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*Systematic Review*

# Psychosexual Education Interventions for Autistic Youth and Adults—A Systematic Review

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**Abstract:** (1) Background: The literature shows a general lack of sexual knowledge and appropriate sexual health education in persons with Autism Spectrum Disorders (ASD). Moreover, the existing interventions mainly target the neurotypical population, without addressing the specific needs of individuals with ASD. (2) Aims: The current systematic review aimed at analyzing the literature encompassing psycho-educational interventions on sexuality addressed exclusively to people with ASD, in order to report the good practices and to describe the effectiveness of the existing programs. (3) Methods: The systematic review followed the PRISMA-P method. The literature search was conducted in June 2022, examining PsycInfo, PsycArticle, PubMed, and Education Source. The search strategy generated 550 articles, of which 22 duplicates were removed, 510 papers were excluded for not matching the criteria, and 18 articles were finally included. (4) Results: Ten papers presented good practices and eight focused on intervention validation. The analysis showed that the good practices were essentially applied in the intervention studies. No intervention proved to be successful both in increasing psychosexual knowledge and in promoting appropriate sexual behaviors; thus, further research is needed. (5) Conclusions: The current review allows for critical reflection on the need for validated sexuality interventions.

**Keywords:** systematic review; developmental disabilities; autism spectrum disorder; sexual education; good practices; sex education interventions; adolescence

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## 1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder with a multifactorial and heterogeneous etiology, encompassing a series of neurodiverse conditions whose onset occurs in the early years of life. People with ASD show qualitative impairments in social interactions and communication and a stereotyped, limited, and repetitive repertoire of interests and activities [1]. Currently, ASD is considered one of the most widespread developmental disabilities, with an incidence of 1 in 44 children in the United States [2]. As for Europe, a recent study carried out by Autism Spectrum Disorders in Europe (ASDEU) on the prevalence of ASD in the European Union estimated that approximately 1 in 89 children would be autistic [3].

In recent years, several studies have been conducted on the neglected topic of sexuality of people with ASD. Sexuality is a complex phenomenon characterized by different desires, thoughts, fantasies, attitudes, beliefs, behaviors, practices, values, roles, and relationships and it represents an essential component of our identity as human beings [4]. Therefore, sexual rights, enshrined by the World Health Organization, must be protected and guaranteed for all, without any discrimination.

Social and cultural changes have modified the way we consider sexuality and affectivity within relationships: the ever-increasing knowledge regarding complex issues such as sexually transmitted diseases (STDs), abortion, sexual dysfunctions, and sexual functioning allowed the development of a positive approach to human sexuality [4]. Indeed, nowadays,

sex education programs not only aim to address issues such as the use of contraceptive technologies or devices to prevent unwanted pregnancies, but they also incorporate topics related to love, affectivity, and consent [5].

At the same time, an increasing number of studies on sexuality in persons with ASD have been published in the past 10 years. However, there is still a long way to go, as for a long time, the dimension of sexuality has been confined to a secret area for anyone with a disability [6]. Historically, society has considered sexuality in people with disabilities by relating to either of two opposing poles: on the one hand, they were seen as "asexual" or "eternal children", not desiring or being interested in relationships, and on the other hand, they were regarded as potentially dangerous to others [7]. Until recently, the sexuality of people with developmental disabilities has been ignored and viewed from a blaming perspective, rather than seen as an integral part of everyone [6].

Nevertheless, studies agreed that persons with ASD have pubertal development and physical and sexual maturation that adheres to a similar timeline as individuals with typical development (TD); moreover, they show interest in romantic relationships and engage in sexuality-related behaviors [8,9]. However, the specific information processing associated with ASD—such as peculiarities in communication and social interaction, the possible presence of repetitive patterns of behavior, and inflexibility or difficulty in taking others' perspectives—may lead to challenges in coping with the cognitive, emotional, and relational changes that occur during adolescence [10,11]. The hyper- or hypo-sensitivity associated with ASD may also favor problems in coping with the physical changes associated with puberty. For instance, girls with ASD may present greater emotional and behavioral issues related to the onset of menstruation [12].

Despite the similar sexual development to that of TD peers and the evidence showcasing the importance of the sexuality dimension for people with ASD, an interesting finding from the literature on the topic is that there is a general lack of sexual knowledge and appropriate sexual health education in this population [13,14]. Another issue is that the main target of existing interventions is the neurotypical population, thus not focusing on the specific social, cognitive, and emotional needs of individuals with ASD. For example, the chronological age of persons with ASD often does not coincide with their cognitive, emotional, and psychosocial development [15]. Additionally, repetitive behavior and a lack of flexibility could interfere with the spontaneity of sexual interactions [16]

The main sex-related problems to which this population is exposed could be partially or totally stemmed by increasing knowledge and developing appropriate skills. This need is also expressed by schools, families, and mental health professionals, who are fundamental components for an effective generalization and internalization of the skills. Indeed, the presence of a supportive environment that provides consistent information is crucial for the stabilization of such skills over time [17]. For this reason, it is essential to act through ongoing training and support towards all figures who have a role of responsibility towards individuals with ASD.

