



## Autism spectrum disorder (ASD) and sexual offending: A systematic review

Anna Margari<sup>a</sup>, Gabriele De Agazio<sup>b</sup>, Lucia Marzulli<sup>b</sup>, Francesco Maria Piarulli<sup>b</sup>,  
Gabriele Mandarelli<sup>a</sup>, Roberto Catanesi<sup>a</sup>, Felice Francesco Carabellese<sup>a,\*,1</sup>,  
Samuele Cortese<sup>c,d,e,f,g,1</sup>

<sup>a</sup> Interdisciplinary Department of Medicine, Section of Criminology and Forensic Psychiatry, University of Bari "Aldo Moro", Bari, Italy

<sup>b</sup> Department of Translational Biomedicine and Neuroscience (DiBrain), University of Bari "Aldo Moro", Bari, Italy

<sup>c</sup> Centre for Innovation in Mental Health, School of Psychology, Faculty of Environmental and Life Sciences, University of Southampton, Southampton, UK

<sup>d</sup> Clinical and Experimental Sciences (CNS and Psychiatry), Faculty of Medicine, University of Southampton, Southampton, UK

<sup>e</sup> Solent NHS Trust, Southampton, UK

<sup>f</sup> Hassenfeld Children's Hospital at NYU Langone, New York University Child Study Center, New York, NY, USA

<sup>g</sup> DiMePre-J-Department of Precision and Regenerative Medicine-Jonic Area, University of Bari "Aldo Moro", Bari, Italy

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### ABSTRACT

The relationship between autism spectrum disorder (ASD) and sexual offending (SO) is an overlooked issue, both in clinical practice and in research. Based on a pre-specified protocol (PROSPERO: CRD42024501598), we systematically searched Pubmed and Scopus, between January 1st, 1994 and January 12th, 2024, for articles related to SO in ASD. Study quality was assessed with study design-specific tools (Study Quality Assessment Tools, NHLBI, NIH). We found 19 relevant publications (five cross-sectional studies, two case-control studies, and 12 case reports). Seven of the studies were deemed of "good" quality, the rest as "fair". Included studies addressed three key aspects: 1) psychopathological characteristics of individuals with ASD that increase the risk of committing SO; 2) intervention strategies for individuals with ASD and SO; 3) involvement of individuals with ASD and SO in the justice system. Overall, while there is an increasing interest in this topic, more rigorous study designs, including randomised controlled trials, are needed to inform clinical practice and healthcare and social policies.

## 1. Introduction

### 1.1. Background

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterised by impaired social and communication skills as well as repetitive and restrictive behaviors (APA, 2022). The Centers for Diseases Control and Prevention (CDC) of Atlanta estimated a prevalence of ASD at 2.8 % during 2020 in the USA, with an estimated male–female ratio of 4:1 (Maenner et al., 2023). Worldwide, the Global Burden of Disease (GBD) estimated that 28 million people presented with ASD in 2019 (Solmi et al., 2022).

According to the Diagnostic and Statistical Manual of Mental Disorders – 5th edition text revision (DSM-5-TR), while symptoms of ASD must be present in the early developmental period, they may not become fully manifest until social demands exceed limited capacities, or they

may be masked by learned strategies in later life. Moreover, some individuals could have sufficiently adequate academic and school functioning despite the presence of social symptoms of ASD. The heterogeneous nature and masked features of ASD represent a challenge to early diagnosis, leading to a diagnostic delay (Fusar-Poli et al., 2022).

Overall, individuals with more impairing symptoms of ASD report worse relationship satisfaction (Sevlever et al., 2013). Among different aspects of health and wellbeing, sexual health contributes to satisfaction in the interpersonal relationship and is fundamental to an individual's overall health and well-being. Indeed, a positive and respectful approach to sexuality and sexual relationships is necessary for pleasurable and safe sexual experiences, free of coercion, discrimination, and violence. However, sexual health often poses a challenge for individuals with ASD, even when they express a desire for relationships, friendship, romantic relationships, or connection with a loved one (Sevlever et al., 2013). Importantly, the tendency of people with ASD to have focused

\* Corresponding author.

E-mail address: [felicefrancesco.carabellese@uniba.it](mailto:felicefrancesco.carabellese@uniba.it) (F.F. Carabellese).

<sup>1</sup> These authors share the senior authorship

and intensive interests, combined with difficulties in interpreting the behavior and intentions of others, could lead to harmful sexual behaviors (Payne et al., 2020).

The World Health Organization defines sexual offense (SO) as any act of a sexual nature, whether consummated or attempted, typically coercive, which may involve physical contact and the use of violence (WHO, 2017). A variety of behaviors fall under the definition of SO, including sexual intercourse, urinating in public, caressing, or unwanted comments (Bonnar-Kidd, 2010). The characteristics of sexual offenders depend on their sex, age, as well as the context of deviant behavior, such as paraphilia, type of victims, psychiatric comorbidities, and the association with addictive behaviors (Przybylski, 2010).

There is evidence that SOs are the most frequent type of offense by people with ASD, accounting for 2.4 – 15 % of all the offenses committed by individuals with ASD seen in the European forensic settings in Europe (Payne et al., 2020). However, it is important to appreciate that individuals with ASD are more likely to be victims of crime than perpetrators (Sevlever et al., 2013). Indeed, it has been estimated that individuals with ASD are ten times more likely to be victims of sexual violence (Modell and Mak, 2008) and of robbery (Modell and Mak, 2008), while they are not at a significantly increased risk of offending (Mouridsen, 2012; Woodbury-Smith et al., 2006) compared to neurotypical controls. Additionally, according to a study conducted on data from the penal register regarding 177 individuals originally described by Hans Asperger, the rate and nature of crimes committed by these individuals were identical to those of the general population (Hippler et al., 2010).

However, in the minority of individuals with ASD who do offend, the lack of social skills and repetitive/rigid traits have been found to be related to vulnerability to sex-related crimes (Sutton et al., 2013). The most common SOs perpetrated by individuals with ASD include public masturbation and masturbation in the presence of children (Allely and Creaby-Attwood, 2016), inappropriate courtship of both adults and minors (Mogavero, 2016), viewing and possessing child pornography (Allely and Dubin, 2018) or exposing of genitals (Allely and Creaby-Attwood, 2016). It is possible that specific characteristics of individuals with ASD influence the type and severity of SO, but this has not been systematically explored.

