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Substance misuse and substance use disorders in sex offenders: A review ☆

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ABSTRACT

Substance abuse has often been associated with committing sex offenses. In this article, the following will be reviewed: 1) studies that assessed substance abuse in sex offenders; 2) differences in substance abuse among different types of sex offenders; 3) differences in substance abuse between sex offenders and nonsexual offenders and substance abuse in the normal population; 4) sex offenders' intoxication at the time of the offense; and 5) differences in intoxication at the time of the offense among different types of sex offenders. Studies will be discussed according to the method they used to assess substance abuse, i.e., file research, screening instruments or semi-structured interviews. This review shows that about half of the sex offenders has a history of substance abuse, a quarter to half of the sex offenders has a history of alcohol misuse and that about one fifth to a quarter of the sex offenders has a history of drug misuse. Furthermore, about a quarter to half of the sex offenders appeared to be intoxicated at the time of the offense. The review results in recommendations for future research. Because of the high prevalence of substance abuse in sex offenders it is advisable to routinely screen for substance abuse and, if necessary, to treat substance abuse.

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1. Introduction

Recently, research is increasingly focusing on the relationship between criminality and substance abuse, because significantly more offenders than non-offenders are abusing substances. For example, a review showed that 18 to 30% of male prisoners and 10 to 24% of female prisoners were diagnosed with any alcohol related disorder (Fazel, Bains, & Doll, 2006). Prevalence of drug use disorders was estimated between 10 and 48% in male prisoners and between 30 and 60% in female prisoners (Fazel et al., 2006). Although estimates of prevalence of substance use disorders varied significantly (substantial to large heterogeneity; Fazel et al., 2006), these figures are substantially higher than those in the normal population in the US where 8.5% was diagnosed with any alcohol use disorder and 2.0% was diagnosed with any drug use disorder in the past 12 months (Grant et al., 2004). Also, a substantial proportion of offenders has been found to be intoxicated by alcohol (e.g., McClelland & Teplin, 2001) or drugs (e.g., Brochu, Cournoyer, Motiuk, & Pernanen, 1999) when committing offenses, which emphasizes the connection between substance use and criminality.

Substance abuse has also been studied in sex offenders and has been examined from various perspectives. For example, some studies focused on prevalence of substance abuse in sex offenders or intoxication by substances at the time of the sex offense, while others conducted experimental studies focusing on the mechanisms that underlie the relationship between sex offenses and substance use (for a review, see Testa, 2002). Also, alcohol and drug (ab)use has been studied in victims of sex offenses (e.g., Abbey, McAuslan, & Ross, 1998). In addition, substance abuse has been investigated in different sex offender populations, such as convicted sex offenders in prison (e.g., Peugh & Belenko, 2001) or forensic hospitals (e.g., Harsch, Bergk, Steinert, Keller, & Jockusch, 2006), or college students who admitted to having committed sex crimes (e.g., Koss & Gaines, 1993; Ouimette, 1997).

Sex offenders comprise a heterogeneous group. To allow further study, several models have been developed to classify them. These (multi-axial) classification models distinguish between different types of sex offenders, such as rapists versus child molesters, male versus female sex offenders, adult versus adolescent sex offenders, etc. (Robertiello & Terry, 2007). Additionally, Robertiello and Terry (2007) distinguish subtypes of these typologies, such as sexualized versus non-sexualized rapists.

An explanation for the association between alcohol use and sexual violence is offered by Seto and Barbaree (1995), who proposed a disinhibition model for alcohol and sexual violence. Seto and Barbaree defined inhibition as "a decrease in the likelihood of a behavioral response due to directly experienced or observed negative consequences for this behavior in similar situations" (p. 558). Disinhibition takes places when "the usual level of behavioral inhibition is reduced" (p. 558). According to them, alcohol leads to disinhibition of behavior in three ways. 1) first, when stronger beliefs are held regarding the disinhibiting properties of alcohol, such as reducing anxiety, it increases the likelihood that alcohol will act as a disinhibitor upon consumption. 2) alcohol consumption leads to applying more liberal norms concerning socially condemned behavior, insomuch that disinhibition of behavior is to be expected. And 3) alcohol has pharmacological effects that interfere with processing inhibitory cues, e.g., women's refusal.

Seto and Barbaree's (1995) disinhibition model emphasizes the importance of recognizing alcohol use as a risk factor for sexual aggression. Many studies acknowledged this and examined the prevalence of alcohol misuse in this population. However, to date, these studies have not been reviewed, and thus, a summary of the number of sex offenders that have alcohol use problems is lacking. The prevalence of drug misuse in sex offenders is also included. The purpose of this article is fivefold: 1) summarizing studies that assessed substance abuse in different types of sex offenders, 2) because sex offenders comprise a heterogeneous group, comparing prevalence rates of substance abuse among different subtypes of sex offenders, 3) comparing sex offenders to nonsexual offenders and normal population controls with regard to substance abuse to examine whether sex offenders differ in substance abuse from other offenders and people in the normal population, 4) examining the proportion of sex offenders that was intoxicated at the time of the offense, and 5) comparing different subtypes of sex offenders with regard to intoxication at the time of the offense.

A complicating factor is that only some of the studies described in this review did use the formal Diagnostic and Statistical Manual of mental disorders (DSM; APA, 1994) criteria for alcohol or drug abuse and dependency. The other studies used other definitions of alcohol and drug (mis)use or remained unclear in their definitions. Therefore, in this article, the phrases alcohol/drugs abuse and dependency are reserved for those studies that used the DSM-criteria, whereas the term misuse is applied for those studies that did not follow the DSM. The phrase "substance abuse" will be used as a general phrase and can refer to alcohol and/or drug misuse as well as to any DSM substance related disorder. It is important to notice that the definitions of the DSM-diagnoses substance abuse and dependence have changed over the years and thus over the course of the studies that are discussed in this article.

Search engines that were used to collect literature for this review were Scopus, Web of Science and PsycINFO. The following search strings were entered: 'sex offen* OR rapis* OR child molest* OR pedophil* OR incest offende* OR exhibitionis* OR sexual murde* AND substance use OR substance abuse OR substance dependence OR alcohol use OR alcohol abuse OR alcohol dependence OR drug use OR drug abuse OR drug dependence OR addiction'. In addition, references of the studies that were identified in this way were reviewed to identify studies that were missed while searching for literature. Also, references of the studies that cited the identified studies were checked.

Studies were included in this review if they assessed substance abuse in forensic sex offender populations by means of self-report. The following three methods were distinguished: 1) retrospective file research, 2) use of self-report (screening) questionnaires, or 3) use of semi-structured interviews. We discriminated between these different research methods because of the following reasons. 1) diagnostic agreement with regard to substance use disorders between clinical evaluations (as is done in studies that studied patients files to assess substance abuse) and semi-structured interviews was moderate (Rettew, Doyle Lynch, Achebach, Dumenci, & Ivanova, 2009). Clinical evaluations estimated lower prevalence figures of alcohol as well as drug use disorders than standardized diagnostic interviews (Rettew et al., 2009). 2) Recommended cut-off scores of screening instruments often have high sensitivity (Hendriks, 2009). In practice, high sensitivity results in lower specificity, which leads to a relatively high number of false positives and thus an overestimation of the prevalence of substance abuse (Hendriks, 2009). Because these different methods yield different results, results should be discussed separately.