Another aspect that should not be ignored concerns the sources of information about sexuality that these individuals generally consult. The social and relational difficulties faced by people with ASD expose them to a higher risk of learning about sexuality through the passive use of information channels which could provide partial or distorted notions [18]. Failure to acquire correct information about the development of healthy sexuality makes persons with ASD more likely to consider themselves consistent with the negative beliefs conveyed by society [19]. Moreover, this exposes them to a higher risk of engaging in inappropriate sexual behaviors, such as masturbating or denuding themselves in public, touching others inappropriately, or developing paraphilias, which may evolve into problematic behaviors, such as acts of self-harm or aggression [6,20,21]. In their review, [20] emphasized that the development of interventions that educate adolescents with ASD about sexuality and related problems is important to reduce inappropriate sexual behavior and to understand the mechanism behind their occurrence.

The lack or inadequacy of sex education also increases the probability for individuals with ASD to be victims or perpetrators of abusive behaviors [6]. In particular, the risk of sexual victimization in this population is very high, especially among young women [22]. A study conducted in 2014 [18] found that 78% of respondents with ASD reported being exposed to sexual victimization at least once.

In summary, the failure in acquiring psychosexual skills denies people with ASD a crucial developmental opportunity. This emphasizes the importance of developing educational interventions suited to the level of physical and cognitive maturation of the persons with ASD to support them in acquiring knowledge and practices which could be useful for the development of a responsible sexual identity and healthy meaningful relationships [9].

Recently, three reviews have addressed the topic of interventions on sexuality education [23–25]. Their main limitation is that they included people with several different disorders or disabilities (ASD, intellectual disability, developmental disabilities). Only a few studies focus specifically on ASD [26–28]. Since each disorder has its peculiarities, identifying specific sex education needs in individuals with such a heterogeneous disorder as ASD is paramount [29].

The current systematic review expands the current knowledge about the psychoeducational interventions on sexuality, offering an integrated view on the topic. We pursue this goal adopting two strategies: focusing exclusively on people with ASD and including articles about best practices to allow for a comparison with evidence-based interventions. The aims of the study are (1) reporting the good practices, arising from the literature in the field, to adopt when structuring sexuality education interventions; (2) describing the existing sex education programs only targeting persons with ASD; (3) checking the congruence between the good practices reported by the literature and the actual features of the interventions that were conducted; and (4) analyzing the effectiveness of the interventions for psychosexual education.

## 2. Materials and Methods

This systematic review was conducted by B.R., D.B., and M.C. following the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P; [30]).

### 2.1. Eligibility Criteria

Only studies targeting adolescents and adults diagnosed with ASD, with or without comorbidities, were considered eligible. Studies conducted on both people with ASD and people with other diagnosis were excluded when the data referring to the sub-sample of people with ASD were not clearly identifiable.

A further inclusion criterion was the focus on sex education interventions and their validation, strategies, and recommendations for the development of sex education treatments and treatment of problematic sexual behaviors. Only articles published in peer-reviewed journals were included; dissertations, book reviews, meta-analyses, and systematic reviews were excluded.

### 2.2. Information Sources and Search Strategy

The literature search was conducted on 20 June 2022, examining the following databases: PsycInfo, PsycArticle, PubMed, and Education Source. The following keywords were included: (Autism OR ASD OR Autism Spectrum Disorder OR Asperger's OR Asperger's syndrome OR Autistic Disorder OR Aspergers) AND (sexuality education OR sex education OR sexual health education) AND (interventions OR strategies OR best practices OR treatment OR therapy OR program OR management).

### 2.3. Data Management and Selection Process

The search strategy generated 550 articles, and 22 duplicates were removed. Each remaining paper was assigned a unique identifier throughout the process.

In the screening stage, B.R. excluded all irrelevant articles based on the title and the abstract of the 528 studies. A total of 499 papers were excluded for not matching the criteria due to the following reasons: mismatched or mixed groups in the sample, and out of scope (e.g., studies conducted with people with ASD but not related to sexual education). Moreover, 3 studies were not retrievable.

The eligibility phase was based on reading the content of each article by B.R. and D.B. The interrater agreement was good (Cohen's K = 0.85); the disagreements were solved by discussing them together with M.C. A total of 11 articles were excluded because they analyzed the topic of sexuality without addressing sex education, included a mixed diagnosis sample (and this was not specified in the abstract), or consisted of a study protocol. At the end of the process, 18 articles were included, as shown in the PRISMA flow diagram (Figure 1).