## 1.2. Aims of the study

While there is an increasing literature on SOs in individual with ASD, currently a comprehensive critical overview of such body of research is lacking. The current systematic review aimed to address this gap by systematically analyzing three key areas of research, namely the psychopathological characteristics of ASD associated with increased vulnerability to engage in sexual offending, treatment options for this subgroup of individuals with ASD, and the involvement of individuals with ASD in the judicial system. More specifically, we aimed to address the following questions: 1) What are the psychopathological characteristics of individuals with ASD that increase the risk of committing sexual offenses? 2) In individuals with ASD who commit SO, are psychotherapy, psychiatric rehabilitation, and/or pharmacotherapy significantly more efficacious/effective than standard care in reducing the recurrence of sexual offending, improving the quality of life, and/or reducing the associated disability? 3) Are individuals with ASD who commit SO significantly more likely to commit specific types of SO than the general population of sexual offenders? Are individuals with ASD who commit SO significantly less likely to be judged criminally responsible than the general population of sexual offenders?

## 2. Methods

The protocol of this systematic review protocol was pre-registered in the International Prospective Register of Systematic Review (CRD42024501598). This systematic review was reported according to

the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines (Page et al., 2021).

### 2.1. Literature search

We conducted a two-step literature search. First, we searched Pubmed and Scopus, with the following search terms and syntax: ("autis\*" OR "Asperger\*" OR "pervasive developmental disorder\*") AND (("sexual") OR ("assault") OR ("offender") OR ("offense")) between January 1st, 1994 and January 12th, 2024. This time criterion was established considering that in the DSM-IV (APA, 1994) a significant conceptual change was implemented, with the move from "infantile autism" to "autistic disorder", reflecting the awareness of the need for a more flexible and developmentally-oriented approach useful across ages and developmental levels (Rosen et al., 2021).

The second step involved a manual search of the reference lists of the retrieved papers by two investigators (AM. and GDA), to identify any references possibly missed at the first step. Abstracts of papers identified through these two steps were then screened for eligibility, and papers passing this screening were assessed for eligibility based on a full-text reading. Discrepancies were resolved through consensus with a third author (F.P) and, eventually, Delphi rounds with all other authors.

### 2.2. Inclusion and exclusion criteria

We included studies of any design (excluding reviews) assessing psychological characteristics, therapeutic strategies, and psychiatric forensic aspects in individuals of any age diagnosed with ASD who committed SO. Studies including samples of individuals affected by ASD and intellectual disability were excluded, as this represents a distinct clinical population with different implications from a forensic standpoint. We also excluded papers written in languages other than English (due to lack of funding for translation) and those with unavailable full-text even after contacting the corresponding author.

The PICOs (Population/problem, Intervention/exposure, Comparison/control, Outcomes) of this systematic review are summarised in Table 1.

### 2.3. Data extraction

Titles and abstracts were screened independently by two authors to determine whether the retrieved studies met the inclusion criteria. These authors were blinded to each other's decisions. Full texts were independently assessed for eligibility by two authors. Discrepancies were resolved through an initial discussion with a third senior author, when required, and possibly with Delphi rounds, until complete consensus was reached. Decisions on article inclusion/exclusion were recorded using an Excel spreadsheet. Information about the study design, aim, and main outcomes were extracted from study documents and summarised on an Excel spreadsheet. The approach of textual narrative synthesis was used for data synthesis to group studies into more homogenous groups (Sniltveit et al., 2012).

### 2.4. Quality assessment

The quality assessment of the included studies was performed using study design-specific tools (Study Quality Assessment Tools, NHLBI, NIH).

When assessing the quality of case reports, case series and case studies, we applied the 9 criteria provided by the NHLBI, including, when applicable: clarity of question or objective, clear definition and description of the population and cases, intervention(s), outcome(s), follow-up, comparability of cases.

When assessing case-control studies, we applied the 12 criteria from the NHLBI including, when applicable: clarity of the question and objective, clarity and definition of the study population, information

**Table 1**  
PICOs of the systematic review.

Question Type	Population, Problem	Intervention or exposure	Comparison or control	Outcome
Vulnerability	Are individuals of any age with Autism Spectrum Disorder (ASD)	who present specific ASD symptomatology or specific genetic or environmental risk factors	[not applicable]	at a higher rate of committing SO than typically developing individuals?
Treatment	In individuals of any age with ASD who commit SO	are psychotherapy, psychiatric, rehabilitation, or pharmacotherapy	more efficacious/ effective than standard care	in reducing the recurrence of SO, quality of life, or disability?
Forensic aspects	Are individuals of any age with ASD who commit SO	more likely to commit specific type of SO or more likely to be judged criminally irresponsible	than the general population of sexual offenders?	(types of sexual offenses in ASD individuals and criminal responsibility compared to non-ASD sexual offenders)

regarding the sample size, time frames, consistency of the inclusion and exclusion process, use of concurrent controls, measures of exposure, blinding, confounding variables.

Finally, when assessing observational cohort and cross-sectional studies, we applied the 14 criteria provided by the NHLBI including, when applicable: clarity of the question and objective, clarity and