In total, 42 studies meeting inclusion criteria were included in this review; 16 studies were excluded for various reasons (see Appendix).

2. Prevalence of substance misuse and substance use disorders in sex offenders

Tables 1–3 show 42 studies that examined substance abuse in sex offenders. Below, these studies will be discussed according to the research method that was used to obtain the data.

2.1. Retrospective file research

Thirteen studies that used retrospective file research to assess substance abuse are reported in Table 1. Five studies reported prevalence rates of lifetime substance misuse without distinguishing

Table 1
History of substance abuse among sex offenders: retrospective file research.

Study	N	Sample(s)	Outcome measure	(%)
Rada (1975)	77	Rapists	Alcoholism	35.1
Gratzer and Bradford (1995)	28	Sexual sadists who attempted/committed sexual homicide	Drug misuse	50.0
	29	Non-sexual sadists who attempted/committed sexual homicide	Drug misuse	54.8
Tzeng et al. (1999)	532	Child molesters	Substance abuse	51.3
			Alcohol misuse	27.3
			Cocaine misuse	5.3
			Other drug misuse	14.0
Kubik et al. (2002)	10	Female adolescent sex offenders	Alcohol misuse	10.0[a]
			Drug misuse	10.0[a]
	11	Female adolescent nonsexual offenders	Alcohol misuse	63.6
			Drug misuse	63.6
	11	Male adolescent sex offenders	Alcohol misuse	20.0
			Drug misuse	10.0
Iqbal et al. (2004)	137	Deaf SO	Alcohol misuse	19
Looman et al. (2004)[d]	41	Rapists	Alcohol misuse	82.6[e]
			Drug misuse	65.2
	25	Child molesters	Alcohol misuse	66.7
			Drug misuse	41.7
	29	Nonsexual violent offenders	Alcohol misuse	27.4
			Drug misuse	44.8
Carlstedt et al. (2005)[d]	70	Child molesters with pedophilia	Substance abuse	23
	103	Child molesters without pedophilia	Substance abuse	33
Firestone et al. (2005)	48	Incest offenders; victims <6	Alcohol dependence	50.0[a]
			Drug misuse	85.4[a]
	71	Incest offenders; victims >11	Alcohol dependence	27.0
			Drug misuse	9.4
Hill et al. (2007)	130	Sexual murderers: single victim	Any substance use disorder	50.0
			Alcohol abuse	27.7
			Alcohol dependence	19.3
			Any alcohol use disorder[f]	47.0
			Any drug use disorder	10.2
	36	Sexual murderers: multiple victims	Any substance use disorder	47.7
			Alcohol abuse	25.4
			Alcohol dependence	19.2
			Any alcohol use disorder[f]	44.6
			Any drug use disorder	9.2
Briken et al. (2006)	47	Sexual murderers without PRD/PA	Alcohol dependence	25.5
	29	Sexual murderers with PRD	Alcohol dependence[b]	31.0
	29	Sexual murderers with PA	Alcohol dependence	3.4
	56	Sexual murderers PRD/PA	Alcohol dependence	17.9
Alish et al. (2007)	36	SO with schizophrenia	Substance abuse[c]	44.4
	80	SO without schizophrenia	Substance abuse	26.3
	57	Non-SO with schizophrenia	Substance abuse	66.3
Poortinga et al. (2007)	38	Child molesters; victims <6	Substance abuse	44.7
	125	SO; victims >11	Substance abuse	51.2
Rojas et al. (2007)	102	Adolescent aboriginal SO	Substance abuse	56.7[a]
	257	Adolescent non-aboriginal SO	Substance abuse	28.6
Bader et al. (2008)	202	Exhibitionists	Alcohol misuse	
			Drug misuse	27.4
				34.9

SO = sex offenders; PRD = paraphilia related disorder; PA = paraphilic disorders.
[a] Significant difference between groups ($p<.05$).
[b] PRD vs. PA group differences statistically significant ($p<.05$).
[c] Significantly more non-sexual offenders with schizophrenia had a history of substance abuse than sex offenders with schizophrenia and more nonsexual offenders had a history of substance abuse than sex offenders without schizophrenia.
[d] Studies are also reported in Table 4.
[e] More rapists and child molesters had a history of alcohol misuse than nonsexual violent offenders.
[f] Variable calculated by the authors.

between alcohol and drug misuse and found that between 23% and 56.7% (median = 44.4%) of sex offenders had a history of substance abuse (Alish et al., 2007; Carlstedt, Innala, Brimse, & Söderström Anckarsäter, 2005; Tzeng, Robinson, & Karlson, 1999; Poortinga, Lemmen, & Majeske, 2007; Rojas & Gretton, 2007). One study (Hill, Habermann, Berner, & Briken, 2007) reported prevalence rates of

Notes to Table 2:
SO = sex offenders; MAST = Michigan Alcoholism Screening Test; DAST = Drug Abuse Screening Test; SADD = Short Alcohol Dependence Data.
[a] Significant difference between groups ($p<.05$).
[b] Nonsexual violent offenders scored significantly lower than rapists and child molesters ($p<.05$).
[c] Nonsexual violent offenders scored significantly higher than rapists and child molesters ($p<.05$).
[d] Rapists scored significantly higher than the normal population control subjects ($p<.05$).
[e] Rapists scored significantly higher on the MAST than nonsexual violent offenders ($p<.05$.
[f] Rapists scored significantly higher than child molesters on the DAST.
[g] Studies are also reported in Table 1.
[h] SADD and DAST were also administered, but were not included in the table because no exact scores or percentages were provided.
[i] Sex offenders with victims >18 years had significantly higher DAST scores than both sex offender subgroups with younger victims ($p<.05$).

lifetime DSM-IV substance use disorders and found that 50% of sexual murderers with one victim and 48% of sexual murderers with multiple victims were diagnosed with any lifetime substance use disorder.

Five studies reported prevalence rates of any lifetime alcohol misuse in sex offenders; figures varied between 3.4% and 47.0% (median = 27.3%; Bader, Schoeneman-Morris, Scalora, & Casady,

Table 2
Studies that used screening instruments to assess alcohol and drug misuse.