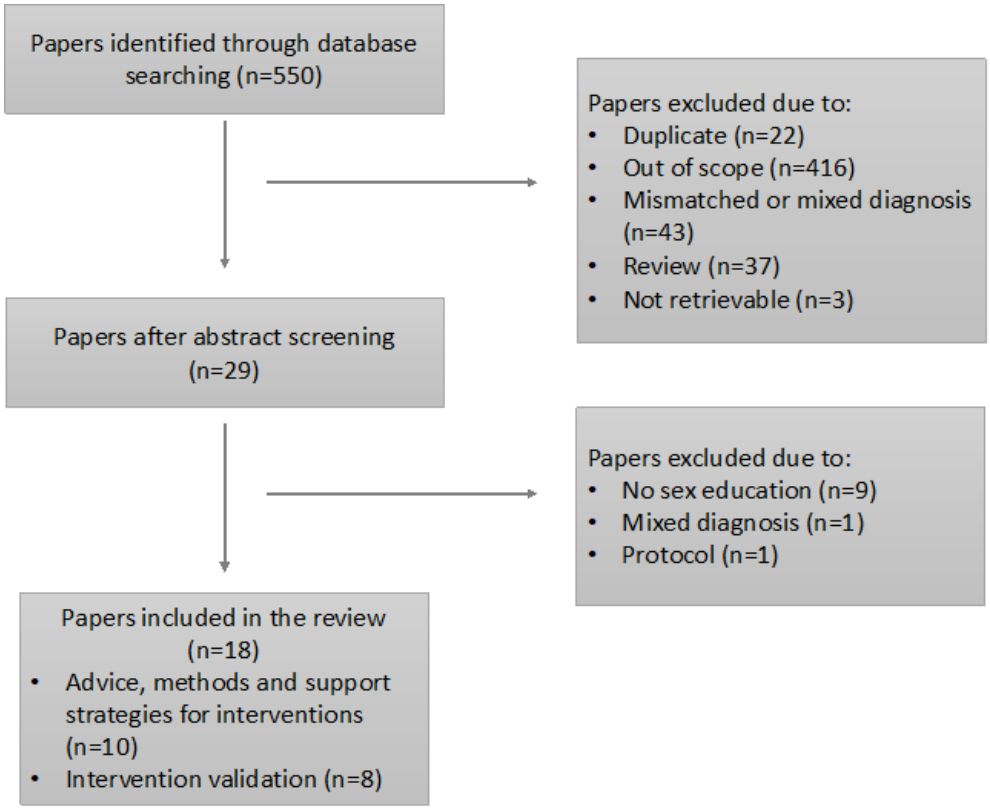


**Figure 1.** Search results and filtering process.

### *2.4. Data Collection Process*

B.R. filled out a piloting form developed ad hoc for this review, to extract relevant data from the selected papers. D.B. and M.C. revised the form; disagreements among the authors were discussed and solved.

### *2.5. Data Items and Outcomes*

We summarized the content of the included articles into four tables.

Table 1 addresses the advice for sexual interventions and Table 2 reports methods and support strategies for sexual interventions. Tables 1 and 2 include the following variables: author/s, year of the publication and the country where the study was run; the objective of the study; informants in the study; persons targeted by the intervention; intervention topics; mode of intervention delivery; instructor/s; methods and support strategies for the intervention; usefulness of strategies for sexuality education.

**Table 1.** Advice for sexual interventions reported in the studies.

| N | Author/s (Year), Country | Objective of the Study | Informants in the Study | Person Targeted by the Intervention | Intervention Topics | Mode of Intervention Delivery | Instructor/s |
|---|---|---|---|---|---|---|---|
| [31] | Mesibov and Schopler (1983), USA | Advice for interventions derived from TEACCH | Author/s | Adolescents | (a) For people with extremely limited language or comprehension: body parts; interpersonal behaviors; behaviors in public or private. (b) For those with limited ability to communicate and understand: appropriate behaviors in public; basic anatomy; body care. (c) For high-functioning people: full range of heterosexual issues. | (1) Autistic people at different levels of functioning have different needs for sex education. (2) Separate values from training techniques. (3) Sex education needs to be an ongoing process. (4) Create a long-standing relationship involving mutual trust and good parent–professional communication. (5) The professional role includes providing some perspective in terms of what other parents are doing about similar situations and what the professional literature suggests; this role should never include imposing a specific solution on any parent. (6) Sexuality has to be addressed comprehensively over time and settings; it should not be an isolated teaching segment in one setting. | Parents and resources to assist them |
| [32] | Tarnai and Wolfe (2008), USA | How to use Social Stories for sexuality education with ASD | Author/s | Students | Health and hygiene; relationships; self-protection/self-advocacy | Use of Social Stories (SS) for the intervention: (1) Involve the students themselves as much as possible both in the writing of the SS, as well as in refining it based on feedback from actual skill performance during initial practice. (2) SS should be individualized and adapted for each individual. (3) It is possible to use additional visual supportive materials (4) SS should be revised in the course of fading out the intervention for maintenance and generalization. (5) Future research should empirically validate SS interventions. | Information is missing |
| [33] | Wolfe et al. (2009), USA | How to use ABA strategies for sociosexual education for people with ASD | Author/s | Students | Biological and reproductive area; health and hygiene; relationships; self-protection/self-advocacy | (1) Appropriate knowledge should be taught through empirically based strategies. (2) Instructional goals and strategies should be individualized to match the learner with the targeted behavior. (3) All the ABA strategies should have the approval of parents and administrators. | Parents should be involved in planning and implementing sociosexual curricula |
| [34] | Hatton and Tector (2010), U.K. | Advice for intervention derived from interviews | Persons with ASD | Adolescents (age: 11–19 years) | Sense of self; self-esteem and self-worth; masturbation; menstruation; relationships of different kinds; relationships that include sex; clean and dirty; public and private; health issues; touch and personal safety | (1) Use a person-centered curriculum. (2) The curriculum should be made up of building blocks that need to be taught clearly, explicitly, and dealt with sensitively. (3) The areas that require the most work for particular individuals need to be identified by assessment. (4) Use intensive interaction-type work, through which staff can express a sense of value in what interests each individual. (5) The work should be as visual as possible, as well as ongoing. (6) It is important to consider the cultural variations in attitudes when planning an educational program. | Information is missing |