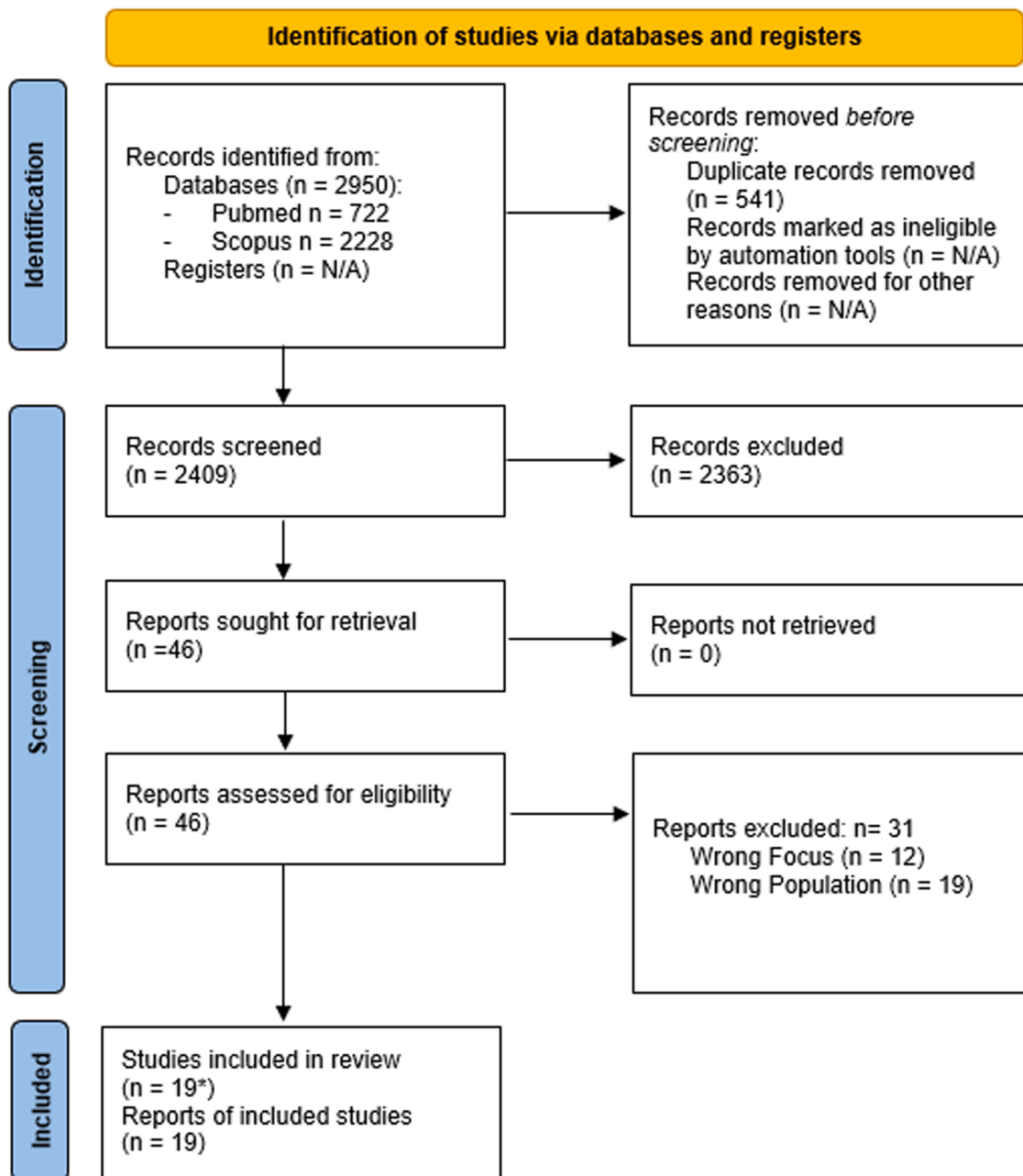


Fig. 1. PRISMA 2020 flowchart showing the selection process of the articles.

definition of the study population, information regarding participation rates, time frames, consistency and uniformity of the inclusion and exclusion process, sample size, power, variance, effect estimates, measures of exposure, blinding, loss to follow up, confounding variables.

The detailed quality check for the studies included in this paper is available in the [Supplementary Material](#).

### 3. Results

Based on 2950 records from the selected databases, we identified 46 potentially eligible studies based on title and abstract. After reviewing the full text of the papers, 31 records were excluded. Nineteen records were not eligible for “wrong population”: in one, the individual was a serial killer with just speculative suspicion of ASD traits (Silva et al., 2002); one focused on “autism” as a defense mechanism in psychodynamic theory (Gregor, 2023); in two, the participants did not commit SO (Aston, 2012; Ventura et al., 2022); two analysed ASD individuals who were victims of SO (Dike et al., 2023; Douglas and Sedgewick, 2023); two analysed ASD individuals who committed a crime, not limited to SO (Allen et al., 2008; Habermeyer and Haker, 2021); four focused on individuals with ASD and intellectual disability (Borghino et al., 2022; Melvin et al., 2020a, 2020b; Murphy and Melvin, 2020); one analysed the case of SO committed by individuals with multiple psychiatric diagnoses (Singh and Coffey, 2012); four focused on SO committed by individuals without a formal ASD diagnosis (Baarsma and Boonmann, 2016; Cunningham et al., 2021; Drapeau et al., 2008; Kafka, 2012); one analysed the sexual health of people with ASD who did not commit SO (Byers and Nichols, 2018); one focused on an individual with brain injury (Chan and Saluja, 2011). Additionally, twelve records were excluded for “wrong focus”: one focused on other mental illnesses developed during the treatment of SO in an individual with ASD (Chen et al., 2020); six analysed overall sexual behavior in ASD individuals, marginally addressing SO (Bonagura and Jeglic, 2023; Ray et al., 2004; Rothman et al., 2021; Shahani, 2012; Stokes et al., 2007; Turner et al., 2021), one was excluded because it addressed general legal aspects of individuals with ASD (Freckelton, 2011); one assessed individuals with paraphilia with no formal diagnosis of ASD (Chiho Ueno et al., 2007); one reported only clinicians’ perspectives with no clinical data (MacDonald et al., 2017); and two assessed treatment of PTSD in individuals with ASD, who committed SO (Faccini, 2020; Shelton, 2022).

The screening process is outlined in Fig. 1 and the characteristics of the included studies are summarized in Table 2. Of the 19 studies retained in the present systematic review, nine focused on psychopathological features, four on criminological features, and seven on a therapeutic approach.

The design of the selected papers was as follows: case reports (12 studies), cross-sectional studies (five studies), case-control studies (two studies).

In terms of the quality assessment, seven of the studies were deemed of “good” quality, the rest as “fair”. The most problematic items were in relation to consecutive recruitment and comparability of cases and controls. The detailed quality check for each of the studies included in this paper is available in the [Supplementary Materials](#).

#### 3.1. Psychopathological characteristics

Out of the 19 selected articles, eight focused on psychopathological characteristics of ASD which inform on the psychopathological characteristics which increase the vulnerability to engage in sexual offending (Aral et al., 2018; Bleil Walters et al., 2013; Haskins and Silva, 2006; Katz and Zemishlany, 2006; Kohn et al., 1998; Daniel C Murrie et al., 2002; Payne et al., 2020; Peixoto et al., 2017). Among these, seven were case reports, and 1 was a cross-sectional study.

#### 3.1.1. Characteristics related to alterations in social interaction and communication

All eight selected articles (Aral et al., 2018; Chesterman and Rutter, 1993; Haskins and Silva, 2006; Katz and Zemishlany, 2006; Kohn et al., 1998; Murrie et al., 2002; Payne et al., 2020; Peixoto et al., 2017) identified deficit in social interaction and communication as a possible factor increasing vulnerability to engage in sexual offending in individuals with ASD. Overall, the deficit in social skills could be associated with SO through three main mechanisms: 1) difficulty recognizing the absence of consent in the partner/victim; 2) limited experience of sexuality and intimacy, and sexual frustration; 3) difficulty in interpreting social and legal norms.

Furthermore, some studies found that deficits in social communication and interaction skills could hinder effective communication, hampering the development of appropriate and consensual sexual relationships (Katz and Zemishlany, 2006; Kohn et al., 1998; Payne et al., 2020; Peixoto et al., 2017).

