study, current results are not necessarily generalizable to men and further research with larger samples to examine differences among genders is needed. Notwithstanding the limitations, this study builds upon existing literature in a number of ways. It identifies issues unique to DFSA trauma not captured by gross symptom assessment but contribute to the treatment-refractory nature of DFSA, and that can inform adaptation of evidence-based treatments. This study benefitted from the use of a real-world clinical sample of SA survivors seen acutely at an urban RTC and chart review methodology that enabled all in the identified two-year cohort to be included, allowing for greater generalizability. The early assessment timeframe potentially reduces recall biases inherent in retrospective methodologies. Few, if any, have analyzed therapy records beyond case studies for DFSA. Our expansion of Du Mont et al.'s (2009) SA subgroup classification scheme to separately examine DFSA-I and DFSA-V was clearly effective toward identification of important clinical distinctions and differential treatment needs of survivor subgroups. The striking findings of much greater SUD for DFSA-V have implications for outreach, treatment, prevention, and risk management. They inform an avenue to treatment engagement for individuals who may not be presenting otherwise due to the nature of SUD, limited resources, shame, and stigma. The trend suggesting DFSA-V survivors are more likely to have histories of childhood SA helps to characterize this vulnerable group. Walsh, DiLillo, Klanecky, and McChargue (2013) identified the hyper-arousal component of PTSD as a pathway from childhood sexual abuse to adult DFSA through coping via substance use. This warrants further investigation as it has important implications for treatment. Given the present findings of more severe self-blame and shame with voluntary substance use, future studies may benefit from a more fine-grained classification and analysis of the degree of voluntary ingestion, as some voluntary ingestion is common across all SA groups. Future studies will benefit from use of contemporary diagnostic schemes with continuous ratings to assess symptom severity as well as memory impairment, and prospective research designs to measure change over treatment course. Further qualitative research is needed to identify themes related to

the absence or partial presence of trauma memory and associated distress, and can address the problem of unsystematic clinician charting by directly interviewing clinicians and survivors using standardized questions and prompts. Additionally, direct investigation of the types of re-experiencing symptoms reported by individuals for whom trauma memory is impaired would be of benefit to the field.

4.5. Treatment considerations

There are substantial limitations of existing evidence-based treatments when trauma memory is impaired. It is noteworthy that both DFSA groups in the present study had fairly high rates of impaired memory, yet limited documentation in therapy records about it. This is likely an artifact of the documentation process, as clinic therapists include treatment goals they plan to address, but the evidence base is lacking in how to address it therapeutically. We also consider missing memory as similar to a 'negative symptom', wherein there is lack of awareness or neglect by client and/or therapist. In this case, it might not be noted in records as a focus of treatment, yet still has implications in providing therapy. Disrupted or disorganized processing of trauma memories has been shown to increase symptomatology in SA survivors (Ehlers & Clark, 2000; Halligan, Michael, Clark, & Ehlers, 2003). Therapies with the strongest empirical support generally focus on processing of trauma-related cognitions or memories (Schnyder et al., 2015). Therapists may work with impaired memory by implementing idiosyncratic adaptations of evidence-based treatments, though standardized guidelines are lacking. Padmanabhanunni and Edwards (2013) noted survivors in therapy often become preoccupied with trying to remember or believe they must remember in order to recover, as illustrated in our qualitative findings. Indeed, Jaffe et al. (2021) identified better outcomes for DFSA survivors receiving cognitive processing therapy when they did not include the written account component, in order to curtail the risk of increased rumination in attempting to focus on recalling memories. However, they still found more severe residual PTSD at post-treatment follow-up for DFSA survivors receiving the cognitive-only component. We have found that the common obstacle encountered in administering evidence-based PTSD therapies, even when not focused on processing trauma memories directly, is that they still require exploration of the context of the assault for successful processing. Facts about the situation, environment, actions, physical and emotional state, etc. at the time of the assault are needed. DFSA survivors are often not able to recall these contextual elements needed for therapists to review facts that can shift negative cognitions – a key aspect of both exposure and cognitive therapies. DFSA may be treatment refractory because therapists are less likely to successfully process the trauma with the evidence-based exposure and processing paradigms currently available. Case-based studies have provided considerations in adapting cognitive techniques for DFSA (Gauntlett-Gilbert et al., 2004; Padmanabhanunni & Edwards, 2013). Innovations in development by authors of the present study provide a means of exposure and processing of DFSA trauma-related material without requiring trauma memory, and address the distinctive concerns of survivors including betrayal and premeditation of drugging, SUD, problematic disclosure reactions and other relational issues, complicated legal processes, self-blame, stigma, and safety issues. In order to enhance recovery trajectories for DFSA survivors, findings of the present study can serve to guide treatment development.

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Disclosure statement

LR conducts forensic evaluations of SA survivors. No potential conflict of interest was reported by the other authors.

Data availability statement

Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

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