**Table 1.** *Cont.*

| N | Author/s (Year), Country | Objective of the Study | Informants in the Study | Person Targeted by the Intervention | Intervention Topics | Mode of Intervention Delivery | Instructor/s |
|---|---|---|---|---|---|---|---|
| [35] | Penwell Barnett and Maticka-Tyndale (2015), USA | Advice for intervention derived from interviews | Adults identifying themselves as a person on the autism spectrum | Individuals (age: 18–61 years) | Risks, methods, tools, and diversity in sexual desires; alternative or unconventional sexual activities; difference between real life and pornographic fantasies, movie sex, book sex; slang words people use to describe sexual activities, body parts, that get used in invitations for sexual activities; moral or social conventions around sex; courtship difficulties and sensory dysregulation in the context of partnered sexuality | (1) Sex education should be disability-friendly and developmentally appropriate. (2) Such education should be offered at regular intervals throughout the life course, particularly in young adulthood. (3) Communicate information factually, explicitly, and in detail. (4) Describe and allow for the practice of sociosexual norms and skills. (5) Provide examples (of the subtle signs of abuse and exploitation). (6) Be autism spectrum-normative by normalizing sexuality and gender variance, sensory differences, and delayed sociosexual milestones. (7) Research on sex education of people with ASD should include the perspectives of autistic persons themselves. | Information is missing |
| [36] | Mackin et al. (2016), USA | Advice for intervention derived from interviews | Parents of persons with ASD | Adolescents (age: 14–20 years) | Matters of maturation (e.g., anatomy and physiology, puberty); consequences of sexual behavior (e.g., pregnancy, illegal possession of pornographic material); issues of social navigation (e.g., language, self-advocacy, rules, and boundaries). The goals are to increase the recognition of healthy relationships; provide a measure of self-protection; ameliorate undesirable consequences of sexual activity. | (1) Interventions should be both ASD-specific and individualized. (2) They should include an evaluative mechanism indicating the person's level of performance or they should be information learned or capable of providing feedback to parents. (3) Informational resources should be evidence-based, accessible, acceptable, and effective at increasing sexual health knowledge. (4) They should optimize the children's ability to generalize and retain information. (5) Issues of cost and access need to be considered. (6) The education format should be visually presented; interactive; specific to ASD; technology-based; capable of repetition; written information that can be read; information presented in context; has an evaluation component; capable of feedback for parents to use; potential to link to additional information on a particular topic; self-guided/paced; presents information in multiple ways. | Parents and resources to assist them |
| [37] | Ballan and Freyer (2017), USA | Exemplification of 3 methods for intervention based on the literature | Author/s | Adolescents | Masturbation; menstruation hygiene; inappropriate touching | (1) Sexuality education should not be limited to one environment and the skills learned must be transferable to multiple contexts. (2) Mental health providers can strengthen sexuality education efforts by collaborating with parents and educators to encourage reinforcement of positive techniques in all aspects of an adolescent's life. (3) Research has to determine the effectiveness of these intervention strategies for sexuality education. | Information is missing |

**Table 1.** *Cont.*

| N | Author/s (Year), Country | Objective of the Study | Informants in the Study | Person Targeted by the Intervention | Intervention Topics | Mode of Intervention Delivery | Instructor/s |
|---|---|---|---|---|---|---|---|
| [38] | Clionsky and N'Zi (2019), USA | Adaptation of sexual intervention for children with ASD | Author/s | Children or adolescents with problematic sexual behaviors | Sexual acting out behaviors | Decide which treatment approach to adopt: a thorough assessment of the child's developmental level, cognitive and intellectual functioning, and problematic sexual behaviors would be beneficial. | Information is missing |
| [39] | Cummins et al. (2020), U.K. and Ireland | Advice for intervention derived from interviews | Parents and educators | Girls (age: 11–19 years) | Puberty changes: menstruation, masturbation, breast development, developing body hair. Puberty-related basic, functional skills (hygiene, body care); promoting independence, dignity and respect. | (1) Tailored support. (2) Take gradual steps toward realistic goals. (3) Use a range of strategies and supports. (4) Use appropriate language and open communication. (5) Promote consistency and collaborative work between parents and school. (6) Basic, related skills should be focused on as early as possible. | Parents and experts in sex education |
| [40] | Rothman and Graham Holmes (2022), USA | Advice for intervention derived from interviews | Individuals with ASD | Youth (age: 16–22 years) | Friendships or dating relationships: defining healthy (reciprocal and rewarding) versus unhealthy (abusive) relationships; relationship challenges such as support lasting, taking emotional risks, etc.; relationship anxiety and neurohealth; establishing new relationships; establishing, communicating, and respecting boundaries; ending relationships | It has become increasingly important for researchers to generate high-quality and methodologically rigorous evaluation studies that reveal which participants are most likely to benefit from the interventions and how the interventions can be improved to make larger impacts on the lives of autistic people. | The workshops should be co-facilitated by a neurotypical adult and an autistic adult as a pair |

Whenever possible or informative, the words reported in the table are citations from the paper.