Study	N	Type of sample	Instrument	Mean (S.D.)	Diagnosis according to screening instrument	%
Rada (1976)	108	Child molesters against girls	MAST		Alcohol misuse	44
	82	Child molesters against boys	MAST		Alcohol misuse	58
	13	Child molesters against both sexes	MAST		Alcohol misuse	54
Rada et al. (1976)	52	Rapists	MAST		Alcohol misuse	38
	12	Child molesters	MAST		Alcohol misuse	42
Langevin and Lang (1990)	240	Extrafamilial child molesters	MAST	11.0 (13.1)		
			DAST	2.9 (4.4)		
	167	Incest offenders	MAST	10.4 (12.2)		
			DAST	3.2 (3.7)		
	35	SO against females	MAST	8.2 (13.3)		
			DAST	–		
	16	Exhibitionists	MAST	6.7 (5.7)		
			DAST	–		
Langevin et al. (1999)	19	Physician SO	MAST	–	Alcohol misuse	15.8[a]
			DAST	–	Drug misuse	15.8
	19	Non-physician SO	MAST	–	Alcohol misuse	36.8
			DAST	–	Drug misuse	26.3
Abracen et al. (2000)	72	Rapists	MAST	9.3 (7.2)		
			DAST	5.5 (5.4)		
	34	Child molesters	MAST	7.1 (6.6)		
			DAST	4.3 (5.3)		
	24	Nonsexual violent offenders	MAST	3.7 (3.6)[b]		
			DAST	8.0 (3.6)[c]		
Langevin et al. (2000)	24	Clerical SO	MAST	–	Alcohol misuse	29.9
			DAST	–	Drug misuse	4.2
	24	Non-clerical SO	MAST	–	Alcohol misuse	33.3
			DAST	–	Drug misuse	12.5
Aromäki and Lindman (2001)	10	Rapists	MAST	26.0 (19.6)[d]		
	10	Child molesters	MAST	14.5 (13.2)		
	31	Normal population control subjects	MAST	8.3 (9.5)		
Looman et al. (2004)[g]	41	Rapists	MAST	8.1 (7.2)[e]		
			DAST	5.4 (5.7)		
	25	Child molesters	MAST	5.3 (6.8)		
			DAST	4.9 (5.5)		
	29	Nonsexual violent offenders	MAST	3.0 (4.1)		
			DAST	4.8 (5.3)		
Firestone et al. (2005)[g]	48	Incest offenders; victims <6	MAST	16.9 (17.3)[a]	Alcohol misuse[a]	50.0
	71	Incest offenders; victims >11	MAST	5.1 (8.7)	Alcohol misuse	27.0
Greenberg et al. (2005)	51	Men who abused biological daughters	MAST	8.84 (13.74)		
	38	Men who abused step/adopted daughters	MAST	10.74 (16.03)		
Abracen et al. (2006)	91	Rapists/Child molesters	MAST	8.4 (?)[a]		
	48	Rapists	DAST	8.0 (?)[f]		
	43	Child molesters	DAST	4.9 (?)		
	21	Nonsexual violent offenders	MAST	5.5 (?)		
			DAST	6.8 (?)		
Langevin (2006)	778	SO	MAST		Alcohol misuse	50.9
Marshall and Marshall (2006)	14	SO sexual addicts	MAST	12.6 (15.7)		
			DAST	3.1 (4.1)		
	26	SO non-sexual addicts	MAST	8.8 (7.5)		
			DAST	2.5 (3.3)		
Baltieri and Andrade (2008c)	149	SO with one victim	SADD	13.0 (13.9)		
			DAST	4.3 (7.8)		
	25	SO with two victims	SADD	14.2 (14.0)		
			DAST	3.1 (6.6)		
	24	SO with three or more victims	SADD	13.1 (16.6)		
			DAST	2.4 (6.7)		
Baltieri and Andrade (2008a)[h]	48	Child molesters against boys	CAGE		Alcohol misuse	89.6
	52	Child molesters against girls	CAGE		Alcohol misuse	48.0
Baltieri and Andrade (2008b)	46	Child molesters; victims <11	CAGE	11.4 (12.8)	Alcohol misuse	43.5
			SADD	3.0 (6.7)[i]		
			DAST	8.1 (12.2)		
	43	SO; victims 12–18	CAGE	1.9 (5.5)	Alcohol misuse	30.2
			SADD			
			DAST			
	42	SO; victims >18	CAGE		Alcohol misuse	38.1
			SADD	10.6 (13.3)		
			DAST	9.9 (9.9)		

2008; Iqbal, Dolan, & Monteiro, 2004; Kubik, Hecker, & Righthand, 2002; Looman, Abracen, DiFazio, & Maillet, 2004; Tzeng et al., 1999). Furthermore, Hill et al. (2007) found that 46.5% of sexual murderers fulfilled DSM-criteria for any alcohol use disorder. In addition, four studies displayed in Table 1. reported that between 19.2% and 50.0% (median = 26.3%) of sex offenders met DSM-criteria for alcohol dependence/alcoholism (Briken, Habermann, Kafka, Berner, & Hill, 2006; Firestone, Dixon, Nunes, & Bradford, 2005; Hill et al., 2007; Rada, 1975). Finally, only Hill et al. (2007) study reported prevalence figures regarding DSM-IV alcohol abuse: 27.2% of sexual murderers were diagnosed with alcohol abuse.

Five studies assessed drug misuse in sex offenders. Prevalence figures that were found among different studies varied widely; studies showed that between 9.4% and 85.4% (median = 38.3%) of sex offenders were classified as drug misusers (Firestone et al., 2005; Gratzer & Bradford, 1995; Kubik et al., 2002; Looman et al., 2004; Bader, Schoeneman Morris, Scalora, & Casady, 2008). Unfortunately, only one study provided information on the specific type of drug that was abused: Tzeng et al. (1999) found that 5.3% of child molesters had a history of cocaine misuse and 14.0% had a history of other drug misuse. Finally, again Hill et al. (2007) study was the only study that classified substance use disorders according to the DSM-IV, i.e., of sexual murderers, 10.0% was diagnosed with any lifetime drug use disorder.

2.2. Screening instruments

Sixteen studies were identified that studied alcohol and drug misuse in sex offenders using screening instruments (see Table 4). All of them assessed alcohol misuse. Thirteen used the Michigan Alcoholism Screening Test (MAST; Selzer, 1971) for that purpose, an instrument consisting of 25 dichotomous items. A MAST-score between 0 and 3 is considered non-alcoholic, a score of 4 is suggestive of alcohol use problems and a score between 5 and 50 is indicative of alcoholism (Selzer, 1971). On the basis of the MAST, six studies classified between 15.8% and 80.0% of sex offenders as alcohol abuser (i.e., MAST scores of 5 of higher; median = 47.5%) (Langevin, 2003, 2006; Langevin, Curnoe, & Bain, 2000; Langevin, Glancy, Curnoe, & Bain, 1999; Rada, 1976; Rada, Laws, & Kellner, 1976). This can be considered a wide range. Eight studies calculated *mean* MAST scores and found a wide range of scores varying from 5.1 to 26.0 (median = 9.5; Abracen, Looman, & Anderson, 2000; Abracen, Looman, DiFazio, Kelly, & Stirpe, 2006; Aromäki & Lindman, 2001; Firestone et al., 2005; Greenberg, Firestone, Nunes, Bradford, & Curry, 2005; Langevin & Lang, 1990; Looman et al., 2004; Marshall & Marshall, 2006). Given that that a score of 5 or higher is indicative of alcohol dependence (Selzer, 1971), this suggests that the majority of subjects were suffering from alcohol use disorders.