Furthermore, possible challenges with the language associated with intimate relationships, which are usually complex and requires understanding of nuances, were identified in some studies. People with ASD could present with an inability to detect this specific language, as described in a case report of a 30-year-old young man. During their sexual encounters, his wife complained of feeling raped, particularly when he failed to grasp that she did not want sex. Indeed, the young man believed he was fulfilling his wife’s desires (Peixoto et al., 2017). Another example is provided by Kohn et al., who discussed the case of an adolescent with ASD, who was hospitalized for the first time after three incidents of sexual assault. In one of them, in particular, he approached an unknown girl in the street and grabbed her, trying to undress her, and touching her breasts and genitals. He explained this behavior in a very calm tone, as his expression of fondness and his way to make “her his girlfriend” (Kohn et al., 1998).

The inability to recognize facial expression in images of the minor (such as fear), the incompetence to correctly attribute ages of the individuals in the images, and the inability to distinguish adult from child facial features were identified in the included studies as additional vulnerabilities increasing the risk of engaging in sexual offending (Woodbury-Smith et al., 2006)

Other peculiarities characterising the sexuality of individuals with ASD include anxiety, related to social expectations, of being in a relationship or uncertainty about how to satisfy their partner sexually (Dewinter et al., 2017; Hellemans et al., 2007). The expression of ASD sexuality within the context of an ‘appropriate relationship’ could also be hindered by a lack of, or limited experience in, being in an intimate relationship (Murrie et al., 2002). Indeed, the absence of romantic relationships was one of the explanations given by individuals with ASD for their problematic behaviors (Payne et al., 2020). Unmet sexual desires, needs, or expectations can lead to sexual frustration, which can be defined as a state of dissatisfaction, tension, or distress. Indeed, even if sexual activities may be of interest to individual with ASD individuals, it has been found that these individuals may be more susceptible to feeling dissatisfied with their sexual life than those who do not have ASD (Solomon et al., 2019). Sexual frustration was also reported as a common occurrence for those with ASD (Payne et al., 2020).

Misinterpretation of social clues and inappropriate sexual behavior could result from lack of social comprehension and the inability to grasp social norms and legal rules, as described in one of the selected case reports (Katz and Zemishlany, 2006). The report details the reaction of a young man with ASD after being rejected by the woman he fell in love with. Despite her refusal, he continued to pursue her, escalating to increasingly threatening behavior, eventually culminating in plans to kill her. Clinicians described his severe difficulty in correctly understanding and interpreting the message he received, as well as his failure to accept the rejection of his advances (Katz and Zemishlany, 2006).

One of the main characteristics described in individuals with SOs, as revealed in semi-structured interviews, was social skills difficulties and a

**Table 2**

Records included in the qualitative synthesis (in alphabetical order based on surname of the first author).

Record	Aim of the study	Study design	Main Findings	Main Focus
(Allely et al., 2019)	To examine how evidence of ASD is raised in legal arguments in ways that suggest a diagnosed condition may have contributed significantly to the alleged crime.	Cross-Sectional Study	Variable outcomes in terms of case allowance and sentences	Criminological characteristics
(Aral et al., 2018)	To present the case of a Turkish adolescent girl diagnosed with ASD who had been charged with possession and sharing of child pornography material.	Case Report	The forensic psychiatric assessment pointed out the adolescent girl's inability to control her behavior and the incapability of understanding its consequences. According to the Turkish law, she was evaluated criminally irresponsible.	Psychopathology
(Barry-Walsh and Mullen, 2004)	To present five cases of individuals with Asperger's syndrome, discussing the links between symptomatology and offending, culpability, and fitness to plead.	Case Report	O We select here a representative case. A 16-year-old with Asperger's Syndrome, charged with minor sexual offending. He had approached two kids, putting his arms around them, and saying he wanted to take them to his place to 'do naughty things.' A few months later, he approached a girl in a library, making a direct and frank sexual advance towards her. When she refused, he assaulted her. At the time of assessment, he displayed a naive grandiosity with improbable accounts of sexual exploits, and significant concerns about sex.	Psychopathology
(Bleil Walters et al., 2013)	To compare the self-reported presence and severity of abuse, neglect, and depressive symptoms between adolescents charged with SO with and without a diagnosis of ASD.	Case – Control Study	Adolescent sexual offenders with ASD reported a significantly higher degree of emotional abuse when compared to the non-ASD group. On average, adolescent sexual offenders with ASD reported higher levels of both emotional and physical neglect. Adolescent sexual offenders with ASD experience more depressive symptoms.	Psychopathology
(Creaby-Attwood and Allely 2017)	To present three cases of men with ASD, describing the main psychopathological element that constitutes vulnerabilities to committing sexual offenses.	Case Report	Three case reports highlighted the ASD-related difficulty with the ability to develop appropriate and consensual sexual relationships as a result of impaired social cognition and stereotypical thinking, factors that may increase the risk of sexual offending in individuals with ASD.	Criminological characteristics
(Griffin-Shelley, 2010)	To present the case and focus on the subsequent residential treatment of an adolescent individual diagnosed with Asperger's Syndrome and compulsive sexual behaviour, caught engaging in inappropriate sexual contact.	Case Report	The individual did not lend himself to the benefits of confrontation therapy, which proved too lengthy, difficult and frustrating for both the individual and the staff of the correctional facility. Learning from the shortcomings of this treatment case, the author indicated the need, in such cases, to focus on behavior change, identification of emotional triggers, correct use of support, need for honesty. The author also highlights the need of inclusion and education of the family.	Treatment
(Haskins and Arturo Silva, 2006)	To present cases of individuals with Asperger's Syndrome who committed criminal offenses and to evaluate their engaging in criminal behaviour.	Case Report	Two cases show a common type of sexually maladaptive behavior, resulting from deficits in social reciprocity, and "cluelessness" when interacting with potential sexual partners. In one case, the individual was found guilty and given probation.	Psychopathology
(Hart-Kerkhoffs et al., 2009)	To investigate ASD symptoms in juvenile suspects of sex offenses.	Case-Control study	Significantly higher levels of ASD symptoms were found in juvenile suspects of sex offenses compared to a healthy control group, especially in those suspected of child molesting and solo peer-offenses.	Criminological characteristics
(Katz and Zemishlany, 2006)	To describe the case of a young man who had harassed a woman after being rejected and presents difficulty in repelling gratification and bizarre contents with sexual connotations focused on his mother.	Case Report	In the context of the psychiatric observation, the individual was incapable of appropriately understanding and interpreting the messages he received from the women he harassed and their rejection of his courtship. He presented abnormal reactions, and he was unable to understand their implications.	Psychopathology
(Kohn et al., 1998)	To describe a case of an adolescent with ASD whose main problems were violence and SOs.	Case Report	Impaired social interaction, lack of empathy, poor non-verbal communication, and restricted interests were discussed and the possible roots of the individual's behavior (three sexual assaults). His assaults may have been the consequence of his impaired theory of mind.	Psychopathology
(Milton et al., 2002)	To present the case, pathway to diagnosis and subsequent residential treatment of an individual charged with multiple sexual offenses including acquisitive offenses, direct sexual assaults, indirect sexual assaults, subsequently diagnosed with ASD	Case Report	Treatment of the individual in a corrective facility proved difficult, as the individual showed little to no change in his inappropriate sexual behavior. In particular, the individual proved to fare worst then in the context of group therapy, from which he was withdrawn. Pharmacological treatment for comorbid compulsive behavior also proved ineffective in reducing symptomatology and was subsequently stopped.	Treatment
(Murrie et al., 2002)	To present six cases synopses of individuals encountered in forensic settings who met diagnostic criteria for Asperger's syndrome, to highlight the role that Asperger's syndrome may play in their offending and	Case Report	The individuals charged with SOs showed unawareness of the harm they caused their victims. People with ASD may tend to seek interpersonal contact in ill – advised ways. Sexual frustration may arise from the difficulty to sustain intimate relationships associated with	Psychopathology