**Table 2.** Methods and support strategies for sexual interventions reported in the studies.

| N | Objective of Study | Person Targeted by the Intervention | Methods and Support Strategies for the Intervention | Usefulness of Strategies for Sexuality Education |
|---|---|---|---|---|
| [39] | Advice for intervention derived from interviews | Girls (age: 11–19 years) | (a) Calendar<br>(b) Life-sized dolls<br>€ Social Stories<br>(d) Vibrating watch or more advanced wat€(e) Visual strips<br>(f) Technology-based resources | (a) Calendars can be used to predict when girls will be menstruating.<br>(b) Life-sized dolls are useful for showing girls which areas of the body are pri€e.<br>(c) Social Stories can be used to explain inappropriate touching, but for minimally verbal autistic girls with intellectual disabilities, Social Stories were not always accessible because they did not understand them, and/or did not relate easily to them.<br>(d) The vibrating watch can help girls remember to go to the toilet to change thei€ads.<br>(e) Visual strips can be used for teaching skills in a sequence with visual guides.<br>(f) Technology devices can be used to research puberty topics on the internet. |
| [32] | How to use Social Stories for sexuality education with ASD | Students | Social Stories | Social Stories may be used (1) in a general way to prepare students for changes and unusual situations as a part of going through future stages of sexual development, (2) or they can be written in reaction to evolved problematic situations to offer the student a solution. |

**Table 2.** *Cont.*

| N | Objective of Study | Person Targeted by the Intervention | Methods and Support Strategies for the Intervention | Usefulness of Strategies for Sexuality Education |
|---|---|---|---|---|
| [33] | How to use ABA strategies for sociosexual education for people with ASD | Students | (a) Peer Tutoring<br>(b) Social Scripts Fading<br>(c) Social Stories<br>(d) Task Analysis<br>(e) Video Modeling<br>(f) Visual Strategies | The empirical basis of ABA principles makes it appropriate for the sociosexual education of persons with ASD. Empirically based instructional methods can promote greater skill acquisition and reduction in unwanted behaviors related to sexuality:<br>(a) Peer Tutoring can be used to teach a variety of skills using social modeling techniques.<br>(b) Social Scripts Fading is used to improve social and communication skills.<br>(c) Social Stories provide individuals with ASD social information they may lack and can be written by any person who lives and works with them.<br>(d) Task Analysis is useful for multistep instructional programs.<br>(e) Visual Strategies is a visual cue or stimulus that reminds or prompts an individual to engage in a behavior; it aids the maintenance of attention and is used to sequence and organize the environment.<br>(f) Video modeling can be used across a variety of behaviors. |
| [37] | Exemplification of 3 methods for intervention based on the literature | Adolescents | (a) ABA<br>(b) Social Behavior Mapping<br>© Social Stories | These three methods intended to reduce inappropriate sexual behaviors and promote sexual health and development for adolescents with ASD.<br>(a) ABA-based intervention strategies could be successful in sexuality education, specifically regarding the reduction in public masturbation.<br>(b) Social Behavior Mapping can be used for inappropriate sexual behaviors because it helps place the focus on the impact the behavior has on one's peer©(c) In the context of sexuality education, Social Stories could be used to prepare individuals for puberty-related changes or to help them find solutions to difficult situations that have already occurred. |
| [34] | Advice for intervention derived from interviews | Adolescents (age: 11–19 years) | (a) My touching rules<br>(b) Circle of intimacy<br>(c) Relationship circle<br>(d) Photos<br>(e) Life story work<br>(f) Visual calendar | (a,b) My touching rules and circle of intimacy can be used for topics and situations related to "touch and personal safety" (understand who, where, and when you can touch and when and where it is all right to be touched), "public and private" (understand what are private areas) or to be clear about who it is possible to have sex with when you begin to teach about the act of sexual intercourse.<br>(c) Relationship circle can be used to visually indicate different kinds of relationships and how people can move in and out of different circles.<br>(d,e) The use of photos and the development of life story work is useful to help build a sense of self.<br>(f) Visual calendar for menstruation. |
| [36] | Advice for intervention derived from interviews | Adolescents (age: 14–20 years) | Technology-based strategies | Technology interfaces offer the greatest potential for engagement since they have a compelling visual display, simulate social environments, and allow for interactivity. Specific mechanisms include videos, video games, websites, and mobile device applications, all formats that adolescents with ASD had a propensity for using. |

Tables 3 and 4 report information extracted from the intervention studies on sexual education. Table 3 includes the following variables: author/s, year of the publication and the country where the study was run; details concerning the participants (number, gender, age, and IQ); inclusion criteria to participate in the study; how recruitment of participants took place; study aim/s; gathered measures. Finally, Table 4 includes the following variables: program name and length; study design; information concerning the study procedure and/or the type of intervention; person targeted by the intervention and role of parents; main study outcomes; details concerning follow-up (if it was conducted and, if so, when it was conducted and if improvements recorded at post-test lasted at follow-up).