Furthermore, two studies used the Short Alcohol Dependence Data (SADD; 15 items, Davidson & Raistrick, 1986) to determine alcohol use disorders in sex offenders. Scores were interpreted as follows: 1–9: low dependence, 10–19: medium dependence; 20 or more: high dependence. Mean SADD scores of sex offenders ranged from 8.1 to 14.2 (median = 12.2; (Baltieri & Andrade, 2007, 2008b). Besides, two studies reported used the CAGE (Mayfield, McLeod, & Hall, 1974) to determine alcohol misuse in sex offenders. The CAGE is a short questionnaire with 4 yes/no items. A positive answer to two or more questions is considered clinically significant and indicative of alcohol dependence (Mayfield et al., 1974). Between 30.2% and 89.6% (median = 43.5%) of sex offenders turned out to have alcohol use problems as judged with the CAGE (Baltieri & Andrade, 2008a,b). Overall, when alcohol misuse in sex offenders was assessed with screening instruments, a median of 42% of sex offenders were classified as alcohol abuser.

Nine studies determined drug misuse in sex offenders. All nine studies used the Drug Abuse Screening Test (DAST; 28 items; Skinner, 1982) for this purpose; scores over 5 are indicative of drug misuse. On the basis of the DAST, two studies classified between 4.2% and 26.3% (median = 14.2%) of sex offenders as drug abuser (Langevin et al., 2000, 1999). Seven studies calculated *mean* DAST scores and found mean scores between 1.9 and 9.9 (median = 3.8; Abracen et al., 2000, 2006; Baltieri & Andrade, 2007, 2008b; Langevin & Lang, 1990; Looman et al., 2004; Marshall & Marshall, 2006).

2.3. Semi-structured interviews

Twelve studies used semi-structured interviews to diagnose substance use disorders in sex offenders (see Table 3.). These studies can be subdivided into studies that diagnosed lifetime and current substance use disorders in sex offenders; one study (Raymond, Coleman, Ohlerking, Christenson, & Miner, 1999) focused on both types of substance related disorders.

Several different instruments were used to diagnose substance use disorders in sex offenders. Most studies used the SCID-I (First, Spitzer, Gibbon, & Williams, 2002) for this purpose. Besides, one study used the Geriatric Mental State Schedule (GMS; Copeland et al., 1976), a semi-structured interview to assess the mental state of the elderly, one study the Diagnostic Interview Schedule — Version III-A (DIS-III-A; Robins, Helzer, Ratcliff, & Seyfried, 1982) a structured interview that was developed by the National Institute of Mental Health. Another study used the German version of the Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1997; German version: Margraf, 1994), a structured interview to diagnose the major mental disorders and finally, a last study used the DSM-III-R Diagnostic Interview for Children and Adolescents (DICA-R; Reich, Herjanic, Welner, & Gandhy, 1982), a structured diagnostic interview that covers the major mental disorders in childhood.

Again, prevalence figures varied widely among different studies. Four studies that provided figures of lifetime substance use disorders reported that between 50.0% and 100% (median = 58.5%) of sex offenders fulfilled DSM-criteria for any lifetime substance use disorder (Dunsieth et al., 2004; Galli et al., 1999; Leue, Borchard, & Hoyer, 2004; Raymond et al., 1999). Furthermore, seven studies showed that between 3.8% and 90.9% (median = 38.9%) of sex offenders were diagnosed with lifetime alcohol abuse or dependence (Dunsieth et al., 2004; Eher, Grünhut, Frühwald, & Hobl, 2001; Eher, Neuwirth, Fruehwald, & Frottier, 2003; Galli et al., 1999; Motiuk & Porporino, 1992; Myers & Blashfield, 1997; Raymond et al., 1999). Five studies found that between 8% and 40.4% (median = 17.5%) of sex offenders were diagnosed with any lifetime drug use disorder (Dunsieth et al., 2004; Eher et al., 2001, 2003; Leue et al., 2004; Motiuk & Porporino, 1992).

Notes to Table 3:
SO = sex offenders; C. = current; L. = liefetime; F. = female; J. = juvenile; hall. = hallucinogenic; SCID-I = Structured Clinical Interview for DSM-IV Axis-I Disorders; DIS-III-A = Diagnostic Interview Schedule — Version III-A; DICA-R = Diagnostic Interview for Children and Adolescents; GMS = Geriatric Mental State Schedule; Mini-DIPS = *Diagnotisches Kurz-Interview bei Psychischen Störungen*.

[a] $p < .05$.

[b] Alcohol and drug use disorders were diagnosed using *wide* diagnostic criteria (in contrast with *stringent* diagnostic criteria).

[c] Less sex offenders fulfilled diagnostic criteria for any lifetime alcohol use disorder than homicide offenders, offenders who were convicted of manslaughter, offenders that were convicted of robbery or other offenders.

[d] Less sex offenders fulfilled diagnostic criteria for any lifetime drug use disorder than homicide offenders, offenders that were convicted for manslaughter, offenders that were convicted of robbery, drug offenders and other offenders.

[e] More nonsexualized rapists and sexualized rapists had a history of any alcohol use disorder than child molesters.

[f] More sex offenders in forensic psychiatry and sex offenders in prison were diagnosed with any current substance use disorder than nonsexual violent offenders.

In addition, Dunsieth et al. (2004) reported that 60.7% of sex offenders with paraphilias and 69.2% of sex offenders without paraphilias had a history of both alcohol and drug use disorders and Leue et al. (2004) found that 57% of sex offenders with paraphilia and 56% of sex offenders without paraphilia were diagnosed with lifetime alcohol dependence.

Only two studies reported figures of lifetime diagnoses of specific types of drugs, i.e., Galli et al. (1999) reported that 36% of their sample of adolescent child molesters fulfilled DSM-criteria for any lifetime cannabis use disorder (i.e., abuse or dependence) and 5% for lifetime inhalant abuse. Besides, Raymond et al. (1999) found that 37.8% of their sample of pedophilic child molesters were diagnosed

Table 3
Studies that used structured interviews based on DSM-IV criteria to diagnose substance use disorders.