(continued on next page)



Table 2 (continued)

Record	Aim of the study	Study design	Main Findings	Main Focus
	discussing the implications for decision-making in the criminal justice system.		consensual sexual contact. Poor understanding of relationships, while sometimes leading to inappropriate contact, led to anxiety or resentment when relationship did not develop as expected.	
(Payne et al., 2020)	To assess motivations for sexual offending as described by autistic offenders themselves.	Cross-Sectional Study	Five main themes and sub-themes emerged: social difficulties, misunderstanding, sex and relationships, inadequate control, and disequilibrium	Psychopathology
(Peixoto et al., 2017)	To describe the implications of social inability as a factor that can contribute to sexual abuse in the marriage relationship of people with high-functioning ASD.	Case Report	Social and communicative disability was deemed a complicating factor that could have contributed to the occurrence of sexual abuse in marital relationships with individuals with ASD	Psychopathology
(Pritchard et al., 2016)	To describe the effect of multi-component behavioral intervention on the harmful sexual behavior of a 17-year old male with ASD.	Case Report	Young people with ASD who presented severe problem behaviour, including harmful sexual behaviour, benefitted from intensive and long-term multi-component behavioural treatment in residential settings.	Treatment
(Ray et al., 2004)	To describe cases of ASD adolescents who display harmful sexual behaviors and effective treatments.	Case Report	The authors recommended sing cue cards, role-playing with "I statements", "sensory diets" and other ASD – tailored interventions to treat ASD individuals who display HSB.	Treatment
(Søndenaa et al., 2014b)	To explore any possible relationship between ASD and violent or sexual crime.	Cross – Sectional Study	The violent offenders were contacted by the social welfare services at an earlier stage compared to the sexual offenders. The sexual offenders also denied the charge more often than the violent offenders.	Criminological characteristics
(Lawrence R. Sutton et al., 2013)	To assess the assessment procedures for establishing an ASD diagnosis in a previously undiagnosed adjudicated group.	Cross-Sectional Study	Individuals with ASD may have mimicked more criminally oriented behavior and be reinforced or feel accepted by the predominance of individuals around them who share their interests. Some participants reported a distorted understanding of their wrongful acts, accompanied by similarly distorted problem-solving.	Treatment
(Vinter et al., 2023)	To investigate the experiences of individuals with ASD who have convictions related to sexual offenses, as well as the perspectives of the staff working with them, in the context of prison-based interventions; to identify aspects of these interventions that may pose challenges or provide benefits for individuals with ASD who have committed sexual offenses.	Cross – Sectional Study	Autistic people who had been convicted of sexual assaults presented with heterogenous therapeutic needs and psychopathological traits. Most often they presented the following challenges to therapeutic approaches: they felt overwhelmed, especially by group interactions, they presented the most difficulties when pushed too far out of their comfort zone and presented with problems in understanding social cues that left them feeling disconnected with others.	Treatment

misunderstanding of the seriousness of their behaviors (Payne et al., 2020). It has been suggested that impulsivity could impede individuals with ASD from effectively modulating their behavior according to social norms (Kohn et al., 1998). Inadequate control and a lack of empathy have also been described as important features in individuals ASD who committed SO. In fact, it has been reported that they may get carried away and unintentionally cause harm to the victim due to their intense focus on their own intentions, without considering the other person's feelings (Payne et al., 2020). Finally, a case report indicated that adolescents with ASD may perceive the availability of child pornographic material on the internet as a sign of its legality. This belief could be accounted for by a lack of social judgment (Aral et al., 2018).

### 3.1.2. Restrictive and repetitive sexual interests

Some of the included studies (Aral et al., 2018; Haskins and Silva, 2006) identified restrictive and repetitive interests as a possible vulnerability for individuals with ASD to engage in SO. More specifically, sexual offenses have been directly related to restrictive and repetitive behaviors in some cases, especially when interests are sexually related or have sexual components (Aral et al., 2018; Haskins and Silva, 2006). An example is represented by the case of a teenager with Asperger's Syndrome, charged with minor sexual offending. At the time of assessment, he displayed a naive grandiosity with improbable accounts of sexual exploits and exaggerated drug and alcohol abuse. He was very preoccupied with sex, showing overall a feeble and naive grasp of sexual matters. In one instance, he had approached a seven-year-old girl and her five-year-old brother, putting his arms around them, and saying he wanted to take them to his place to 'do naughty things.' The intervention

of a passer-by had prevented escalation to more severe behavior. A few months later, he approached a girl in a library, making a direct and frank sexual advance towards her. When she refused, he attacked her, putting his hands around her throat (Barry-Walsh and Mullen, 2004). Other reports showed uncommon sexual interests and sexual sensory fascinations in individuals with ASD (Dewinter et al., 2017; Helleman et al., 2007).

Furthermore, individuals with ASD who are child pornography offenders may exhibit a tendency to become fixated on a single subject and intensively focus on it (Aral et al., 2018). Aral et al. reported the case of a girl with ASD who had been searching the internet for photos of famous naked children (Aral et al., 2018). The ritualistic nature of this behaviour in individuals with ASD may include the accumulation of child pornography. The volume of collected pornography does not necessarily reflect the gravity of deviant sexuality, but rather the level of compulsive and obsessive features of ASD individuals (Aral et al., 2018). Some authors have suggested that sexual interests that are restrictive and repetitive may be indicative of sexual addiction, rather than the intention to offend (Griffin-Shelley, 2010).