**Table 3.** Summary of extracted data from intervention studies addressing sexuality education in ASD individuals: participants' details and study aim and design.

| N | Author/s (Year), Country | Participants: N, Gender, Age, IQ | Inclusion Criteria for Participants | Recruitment of Participants | Study Aim(s) | Measures * |
|---|---|---|---|---|---|---|
| [41] | Klett and Turan (2012), USA | N = 3<br>Gender: 3 F<br>Age: 9–12 years<br>IQ = n/a | (1) Female gender;<br>(2) Onset of menstruation had not yet occurred;<br>(3) Menstrual self-care had not been taught;<br>(4) Parents viewed the acquisition of menstrual hygiene skills as important;<br>(5) Parents were willing to collect data and implement the intervention. | At a local Southern California Parent Group. | (1) To examine the generalized effect of parent-implemented Social Stories with an embedded visual task analysis in teaching menstrual care routines among three female adolescents with ASD.<br>(2) To evaluate participants' knowledge of menstruation and puberty concepts. | Children/Adolescents:<br>(1) Menstrual Care and Knowledge (checklist; comprehension questionnaire).<br>Parents:<br>(1) Post-Intervention Satisfaction (survey);<br>(2) Skill generalization and maintenance (20-min semi-structured phone interview). |
| [42] | Dekker et al. (2015), The Netherlands | N = 30<br>Gender: 23 M<br>Age: 11–19 years<br>(M = 14.8, SD = 2.07)<br>IQ $\geq$ 75 (M = 96.96) | (1) Diagnosis of PDD-NOS, AS or AD (DSM-IV-TR criteria);<br>(2) IQ $\geq$ 75;<br>(3) Age between 11 and 19 years. | The participants were in treatment at a large expert mental health care organization specialized in ASD (Yulius). Their clinical practitioner referred the participants to the TTT program. | (1) To investigate whether psychosexual knowledge significantly increases after taking part in the TTT program through a pre-training and post-training design;<br>(2) Which aspects of psychosexual knowledge are particularly impacted;<br>(3) Whether specific characteristics of the participants are related to improved psychosexual knowledge;<br>(4) Whether parents notice in their child's everyday life an application of the acquired knowledge. | Adolescents:<br>(1) Psychosexual knowledge (adapted high school biology test).<br>Parents:<br>(1) Perception of their child's ability to apply in everyday life the acquired knowledge (survey).<br>Trainers:<br>(1) Perception of adolescents' level of motivation, difficulty, and resistance to the training (observation scale). |
| [43] | Corona et al. (2016), USA | N = 8 (+ 8 parents)<br>Gender: 6 M<br>Age: 12–16 years<br>(M = 13.4, SD = 0.92)<br>IQ = n/a | (1) ASD diagnosis, without severe behavior problems;<br>(2) Verbal communication;<br>(3) Ability to participate in a group setting;<br>(4) Age range: 12–16 years. | Postings on websites of local community agencies attended by parents of individuals with ASD. | (1) To investigate the feasibility of providing a short-term, group-based sexuality education program to a small group of adolescents with ASD and their parents.<br>(2) To explore the impact of such an intervention on a variety of parent and adolescent outcomes. | Adolescents:<br>(1) Knowledge about sexuality and relationships (questionnaire).<br>Parents:<br>(1) Parent–adolescent communication about topics related to sexuality and relationships (questionnaire);<br>(2) Comfort discussing sexuality and relationships with their children (questionnaire);<br>(3) Concerns related to sexuality and relationships (Sexual Behavior Scale—SBS);<br>(4) Satisfaction with the program (questionnaire). |
| [44] | Pask et al. (2016), USA | N = 6<br>Gender: 6 M<br>Age: 15–17 years<br>(M = 15.83, SD = n/a)<br>IQ = n/a | (1) ASD diagnosis;<br>(2) Only participants in the school-based autism services program were examined. | At a nonprofit organization offering services and programs. | (1) To investigate the effectiveness of the strategies used to increase sexual knowledge.<br>(2) To determine whether the intervention is effective in knowledge acquisition and knowledge retention. | Adolescents:<br>(1) Knowledge acquisition related to basic biological sex education (curriculum-based measure);<br>(2) Knowledge retention related to basic biological sex education (curriculum-based measure). |