Study (year)	N	Type of sample	Instrument	Diagnosis	%
Becker et al. (1986)	19	Juvenile incest offenders	SCID-I	C. alcohol or cannabis abuse	21.1
Kavoussi et al. (1988)	58	Adolescent SO	SCID-I	C. alcohol abuse	12.1
				C. cannabis abuse	15.5
				C. cocaine abuse	1.7
				C. hallucinogen abuse	1.7
Motiuk and Porporino (1991)	103	SO	DIS-III-A[b]	L. alcohol use disorder	58.3[c]
				L. drug use disorder	30.1[d]
	337	Homicide offenders	DIS-III-A	L. alcohol use disorder	68.8
				L. drug use disorder	43.6
	98	Ss convicted for manslaughter	DIS-III-A	L. alcohol use disorder	78.6
				L. drug use disorder	48.0
	498	Ss convicted for robbery	DIS-III-A	L. alcohol use disorder	74.5
				L. drug use disorder	67.7
	105	Drug offenders	DIS-III-A	L. alcohol use disorder	51.4
				L. drug use disorder	43.8
	1044	Other offenders	DIS-III-A	L. alcohol use disorder	72.5
				L. drug use disorder	54.2
Green and Kaplan (1994)	11	F. child molesters	SCID-OP	C. alcohol/substance abuse	73
	11	F. nonsexual violent offenders	SCID-OP	C. alcohol/substance abuse	100
Myers and Blashfield (1997)	14	J. sexual homicide offenders	DICA-R	C. alcohol abuse	21.4
				C. cannabis abuse	35.7
				C. hallucinogen abuse	7.1
Galli et al. (1999)	22	Adolescent child molesters	SCID-I	Any L. substance use disorder	50
				L. alcohol abuse/dependence	36
				L. cannabis abuse/dependence	36
				L. inhalant abuse	5
Raymond et al. (1999)	45	Pedophilic child molesters	SCID-P	Current	
				Alcohol use disorder	4.4
				Lifetime	
				Any substance use disorder	60.0
				Alcohol use disorder	51.1
				Cannabis use disorder	37.8
				Stimulant use disorder	11.1
				Opioid use disorder	4.4
				Cocaine use disorder	17.8
				Hall./PCP use disorder	2.2
				Polydrug use disorder	8.9
				Other drug use disorder	6.7
Eher et al. (2001)	48	Child molesters	SCID-I	L. alcohol abuse/dependence	41.7
				L. drug abuse/dependence	10.5
Fazel et al. (2002)	101	Elderly SO (> 59 years old)	GMS	C. substance abuse/dependence	1.0
	102	Elderly nonsexual offenders (> 59 years old)	GMS	C. substance abuse/dependence	8.8
Eher et al. (2003)	22	Nonsexualized rapists	SCID-I	L. alcohol abuse/dependence	90.9[e]
				L. alcohol abuse/dependence	27.3
	30	Sexualized rapists	SCID-I	L. drug abuse/dependence	76.7
				L. drug abuse/dependence	10.0
	45	Child molesters	SCID-I	L. alcohol abuse/dependence	26.7
				L. alcohol abuse/dependence	40.4
McElroy et al. (1999); Dunsieth et al. (2004)	84	SO with paraphilias	SCID-I/P	Any L. substance use disorder	82.1[a]
				L. alcohol use disorder	9.5
				L. drug use disorder	11.9[a]
				L. alcohol & drug use disorder	60.7
	26	SO without paraphilias	SCID-I/P	Any L. substance use disorder	100.0
				L. alcohol use disorder	3.8
				L. drug use disorder	26.9
				L. alcohol & drug use disorder	69.2
Leue et al. (2004)	30	SO with paraphilia	Mini-DIPS	Any L. substance use disorder	57
				L. alcohol dependence	57
				L. drug use disorder	23
	25	SO without paraphilia	Mini-DIPS	Any L. substance use disorder	56
				L. alcohol dependence	56
				L. drug use disorder	8
Harsch, Bergk, et al. (2006); Harsch, Keller, and Jockusch (2006)	40	SO in forensic psychiatry	SCID-I	Any C. substance use disorder	100.0[f]
	30	SO in prison	SCID-I	Any C. substance use disorder	87.3
	26	Nonsexual violent offenders	SCID-I	Any C. substance use disorder	69.2

with any lifetime cannabis use disorder, 11.1% with any stimulant use disorder, 4.4% with any opioid use disorder, 17.8% with any cocaine use disorder, 2.2% with any hallucinogenic/PCP use disorder, 6.7% with any other drug use disorder and 8.9% with a poly drug use disorder.

For the prevalence of current substance related disorders in sex offenders, the following figures were found. Three studies found that between 1.0% and 100.0% (median = 80.2%) of sex offenders were currently diagnosed with any substance use disorder (Fazel, Hope, O'Donnell, & Jacoby, 2002; Green & Kaplan, 1993; Harsch, Bergk, et al., 2006).

Furthermore, Becker, Kaplan, Cunningham-Rathner, and Kavoussi (1986) reported that 21.1% of juvenile incest offenders were diagnosed with current alcohol or cannabis abuse. Kavoussi, Kaplan, and Becker (1988) found that 12.1% of adolescent sex offenders were currently diagnosed with alcohol abuse, 15.5% with cannabis abuse and 1.7% with cocaine abuse. Finally, Raymond et al. (1999) found that 4.4% of pedophilic child molesters met DSM-criteria for any current alcohol use disorder and another 4.4% for any current drug use disorder.

2.4. Conclusion

Regardless of the research method that was used to examine substance abuse in sex offenders, about half of the population was diagnosed with lifetime substance abuse. Furthermore, lifetime alcohol misuse was diagnosed in about a quarter to half of the sex offenders and lifetime drug misuse was diagnosed in about one fifth to a quarter of sex offenders, depending on the research method that was used. Finally, studies that assessed substance abuse by means of screening instruments found that sex offenders' mean screening scores regarding alcohol misuse were generally high, whereas mean screening scores regarding drug misuse were moderate.

For substance abuse without distinguishing between the substances that were used, higher rates were found when semi-structured interviews were used than with retrospective file research (median's are 58.5% and 44.4%, respectively). For alcohol misuse, the highest rates were found when alcohol misuse was assessed with screening instruments (median = 47.5%), followed by semi-structured interviews (median = 38.9%) and retrospective file research (median = 27.3%). These results are in accordance with the methodological issues that are described above: screeners tend to overestimate the prevalence of substance abuse (Hendriks, 2009), and higher rates of substance abuse are reported when semi-structured interviews are used than when these are not used (Rettew et al., 2009). However, for drug misuse, the highest rates were found when drug misuse was assessed by means of retrospective file research (median = 38.3%), followed by structured interviews (median = 17.5%), and screening instruments (14.2%), which is not in line with the above.

It is noticeable that prevalence rates of substance abuse among sex offenders vary widely (wide variance). At the most extreme are the prevalence rates for any substance use disorder as assessed with semi-structured interviews; these figures ranged from 1.0% to 100.0%. An explanation for this might be that different types of sex offenders are very different with regard of substance abuse. Another limitation is that the number of participants that were studied varied widely among studies; sample sizes range from 10 (Aromäki & Lindman, 2001; Kubik et al., 2002) to 778 participants (Langevin, 2006).