Another case highlighting the role of repetitive and stereotyped behaviors was that of a schoolteacher who received a diagnosis of ASD and who was charged with several counts of child annoyance. He was reported to have inappropriately touched the shoulder area of many of his adolescent female students. These episodes had occurred in full view of many other students over months. His compulsively touching students was consistent with repetitive and stereotyped patterns of behavior, but also with his inability to appreciate how his physical contact with the students could be perceived by them or others in his environment

(Haskins and Silva, 2006).

### 3.2. Treatment

Out of the 19 records included in our systematic review, seven dealt with possible options for therapy and rehabilitation of people with ASD who commit SO (Bleil Walters et al., 2013; Griffin-Shelley, 2010; Milton et al., 2002; Pritchard et al., 2016; Ray et al., 2004; Lawrence R. Sutton et al., 2013; Vinter et al., 2023).

Out of these seven articles, two were cross-sectional studies (Sutton et al., 2013; Vinter et al., 2023), one was a case-control study (Bleil Walters et al., 2013), and the rest were case reports (Milton et al., 2002; Pritchard et al., 2016; Ray et al., 2004),

As highlighted in several of the included papers, treatment should be tailored to the individual, taking into consideration the most frequent risk factors and comorbidities. The case-control study (Bleil Walters et al., 2013) found that adolescent sexual offenders with ASD reported a higher degree of emotional abuse and neglect and physical neglect when compared to the non-ASD group, and these problems were correlated with a higher degree of depressive symptoms (Bleil Walters et al., 2013). Risk factors and comorbid symptomatology interact with the core symptoms of ASD, resulting in complex therapeutic needs and challenges that need to be tailored to the specific underlying psychopathological features. In line with this, three other selected reports (Griffin-Shelley, 2010; Milton et al., 2002; Ray et al., 2004) highlighted the need to adjust the treatment strategy according to ASD characteristics. Practitioners should aim for the offender to be able to accurately report his offense, understand his offending pattern, learn about bias in thinking, practice empathic responses to victims, stop deviant thoughts and fantasies, control arousal and urges, be honest, learn to be accountable for his actions, be able to use support, and learn relapse prevention strategies (National Task Force on Juvenile Sexual Offending, 1993).

Once established the therapeutic needs of the individuals, several intervention strategies can be implemented. Some of the included studies (e.g., Griffin-Shelley, 2010; Pritchard et al., 2016) suggested implementing interventions aimed at developing more efficient emotion regulation strategies in the treatment pathway of sexual offenders with ASD. Emotion regulation (ER) is defined as “the processes by which individuals influence which emotions they have, when they have them, and how they experience and express them” (Gross, 1998). Indeed, ASD is associated with amplified emotional responses and poor emotional control, leading to difficulties in employing adaptive ER strategies and impulsive reactions to emotional stimuli, with tantrums, aggression, or self-injury (Mazefsky et al., 2013). Strategies to improve ER in ASD can be introduced either before or after the occurrence of the emotional response, making use of either anticipative strategies or strategies related to the emotional response itself. Other treatment studies have focused on behavioral interventions such counseling sessions (Pritchard et al., 2016), behavioral adaptation focused on improving emotional response to triggers (Griffin-Shelley, 2010), and teaching strategies for dealing with emotions and understanding offense cycles (Pritchard et al., 2016).

Other reports included in this systematic review presented strategies to improve adherence to treatment. It has been suggested that group interventions should focus on examining offenses in detail so that individuals with ASD can gain insight into high-risk situations, explore the feelings of their victims, and develop valuable social skills (Pritchard et al., 2016; Sutton et al., 2013). One study indicated severe difficulties of individuals with ASD in engaging in group sessions because of the lack of social skills (Milton et al., 2002). Given that individuals with ASD tend to be visual learners (Sutton et al., 2013), the use of video feedback and video modeling strategies with repetition of appropriate behaviors along with role-playing strategies may assist them in learning appropriate behaviors from typically developing peers and in developing compensatory skills (Sutton et al., 2013).

Additionally, tailored sex education was suggested in two papers (Sutton et al., 2013) along with points – and – level–base systems (Pritchard et al., 2016) with the aim to reward individuals for meeting specific behavioral targets (e.g., using safe words and actions, using respectful words and actions, cooperating with rules and instructions, completing set tasks, etc), encouraging them to work towards long-term goals.

Family therapy is another intervention that has been examined in the literature. It has been suggested that, along with psychoeducation, it may improve the familiar environment often not prepared to manage ASD symptoms, especially when related to sexual topics (Griffin-Shelley, 2010).

Two case reports also highlighted the difficulty in changing behavior and reducing the risk of relapse of criminal behavior, highlighting the inappropriateness of residential correctional facilities in treating ASD individuals (Griffin-Shelley, 2010; Milton et al., 2002).

Furthermore, according to a qualitative study from Vinter et al. (2023), most autistic individuals who engage in of SO, especially in forensic settings, tended to present marked difficulties in three key treatment areas: 1) they felt overwhelmed, especially in group settings; 2) given traits such as repetitive behaviors and sameness, they fared worst when pushed too far out of their comfort zone; 3) lastly, given the difficulties in understanding social cues, they often felt disconnected from others during therapeutic interventions. The authors suggested four key strategies to increase the effectiveness of therapeutic interventions in group settings. First, they advised to clearly prepare the individuals to the interventions, giving them a chance to get familiar with the setting before the therapeutic work actually starts. The second suggestion was aimed at therapists, who were advised to use a clear, non-ambiguous language in order to avoid awkward misunderstanding resulting in disconnection to the group. To reduce sensory overwhelming, the authors also suggested that the sensory environment needs to be adjusted to prevent strong sensory stimuli, in particular avoiding strong fragrances, lowering the noise floor, and reducing clutter in the room. Finally, the last strategy was to make sure that the entire staff was knowledgeable about the special characteristics of the inmates with ASD traits, in order to adapt communication strategies and expectations to the individual (Vinter et al., 2023).

Pharmacotherapy for ASD is known to be most effective in treating acute symptoms at best, whereas chronic pharmacological treatment is not supported by evidence in ASD individuals (Sharma et al., 2018). In line with this, in one of the case reports (Milton et al., 2002) pharmacotherapy with an SSRI proved ineffective in reducing comorbid obsessive behavior and hypersexuality in the longer term and was subsequently stopped.