**Table 3.** *Cont.*

| N | Author/s (Year), Country | Participants: N, Gender, Age, IQ | Inclusion Criteria for Participants | Recruitment of Participants | Study Aim(s) | Measures * |
|---|---|---|---|---|---|---|
| [45] | Visser et al. (2017), The Netherlands | N = 189<br>Gender; 152 M<br>Age: 12–18 years<br>(M = 14.4, SD = 1.74)<br>IQ $\geq$ 85 in most cases (n = 123) | (1) ASD diagnosis (DSM-IV criteria);<br>(2) IQ $\geq$ 85;<br>(3) Adolescents who portrayed offensive sexual behavior were excluded. | Referrals from professionals working with adolescents with ASD, either at Yulius (see ID07), in schools for special education or through open application. | (1) To investigate the effects of the TTT program on cognitive outcomes (i.e., psychosexual knowledge, and insight into interpersonal boundaries) and behavioral outcomes (i.e., skills needed for romantic relationships and problematic sexual behavior). | Adolescents:<br>(1) Cognitive outcomes: i.e., psychosexual knowledge (adapted high school biology test);<br>(2) Behavioral outcomes: i.e., self-perceived romantic relational skills and problematic sexual behavior (ad hoc scales);<br>(3) Maintenance of the acquisitions (questionnaire).<br>Parents:<br>(1) Cognitive outcomes: i.e., psychosexual knowledge (scale); insight into interpersonal boundaries (scale);<br>(2) Behavioral outcomes: i.e., skills needed for romantic relationships and problematic sexual behavior (Social Responsiveness Scale—SRS questionnaire; Sex Problems scale of the Child Behavior Checklist—CBCL; ad hoc scale);<br>(3) Maintenance of the acquisitions (questionnaire). |
| [46] | Pugliese et al. (2020), USA | N = 84 (+ 11 parents)<br>Gender: 68 M<br>Age: 9–18 years<br>(M = 13.10, SD = 2.18)<br>IQ $\geq$ 80 (M = 101.88, SD = 17.22) | (1) ASD diagnosis (DSM-5 criteria);<br>(2) IQ $\geq$ 80. | Through a children's hospital participant pool, consisting of parents who volunteer to be a part of the research. Participants were not required to have been seen at the hospital for assessment or therapy. | (1) To assess the feasibility, acceptability, and preliminary effectiveness of the Supporting Teens with Autism on Relationships (STAR) program when compared with an attentional control drug and alcohol education program. | Children/Adolescents:<br>(1) Feasibility and acceptability of the program (questionnaire);<br>(2) Acquired knowledge (questionnaire); social self-efficacy (Social Self-Efficacy Scale—SSES); skills application (Video Vignette test).<br>Parents:<br>(1) Feasibility and acceptability of the program (questionnaire);<br>(2) Acquired knowledge (questionnaire); self-efficacy (Parenting Self-Efficacy Scale—PSES); outcome expectancy (Parenting Outcome Expectancy Scale—POES). |
| [47] | Stankova and Trajkovski (2021), Republic of North Macedonia | N = 3<br>Gender: 2 M<br>Age: 11–15 years<br>IQ: n/a | (1) Developmental period–puberty. | At primary school, within the special education need program | (1) To design Social Stories to be used for sexuality education for persons with ASD;<br>(2) To evaluate the effects of their implementation. | Adolescents:<br>(1) Knowledge about sexuality (inventory test).<br>Parents:<br>(1) Changes noticed in knowledge and behavior of their child (20–30 min semi-structured interview).<br>Trainers:<br>(1) Behavior and reactions of the participants, i.e., level of interest and attention (observational protocol). |

**Table 3.** *Cont.*

| N | Author/s (Year), Country | Participants: N, Gender, Age, IQ | Inclusion Criteria for Participants | Recruitment of Participants | Study Aim(s) | Measures * |
|---|---|---|---|---|---|---|
| [48] | Gkogkos et al. (2021), Greece | N = 1<br>Gender: 1 M<br>Age: 15 years<br>IQ = 50 | Information not reported | Information not reported | (1) To investigate the effectiveness of a behavior analytic intervention in helping an adolescent with PDD-NOS improve in the area of sexual behavior and minimize his inappropriate behavior.<br>(2) To investigate whether sexual education would result in a generalized decrease in socially unacceptable forms of sexual behavior.<br>(3) To assess generalization to new contexts and maintenance of the acquired target responses. | Adolescent:<br>(1) Improvement in (a) body parts and puberty changes; (b) contrasting appropriate with inappropriate means for reaching self-satisfaction; (c) teaching steps for masturbation (General Sexual Knowledge Scale—GSKQ).<br>(2) Awareness regarding adolescence and sexuality (General Sexual Knowledge Scale—GSKQ).<br>Parents:<br>(1) Changes in the problematic behavior of their child (Eyberg Child Behavior Inventory—ECBI scale).<br>(2) Changes in their anxiety (State-Trait Anxiety Inventory—STAI scale).<br>(3) Anecdotal data regarding: (a) prerequisites for engaging in self-satisfaction and (b) problematic forms of sexual behavior.<br>(4) Satisfaction with the program (semi-structured interview).<br>Trainer:<br>(1) Generalization of acquired responses and maintenance of the newly acquired skills. |

* When the name is not specified, the tool was a measure created ad hoc.

**Table 4.** Summary of extracted data from intervention studies addressing sexuality education in ASD individuals: intervention details, procedure, and outcomes.

| N | Program Name and Length | Study Design | Procedure/Type of Intervention | Person Targeted by the Intervention and Role of Parents | Outcomes | Follow-Up |
|---|---|---|---|---|---|---|
| [41] | Program name not reported<br>2 months | Non-experimental | Length: between three and five minute sessions (according to the participant), every other day<br>Setting: participant's bathroom<br>Trainer: mothers and a trainer. The trainer participated in 20% of the observation sessions to assist mothers<br>Modality: individual session<br>Topics: puberty and menstrual care and knowledge<br>Strategies: individualized Social Stories with visual cues in the form of photographs, commercially available diagrams, and drawings | Children/adolescents and mothers (mothers conducted data collection and intervention sessions). | (1) Menstrual care and knowledge:<br>(a) Participants independently cared for their menses regardless of pad type and condition; (b) improvement in general knowledge about maturation;<br>(c) improvement of the comprehension of questions about puberty and menstrual care.<br>(2) Post-intervention parent satisfaction: high. | Results were maintained after 1 year |