3. Differences among different types of sex offenders with regard to the prevalence of substance abuse

3.1. Retrospective file research

Several retrospective studies compared substance abuse in different subtypes of sex offenders with one another (see Table 1.). Three out of ten studies that compared different subtypes of sex offenders with regard to the prevalence of substance use disorders found differences between these groups. Firestone et al. (2005) found that more incest offenders with victims younger than 6 years had a history of alcohol dependence or drug misuse than incest offenders with victims older than 12 years old. However, these results were not replicated in the study by Poortinga et al. (2007), who found no difference in substance use between child molesters with victims under 6 years old versus sex offenders with victims older than 11 years. Furthermore, Briken et al. (2006) found that sexual murderers who met diagnostic criteria for paraphilia related disorders (such as compulsive masturbation or pornography dependence) were more often diagnosed with alcohol dependence than those who met diagnostic criteria for DSM-IV paraphilic disorders (such as sexual sadism, masochism, and fetishism, etcetera). Finally, Rojas and Gretton's (2007) results revealed that adolescent aboriginal sex offenders more often had a history of substance abuse than adolescent non-aboriginal adolescent sex offenders.

The other seven studies reported in Table 1. did not find differences in substance use disorders among the groups under study, i.e., between rapists to child molesters (Looman et al., 2004), female adolescent sex offenders to male adolescent sex offenders (Kubik et al., 2002), child molesters with victims under 6 with sex offenders with victims older than 11 (Poortinga et al., 2007), child molesters with pedophilia to child molesters without pedophilia (Carlstedt et al., 2005), sexual sadists who attempted/committed sexual homicide to nonsexual sadists who attempted/committed sexual homicide (Gratzer & Bradford, 1995), sexual murders with one victim to sexual murderers with multiple victims (Hill et al., 2007), and sexual murderers with several different paraphilias or paraphilia related disorders (Briken et al., 2006).

3.2. Screening instruments

Fifteen studies that used screening instruments to determine substance abuse compared different subtypes of sex offenders with one another with regard to the prevalence of substance abuse (see Table 4.); four of these studies found significant differences. First, Abracen et al. (2006) found that rapists scored significantly higher on the DAST than child molesters. Further, Firestone et al. (2005) found that incest offenders with younger victims scored significantly higher on the MAST and were significantly more often diagnosed with alcohol misuse on the basis of the MAST than incest offenders with older victims. In contrast, Baltieri and Andrade (2008b) found that sex offenders with victims over 18 years old scored higher on the DAST in comparison to sex offenders with victims under 12 years old and sex offenders with victims between 12 and 18. However, no between groups differences were found with regard to alcohol problems as determined with the CAGE and the SADD. In addition, Langevin et al.'s (1999) results demonstrated that more non-physician sex offenders were abusing alcohol as diagnosed with the MAST than physician sex offenders.

The other eleven studies did not find differences among different types of sex offenders. These studies compared rapists to child molesters (Abracen et al., 2000; Aromäki & Lindman, 2001; Looman et al., 2004; Rada et al., 1976), extrafamilial child molesters, incest offenders, sex offenders against females and exhibitionists with one another (Langevin & Lang, 1990), clerical to non-clerical sex offenders (Langevin et al., 2000), men who abused biological daughters to men who abused non-biological daughters (Greenberg et al., 2005), sexual addicted sex offenders to sex offenders who were not addicted to sex (Marshall & Marshall, 2006), sex offenders with one, two and three victims, respectively (Baltieri & Andrade, 2007), rapists to sexual murders (Oliver, Beech, Fisher, & Beckett, 2007), and child molesters against boys to child molesters against girls (Baltieri & Andrade, 2008a).

Table 4
Intoxication at the time of the offense among different types of sex offenders.

Study (year)	N	Type of sample	Intoxicated by … at the time of the offense	%
Rada (1975)	77	Rapists	Alcohol	49.4
			Drugs	9.1
Tzeng et al. (1999)	532	Child molesters	Any substance	32.9
			Alcohol	24.8
			Alcohol & drugs	3.0
			Psychoactive dr.	2.4
			Heroin	0.6
			Other drugs	2.1
Briken et al. (2006)	47	Sexual murderers without PRD/PA	Alcohol[a]	70.2
	29	Sexual murderers with PRD	Alcohol	85.7
	29	Sexual murderers with PA	Alcohol	46.4
	56	Sexual murderers PRD/PA	Alcohol	54.5
Rojas and Gretton (2007)*	102	Adolescent aboriginal SO	Any substance	25.0
	257	Adolescent non-aboriginal SO	Any substance	8.9
Bader et al. (2008)	202	Exhibitionists	Alcohol	9.4
			Drugs	2.5
Rada (1976)	108	Child molesters against girls	Alcohol	57[b]
	82	Child molesters against boys	Alcohol	38
	13	Child molesters against both sexes	Alcohol	54
Rada et al. (1976)	52	Rapists	Alcohol	44
	12	Child molesters	Alcohol	42
Aromäki and Lindman (2001)	10	Rapists	Any substance	86 (sic!)
	10	Child molesters	Any substance	80
Greenberg et al. (2005)	83	Men who abused biological daughters	Any substance	26.5
	58	Men who abused step/adopted daughters	Any substance	32.8
Langevin (2006)	778	SO	Drugs	23.4

SO = sex offenders; dr. = drugs; PRD = paraphilia related disorder; PA = paraphilic disorder.
[a] Only PA vs. PA + PRD do not differ significantly at $p<.05$.
[b] Significantly more child molesters against girls than child molesters against boys were drinking at the time of the offense ($p<.05$).
* $p<.05$.

3.3. Semi-structured interviews

Five out of thirteen studies that used semi-structured interviews to diagnose substance use disorders compared different subtypes of sex offenders with one another with respect to the prevalence of substance use disorders. Two of these studies found significant differences between groups. Eher et al. (2003) found that sexualized rapists (i.e., primary motive for rape is sexual; Knight & Prentky, 1990) and nonsexualized rapists (i.e., primary motive for rape is aggression, hostility, or vindictiveness; Knight & Prentky, 1990) were more often diagnosed with any lifetime alcohol use disorder than child molesters. Dunsieth et al. (2004) found that sex offenders without paraphilias were more often diagnosed with any lifetime substance use disorder as well as any lifetime drug use disorder than sex offenders with paraphilias. However, a similar study did not find differences with regard to lifetime substance use disorders between sex offenders with versus without paraphilias (Leue et al., 2004). Finally, Harsch, Bergk, et al. (2006) and Harsch, Keller, and Jockusch (2006) found that sex offenders in forensic psychiatry were more often diagnosed with any current substance related disorder than sex offenders in prison.

3.4. Conclusion

Different studies compared different subtypes of sex offenders with one another with regard to substance abuse. However, the comparisons that were made were different among different studies. Only the prevalence of substance abuse in rapists and child molesters is compared several times with one another, but these studies did not find consistent differences between these types of sex offenders (Abracen et al., 2000, 2006; Aromäki & Lindman, 2001; Eher et al., 2003; Looman et al., 2004; Rada et al., 1976). Because studies are too different or results of studies are inconsistent, it is too early to draw conclusions regarding whether different subtypes of sex offenders differ from one another in the prevalence of substance abuse.

4. Comparing the prevalence of substance abuse in sex offenders to the prevalence of substance abuse in other populations

Several studies directly compared substance abuse in sex offenders to substance abuse in other populations.