### 3.3. Criminological characteristics and involvement with the justice system

Out of the 19 records included in this systematic review, four dealt with issues regarding the criminological features of SO committed by people with ASD and the subsequent judicial decisions (Allely et al., 2019; Creaby-Attwood and Allely 2017; Søndena et al., 2014b; Hart-Kerkhoffs et al., 2009). Among these four records, one was a case report, two were cross-sectional studies (Allely et al., 2019; Creaby-Attwood and Allely 2017; Søndena et al., 2014b), and one was a case-control study (Hart-Kerkhoffs et al., 2009).

Available data show that a significant proportion of deviant or sexual offending amongst those with ASD is often driven by symptoms inherent to ASD rather than being the expression of malice or reflecting actual sexual deviance. Such symptoms include restricted, repetitive patterns of interests relating to sexuality, people, or objects (Allely et al., 2019; Søndena et al., 2014b) as well as lack of social understanding (Allely et al., 2019; Creaby-Attwood and Allely 2017), impulse control, or empathy (Hart-Kerkhoffs et al., 2009).

The most frequent SOs committed by ASD people were child

exploitation material possession (Allely et al., 2019), exposition, public masturbation acts (Creaby-Attwood and Allely, 2017), and child molesting (Hart-Kerkhoffs et al., 2009).

Of note, regarding the modality of the crime, core autistic symptoms were found only in suspects of solo offenders, not in those suspected of group offenses (Hart-Kerkhoffs et al., 2009).

Regarding previous offending records, Allely et al., (2019) found that in three out of the nine cases examined, the defendant had previous sexual offending records. Søndena (2014b) found that ASD sexual offenders have a less serious criminal record than ASD perpetrators of violent crimes.

Remorse, admission of guilt, and unawareness of the crime committed were found to be the most common post-crime behaviors (Allely et al., 2019; Creaby-Attwood and Allely 2017).

In another study, some important differences emerged when comparing two offender groups, a first group composed by individuals with ASD who committed violent crime and a second group of ASD offender who committed SO. The sex offender group was significantly older, compared to the other group, and the group of violent offenders was contacted by the social welfare services at an earlier stage, compared to the other group (Søndena et al., 2014b).

The case reports by Søndena et al., 2014 concluded that individuals with ASD were evaluated as criminally irresponsible not for the diagnosis of ASD but for the comorbid diagnoses, in particular severe mental disorders. In another report, Creaby-Attwood and Allely, (2017) found that the defendant was considered criminally responsible in only one out of the three cases examined.

Some authors highlight important problematic elements in prison security measures for autistic offenders. The prison environment and the difficulties that individual with ASD find in learning the rules and routines of the prison system (Allely et al., 2019; Creaby-Attwood and Allely 2017), along with the increased vulnerability of autistic people regarding exploitation from other inmates (Allely et al., 2019; Creaby-Attwood and Allely 2017) contributed to increase levels of anxiety and isolation of ASD people (Creaby-Attwood and Allely, 2017).

#### 4. Discussion

This is the first systematic review of the literature pertaining to the links between ASD and SO, exploring psychopathological dimensions, therapeutic approaches, and criminological aspects related to this intricate interplay. Although more rigorous study designs are needed to inform the field, several significant insights and considerations emerged throughout our systematic and critical analysis of available studies.

The findings suggest that core features of ASD, such as difficulties in social interactions and the presence of restricted and repetitive sexual interests, could substantially contribute to the manifestation of inappropriate sexual behaviors. Furthermore, the lack of communicative abilities and social understanding often observed in individuals with ASD can lead to misinterpretations of interpersonal dynamics and social boundaries, and, ultimately, to inadequate sexual behaviors. This is consistent with findings from previous research (Kohn et al., 1998; Peixoto et al., 2017), highlighting how difficulties in recognizing nuances of intimate language could lead to misunderstandings and unintended sexual behaviors.

We also found evidence that other forms of SO, including possession of child exploitation material, child molesting, solo peer offending, indecent exposure, and acts of public masturbation, may be influenced by ASD characteristics such as restricted and repetitive sexual interests, lack of impulse control, and difficulties in understanding others' emotions. Notably, deficits in social communication and interaction skills and sexuality-related restricted, repetitive interest patterns could be considered inherent traits, stable over time. By contrast, lack of intimate relationships and sexual frustration are malleable traits. Addressing these traits through sex education could prove effective to decrease the risk of SO, even though this needs to be rigorously tested. Indeed, among

the articles selected and examined in this systematic literature review, only a limited number focused on treatment. The most extensively investigated treatment relates to psychological and rehabilitative interventions. The explored therapeutic approaches in the review suggest a focus on strategies aimed at enhancing emotional regulation and address the specific challenges individuals with ASD face in the sexual context. Cognitive-behavioral therapy (CBT) might be a promising approach to addressing obsessive thoughts, improving understanding of the social environment, and developing victim empathy. Techniques such as video feedback, video modeling, and role-playing have shown efficacy in developing appropriate social skills. However, it should be emphasized that, even though therapeutic approach should account for the specificity of ASD, tailoring techniques to their visual learning ability and developmental needs, this has been rarely explored so far. As for pharmacological approaches, available data relate to interventions primarily addressing acute symptoms, but there is no evidence yet on efficacy/effectiveness as well as safety, tolerability and potential for implementation of specific treatment strategies.

In terms of criminological aspects and judicial decisions, a complex picture emerged. From the analysis of the selected articles, it appears that SOs committed by individuals with ASD were predominantly non-violent. No underlying motivation aimed at harming the other party emerged from the offense. Only in one case was a desire for revenge reported (Søndena et al., 2014b). Post-offense conduct shows peculiarity, such as the presence of remorse (Allely et al., 2019), admission of guilt (Creaby-Attwood and Allely, 2017) unawareness of the crime committed, lack of emotional reciprocity and egocentricity (Mogavero, 2016). It appears that it is the naivete of ASD seems to emerge instead of deliberate malice. Despite these being the clinical characteristics, ASD offenders often face heterogeneous recognition of criminal responsibility. It should be stressed that there is no unanimous opinion regarding the criminal responsibility evaluations of these individuals. The "insanity defense" is a controversial and debated evaluation performed by forensic psychiatrists and psychologists. Despite the differences between different jurisdictions, in Western countries, the legal criteria for *insanity* often depend on the defendant's cognitive and/or volitional impairment at the time of the crime (Gowensmith et al., 2013; Gardner et al., 2018). In the field of ASD, evaluating *insanity* may result even more complex due to the inherent heterogeneous clinical characterization of ASD, reaching both individuals that present mild autistic traits and, on the other end of the spectrum, individuals with psychotic symptoms (Fusar-Poli et al., 2020). Also, the contentious nature of evaluations in ASD may be due to the challenge of diagnosing autistic traits, especially in forensic settings: previous evidence points to the fact that autistic traits may be erroneously perceived as deception and lack of credibility (Lim et al., 2022). Overall, it is fair to conclude that ASD remains underdiagnosed in most forensic settings (Ashworth, 2016).