4.1. Retrospective file research

Three studies reported in Table 1. Compared sex offender substance abuse to substance abuse in nonsexual violent offenders. Looman et al. (2004) found that more rapists and child molesters had a history of alcohol misuse than nonsexual violent offenders. They did not find differences with regard to drug misuse between rapists and child molesters versus nonsexual violent offenders. In contrast, Kubik et al. (2002) found that more female adolescent nonsexual violent offenders had a history of alcohol and drug misuse than female adolescent sex offenders. Finally, Alish et al. (2007) found that more schizophrenic nonsexual violent offenders had a history of substance abuse than schizophrenic sex offenders and that schizophrenic nonsexual violent offenders more often had a history of substance abuse than sex offenders without schizophrenia.

4.2. Screening instruments

One of the studies that used screening instruments to determine substance abuse compared sex offender substance abuse rates to substance abuse rates in the normal population. Aromäki and Lindman (2001) found that rapists had significantly higher MAST scores than the normal population control subjects but found no significant difference between MAST scores of child molesters and MAST scores of normal population control subjects. However, sample sizes were very small and control subjects were not matched.

Furthermore, three studies compared alcohol and drug misuse in sex offenders to alcohol and drug misuse in nonsexual violent

offenders. Abracen et al. (2000) found that mean MAST scores of rapists as well as mean MAST scores of child molesters were significantly higher than those of nonsexual violent offenders. However, for mean DAST scores the opposite results were found: rapists as well as child molesters scored significantly lower than nonsexual violent offenders. In contrast, Looman et al. (2004) found that only mean MAST scores of rapists were significantly higher than mean MAST scores of nonsexual violent offenders. No differences were found between mean MAST scores of child molesters and nonsexual violent offenders and between mean DAST scores of rapists and child molesters on the one hand and nonsexual violent offenders on the other. Lastly, Abracen et al. (2006) found that rapists/child molesters scored significantly higher on the MAST than nonsexual violent offenders but there were no between groups differences with regard to DAST scores.

4.3. Semi-structured interviews

Four studies that used semi-structured interviews to assess substance use disorders included a nonsexual violent offender control group. Motiuk and Porporino (1992) found that less sex offenders had a history of alcohol use disorders than homicide offenders, subjects convicted for manslaughter, subjects convicted for robbery and other offenders (but not drug offenders). Also, they found that less sex offenders had a history of drug use disorders than all other types of offenders. In contrast, Harsch, Bergk, et al. (2006), Harsch, Keller, and Jockusch (2006) reported that more sex offenders in forensic psychiatry and sex offenders in prison were diagnosed with any current substance use disorder than nonsexual violent offenders. Two studies did not find differences between female child molesters and female nonsexual violent offenders (Green & Kaplan, 1993) and elderly sex offenders and elderly nonsexual violent offenders (Fazel et al., 2002) with regard to current substance use disorders.

4.4. Conclusion

About a quarter of the studies on the prevalence of substance abuse in sex offenders included a nonsexual offender control condition. Four of these studies compared male sex offenders to male nonsexual violent offenders regarding alcohol misuse and the majority of these studies revealed that more sex offenders than nonsexual violent offenders abused alcohol (Abracen et al., 2000, 2006; Looman et al., 2004). Only Motiuk and Porporino (1991) study demonstrated different results: in a very large incarcerated sample, less sex offenders were found to have any alcohol use disorders than the other types of offenders. For drug misuse, mixed results were found. Unfortunately, only one small study included a normal population control condition, which showed that sex offenders (rapists and child molesters) scored significantly higher on the MAST than the normal population control subjects.

5. Intoxication at the time of the offense

Ten out of 42 studies that were reviewed reported the proportion of sex offenders that were intoxicated at the time of the offense; figures relied on self-report. Four of these studies found that between 8.9% and 86% (median = 32.8%) of sex offenders were intoxicated by any substance at the time of the offense (Aromäki & Lindman, 2001; Greenberg et al., 2005; Rojas & Gretton, 2007; Tzeng et al., 1999). Six studies reported that between 9.4% and 85.7% (median = 47.9%) of sex offenders were drinking alcohol at the time of the offense (Bader et al., 2008, Briken et al., 2006, Rada, 1975, 1976; Rada et al., 1976; Tzeng et al., 1999). In addition, three studies reported that between 2.5% and 23.4% (median = 9.1%) of sex offenders were intoxicated by drugs at the time of the offense (Langevin, 2006; Rada, 1975; Bader et al., 2008). From these studies can be concluded that sex offenders are often intoxicated when committing sex offenses and that most sex offenders that are intoxicated are intoxicated by alcohol. Again, it is noticeable that different studies find widely varying prevalence figures.

6. Differences in intoxication at the time of the offense among different subtypes of sex offenders

Six of the studies that were reviewed compared different subtypes of sex offenders with regard to intoxication at the time of the offense. Briken et al. (2006) found that sexual murderers with paraphilia related disorders were more often intoxicated by alcohol at the time of the offense than sexual murderers with paraphilic disorders. Rada (1976) found that more child molesters against girls than child molesters against boys were drinking at the time of the offense. And Rojas and Gretton (2007) found that adolescent aboriginal sex offenders were more often intoxicated at the time of the offense than adolescent non-aboriginal sex offenders. No differences were found between child molesters against girls, child molesters against boys and child molesters against both sexes, between rapists and child molesters (Aromäki & Lindman, 2001; Rada et al., 1976) and between men who abused biological daughters and men who abused step/adopted daughters (Greenberg et al., 2005) with regard to intoxication at the time of the offense. The studies that compared substance use at the time of the offense differ too much from one another to draw conclusions as to differences in intoxication at the time of the offense between different subtypes of sex offenders.

7. Discussion

7.1. Summary

Substance abuse has often been studied in different types of sex offenders, such as rapists, child molesters and exhibitionists. Various methods have been used to examine the prevalence of substance abuse, including retrospective file research, screening instruments and semi-structured interviews. These different methods showed that about half of the sex offenders had a history of substance abuse, that about a quarter to half of the sex offenders had a history of alcohol misuse or alcohol related disorders, and that about one fifth to a quarter of the sex offenders had a history of drug misuse or drug related disorders. These results are largely in accordance with the methodological issues described in the introduction, whereas (for substance abuse and alcohol abuse) the highest prevalence rates were found when substance abuse was assessed with screening instruments, followed by semi-structured interviews and retrospective file research. As mentioned, the assessment of the prevalence of substance abuse by screening instruments overestimates the prevalence of the disorder (Hendriks, 2009) and clinical evaluations and semi-structured interviews yield different results when examining substance abuse (Rettew et al., 2009). This, however, does not imply that one method is secondary to the other (Rettew et al., 2009).

Furthermore, studies that assessed substance abuse by means of screening instruments found that sex offenders' mean screening scores regarding alcohol misuse were generally high, whereas mean screening scores regarding drug misuse were moderate. No conclusions could be drawn with regard to whether substance abuse rates differed among different subtypes of sex offenders.

In addition, the majority of the studies that included an nonsexual violent offender control group showed that more sex offenders than nonsexual violent offenders abused alcohol (Abracen et al., 2000, 2006; Looman et al., 2004), except for one very large study that demonstrated the opposite, i.e., that less sex offenders were diagnose with an alcohol use disorder than other offenders (Motiuk & Porporino, 1991). For drug misuse, mixed results were found. Unfortunately, only one small study

included a normal population control condition (Aromäki & Lindman, 2001).

A few studies provided figures regarding substance use at the time of the offense. From these studies can be concluded that about one third of the sex offenders were intoxicated at the time of the offense. Because different subtypes of sex offenders are compared regarding intoxication at the time of the offense, it is too early to draw conclusions regarding differences in intoxication among different types of sex offenders.

7.2. Important limitations

Although many studies examined substance use disorders in different types of sex offenders, most of them share some important limitations. 1) the methods that most studies used to determine substance abuse are disputable. Many studies determined the prevalence of substance abuse by using screening instruments, which tend to overrate the prevalence of substance abuse (Hendriks, 2009). Also, a large proportion of the studies extracted substance abuse rates from sex offenders' files, which leads to lower prevalence rates than using semi-structured interviews (Rettew et al., 2009). 2) most studies assessed for lifetime substance abuse instead of substance abuse at the time of the offense. Therefore, the information about the presence of substance use abuse at the time of the sex offense is limited. 3) most of the studies did not differentiate between the types of drugs that were abused or sex offenders were intoxicated at the time of the offense. As a consequence, no information is available about whether specific types of drugs are related to (specific types of) sex offenses. 4) Some of the studies that were discussed used (very) small sample sizes.

Also, there are several limitations with regard to the control groups that were used by the studies discussed in this review. 1) many studies compared sex offenders to nonsexual offenders as well as different subtypes of sex offenders with one another with regard to substance abuse. However, it appears that these comparisons were made between convenient samples that were available for research purposes instead of being based on any theory. Random comparisons between sex offenders and nonsexual offenders and between different subtypes of sex offenders with regard to substance abuse will not contribute to expanding the knowledge on the relationship between substance abuse and sex offenses.

2) although most studies did include control groups, this was the case in only half of the studies that diagnosed substance use disorders in sex offenders using semi-structured interviews. 3) only one study (Aromäki & Lindman, 2001) included a normal population comparison group, which allows an important comparison. Unfortunately, this study also had some problems, e.g., the small numbers of subjects (i.e., 10 rapists, 10 child molesters and 31 normal population control subjects) and the fact that the normal population control subjects were not matched to both sex offender groups and demographic variables of the three groups were not compared with one another. Therefore, it might be possible that the difference found between groups was attributable to other variables. 4) there were not many studies that compared substance abuse in sex offenders to substance abuse in nonsexual violent offenders. Therefore, no conclusions can be drawn with regard to whether the high prevalence of substance abuse in sex offenders is something that is exclusively related to sex offenders or that it is something that is present in other types of offenders as well.

7.3. Recommendations for future research

These limitations result in the following recommendations for future research:

- Future research on the prevalence of substance related disorders in sex offenders should preferably use a structured interview for all participants. An alternative is to screen sex offenders for substance use disorders and use a structured interview for those above the cut-off score, to exclude false positives.
- Future studies should focus on substance use disorders by sex offenders *at the time of the sex offense,* to study the relation between any substance related disorder and the sex offense in more detail. In addition, intoxication at the time of the offense should be addressed.
- Future research studying substance use disorders in sex offenders should include control conditions other than subtypes of sex offenders, if possible (matched) normal population control subjects. Otherwise, nonsexual violent offender control groups should be included.
- Future research should be more theory-driven when comparing sex offenders to nonsexual offenders and different subtypes of sex offenders with one another with regard to substance abuse, so the relationship between substance abuse and sex offenses will be clarified.
- When comparing different subtypes of sex offenders with one another with regard to substance use disorders, it is preferable to connect to previous research so studies can be compared with one another (e.g., compare rapists with child molesters with regard to the prevalence of substance use disorders).
- Furthermore, additional research is needed on whether or not specific types of drugs are more often connected to sex offenses than other types.
- Future research should include a sufficient sample size.

This review shows that substance abuse is prevalent in sex offenders, which is demonstrated by many studies. Mainly, the association between sex offenses and alcohol use has been studied and Seto and Barbaree (1995) suggested alcohol misuse may be related to committing sex offenses through disinhibitory mechanisms. As a result, a logical next step would be to routinely screen for substance abuse in sex offenders and to include substance abuse treatment in treatment programs for sex offenders. Seto and Barbaree (1995) propose that, based on their model, special attention should be directed towards changing expectancies regarding alcohol consumption, increasing the awareness of inhibitory cues and learning to take full responsibility for unacceptable behavior instead of blaming alcohol.

Appendix A

Fifteen studies were excluded from this review for the following reasons. Studies were excluded if the content of questionnaires (Lung & Huang, 2004) or interviews (Faller, 1995; Nathan & Ward, 2002) that were used to determine substance abuse was not known. Also, studies were excluded if they did not report the exact figures of substance abuse for the different populations that were studied (Henn, Herjanic, & Vanderpearl, 1976; Kouri, Pope, Powell, Oliva, & Campbell, 1997; Myers & Berah, 1983). Furthermore, studies that did not differentiate between sex offenders' use and misuse of alcohol were excluded (Bonheur & Rosner, 1980; Peugh & Belenko, 2001; Way & Urbaniak, 2008). Besides, studies were excluded if they only reported on whether sex offenders were intoxicated at the time of the offense but not on substance abuse per se (e.g., Gudjonsson & Sigurdsson, 2000).

Also, two studies were excluded because they did not differentiate between heavy alcohol use and alcohol misuse and the way drug misuse was assessed was unclear (Langevin, 2003; Langevin, Ben-Aron, Wright, Marchese, & Handy, 1988). One study (Strickland, 2008) that used the Substance Abuse Subtle Screening Inventory-3 (SASSI-3; Miller & Lazowski, 1999) to identify alcohol and drug misuse in female child molesters was excluded because no information could be obtained to interpret the outcomes on the SASSI-3. Furthermore, two frequently cited articles were excluded because of deviating methodology, i.e., Långström, Sjöstedt, and Grann (2004) and Fazel, Sjöstedt, Grann, and Långström (2010). These investigators assessed substance use disorders in sex offenders that were diagnosed during inpatient treatment. Because only a small proportion of sex offenders is hospitalized, only the

most severe substance abusers were identified in these studies, which leads to underestimating the proportion of sex offenders that were diagnosed with any substance related disorder (Fazel et al., 2010; Långström et al., 2004). Finally, Oliver et al.'s (2007) study was excluded, because the Millon Clinical Multiaxial Inventory-III (MCMI-III; Millon, 1994) that was used to determine substance abuse is not a true screening instrument.

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