In terms of possible future developments in the field, it is interesting to highlight that some authors suggested alternatives to custodial sentences, such as community-based sentences, which could be more appropriate (Allely et al., 2019; Creaby-Attwood and Allely 2017).

Another important issue from a clinical standpoint is that some individuals may be diagnosed with ASD in adulthood. One of the possible reasons is that some symptoms of ASD become more evident in peculiar areas of life, such as sexuality and romantic relationships. This often happens during adolescence and early adulthood, a period of life in which individuals are presented with increasing challenges. We note that there is a risk that people with undiagnosed ASD will seek medical attention after engaging in SO, so that the first evaluation for ASD can take place in a forensic setting. These occurrences highlight the need to assess the presence of ASD in the forensic setting and the evaluation of the cognitive and/or volitional impairment of the defendant at crime time. In turns, this highlights the urgent need of specific training for professionals.

Finally, an intriguing point in the literature about forensic aspects is around the sex differences. Compared to males, women with ASD bear



neurobiological and clinical differences (Ochoa-Lubinoff et al., 2023) presenting less restricted interests and activities and more significant social communication difficulties (Ziemka-Nalecz et al., 2023), greater capacity in developing, maintaining, and understanding relationships, and “camouflaging” themselves into society (de Giambattista et al., 2021). Thus, during insanity evaluations, the forensic psychiatrist should consider the presence of gender specificity in ASD.

In terms of clinical implications, our findings suggest that preventive strategies, such as sex education programs, should be implemented timely, ideally during adolescence. This is crucial considering that in the past decades, the age at which individuals engage in sexual activities, including masturbation and sexual intercourse, has shifted to earlier ages, typically beginning around 12 years old (de Graaf and Poelman, 2012). Regarding prevention efforts, it is important to involve and educate families on primary relational challenges and early recognition of ASD-related elements in courtship and romantic relationships. Indeed, parents/carers of adolescents with ASD have been found to express greater concern about their children’s sexuality than parents/carers of neurotypical adolescents (Ginevra et al., 2016). Additionally, including family members in sex education programs could benefit the whole family.

Regarding clinical service provision, the link between ASD and SO highlights the relevance of ASD diagnosis but also the legal implications of the lack of specialized care. As early diagnosis, intervention, and specialized care are essential for individuals with ASD, therapeutic efforts must be tailored to their specific needs and evolving challenges throughout the lifespan (Francis et al., 2021). However, without a timely diagnosis of ASD and a comprehensive understanding of its symptoms and their impact on daily functioning, individuals with ASD may not receive appropriate care, leading to unmet needs and prolonged difficulties, including needs related to sexual behaviors. Notably, young individuals with ASD are less likely to successfully transition to adult services, underscoring the need to eliminate potential barriers to optimal transition (Singh et al., 2010). Therefore, ensuring continuity of treatment, especially during the transition from adolescence to adulthood, is pivotal. Effective treatment and specialized care may enhance quality of life and diminish criminal behavior, including sexual offending (Francis et al., 2021). Thus, the transition from child psychiatry to adult psychiatry services should be perceived as a pivotal window of opportunity to prevent an unfavorable trajectory from child psychiatry departments to forensic psychiatry units (Freitas Ramos and França, 2022).

Overall, early diagnosis, continuity of treatment, and prevention programs could have two fundamental implications: promoting sexual health and reducing offending behavior. Promoting and enhancing the quality of sexual health among individuals with autism, aiming to facilitate healthy sexual functioning and fostering the experience of sexual intimacy, is key. These therapeutic and preventive efforts should ultimately aim to reduce the risk of engaging in inappropriate sexual behaviors and experiencing sexual victimization (Sevlever et al., 2013)

#### 4.1. Limitations

Limitations of the present systematic review are mainly related to limitations of the included studies, rather than limitations of our methodology per se. One caveat of the included literature rests in the type of study design. While many of the included records were case reports/case series, large-scale case-controlled and prospective studies, as well as rigorous randomised controlled trials, are lacking. This is expected in relation to an emerging topic such as SO in ASD. Therefore, it is essential to be cautious when interpreting research on ASD and SO. Moreover, most studies are based on information from small samples not representative of the general population. It is rare for these studies to provide comparisons with people without autism. Therefore, it is not appropriate to generalize these studies to the whole ASD population (Maras et al., 2015).

Another limitation of the literature examined in our review is that nearly all the articles analysed focused on male subjects. We expect that, with the increasing number of studies in the future, more attention will be paid to representatives of the sample.

In terms of limitations of our own systematic review, while we endeavored to conduct a very comprehensive search across databases, with no type of document restrictions, we can not rule out that we might have missed some studies. Additionally, it was beyond the scope of this systematic review to search for unpublished material, which would have been very challenging due to the lack of specific repositories for the type of studies included in the present review.

#### 4.2. Clinical implications

To prevent SO associated with ASD, we suggest some recommendations, such as reducing stigma around ASD, improving timely identification and diagnosis of ASD, and providing family support and early intervention. Introducing age-appropriate education starting at primary school could also help prevent offending. It is crucial to provide internet safety education, focused on understanding of what is illegal, sex education consent and nuances, and appropriate behavior on and offline. Internet regulation could also be helpful to prevent cybercrime.

#### 4.3. Future research directions

Overall, the literature reviewed here shows that this specific field of research is still in its infancy. Larger, population-based cross sectional and prospective studies are needed to gain rigorous evidence on predictors of risk of SO and causal pathways. The field would benefit also from additional studies exploring genetic, neurophysiological and neuroimaging correlates. Additionally, standard RCTs as well as pragmatic RCTs, are needed to inform future clinical guidelines and health policy documents.

### 5. Conclusion

This systematic literature review offers a comprehensive overview of the multifaceted aspects characterizing the link between ASD and SO. The main areas explored and requiring further investigation include focused therapeutic interventions, criminological assessment, and the promotion of sexual health for individuals with ASD.

It is essential to ensure a satisfying relational and sexual life in ASD. Considering the underestimation of ASD diagnosis in the forensic setting, a proper diagnostic framework would allow for a better understanding of the problematic behaviors exhibited by these individuals and a judicial process more suited to their needs. Sexual education and the development of social skills programs during their educational journey could be integrated to prevent SO.

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#### Data Availability

Data will be made available on request.

#### Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.neubiorev.2024.105687](https://doi.org/10.1016/j.neubiorev.2024.105687).

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