**Table 4.** *Cont.*

| N | Program Name and Length | Study Design | Procedure/Type of Intervention | Person Targeted by the Intervention and Role of Parents | Outcomes | Follow-Up |
|---|---|---|---|---|---|---|
| [42] | Tackling Teenage Training Program 6 months | Non-experimental | Length: Eighteen between 45 and 60 -minute sessions, once a week, 112 exercises<br>Setting: missing<br>Trainer: trained and certified trainers (N = 5)<br>Modality: individual session<br>Topics: discussing puberty; appearances; first impressions; physical and emotional developments in puberty; how to become friends and maintain a friendship; falling in love and dating; sexuality and sex (e.g., sexual orientation, masturbation, and intercourse); pregnancy; setting and respecting boundaries; internet use<br>Strategies: leaflet with information and exercises, supported with life-like illustrations, practical demonstrations, and explicit skills training using concrete materials | Adolescents and parents (parents were informed about the session topics and the take-home assignment to enhance generalization). | (1) Significant increase in overall psychosexual knowledge from pre-training to post-training. Younger adolescents and those with more difficulty with the content of the sessions showed a larger increase in psychosexual knowledge.<br>(2) The parents of 19 out of 30 adolescents reported a transfer of the learned psychosexual knowledge to everyday life.<br>(3) Trainers perceived in adolescents a high level of motivation, a medium level of difficulty and a low level of resistance to training. | No |
| [43] | Sexuality and Relationship Education Program 3 months | Non-experimental | Length: Six 2-hour sessions<br>Setting: university-affiliated autism center. Adolescent and parent sessions took place in separate rooms.<br>Trainer: for the adolescents, a female clinical psychology doctoral student, a male behavior specialist, and a research assistant; for the parents, a female leader with extensive experience with ASD<br>Modality: group session<br>Topics: introducing sexuality; puberty, the human body and maturation, masturbation, privacy; personal hygiene, friendship development; types of interpersonal relationships, beginning to date; appropriate dating behavior, types of physical contact, sexual activity; personal safety; legal issues; electronic communication; summary and closing<br>Strategies: direct, clear, and specific descriptions of the session's topic. Verbal conversation and prompts were accompanied by visual representations of the subject matter. Each session began with a review of the schedule, depicted verbally and visually | Adolescents and parents (parents learned strategies for teaching and supporting their children about topics related to sexuality). | (1) Adolescents' knowledge: no significant difference between pre- and post-test.<br>(2) Topics discussed: parents discussed significantly more topics with their adolescents between pre- and post-test.<br>(3) Parents' comfort with discussions of sexuality and relationships: no significant differences between pre- and post-test scores.<br>(4) Parental concerns: significantly less total concern between pre- and post-test.<br>(5) Parent satisfaction: high. All parents agreed that they personally benefited from the program. | No |

**Table 4.** *Cont.*

| N | Program Name and Length | Study Design | Procedure/Type of Intervention | Person Targeted by the Intervention and Role of Parents | Outcomes | Follow-Up |
|---|---|---|---|---|---|---|
| [44] | Healthy Relationships and Autism Program Between 4 and 9 months, according to frequency (weekly or bi-weekly) | Non-experimental | Length: Thirty-five 45-minute sessions, once or twice a week<br>Setting: school-based autism services<br>Trainer: a therapeutic staff team composed of one male and one female facilitator<br>Modality: small group format of 5–8 students<br>Topics: basic hygiene (i.e., hand washing, showering and bathing, proper dental care, toileting, bedroom organization, and privacy), basic biological sex education (i.e., puberty, male and female genitalia, intercourse, and pregnancy and childbirth), and relationship development (i.e., differentiating between friends, acquaintances, and bullies, small talk, private talk, showing appropriate affection, dating, and social media and internet safety).<br>Strategies: short step-by-step concrete explanations paired with visual modeling and repeated practice accompanied by corrective feedback. Direct instruction, multiple reinforcers, and repeated dosages of material to address the skill regression. Differential instruction techniques (e.g., repetition, rephrasing, supplementing with the use of videos or individual instruction) | Adolescents and parents (parents received a supplement outlining the material that was taught, with encouragement to follow up, practice new skills, discuss new content learned, and provide opportunities to answer questions). | (1) Significant increase in knowledge about sexuality between the pre- and post-test. | Participants retained their knowledge acquisition at an average level, after 1 month |
| [45] | Tackling Teenage Training Program 6 months | Experimental/ RCT | Length: Eighteen between 45 and 60 minute sessions, once a week, 112 exercises<br>Setting: missing<br>Trainer: professionals (N = 11) who had a bachelor's or master's degree in psychology or social services and who had at least 3 years of working experience with people with ASD.<br>Modality: individual session<br>Topics: discussing puberty; appearances; first impressions; physical and emotional developments in adolescence; friendships; falling in love and dating; sexuality and sex (e.g., sexual orientation, masturbation, and intercourse); pregnancy; setting and respecting boundaries; safe internet use<br>Strategies: the workbook for the adolescent contains illustrations and exercises practiced in a structured manner | Adolescents and parents (parents evaluated the intervention effectiveness and were informed about the progress of the training, in order to stimulate communication with the adolescents, and to enhance generalization). | (1) Cognitive outcomes: compared to the control group, the intervention group showed a significantly greater increase in psychosexual knowledge and adequate insight into boundaries, both posttreatment and at follow-up.<br>(2) Behavioral outcomes: both the intervention and the control groups increased significantly social responsiveness and decreased problematic sexual behavior.<br>(3) Younger adolescents resulted in higher psychosexual knowledge, and higher social functioning. | Effects for psychosexual knowledge and insight into boundaries were maintained after 12 months |

**Table 4.** *Cont.*

| N | Program Name and Length | Study Design | Procedure/Type of Intervention | Person Targeted by the Intervention and Role of Parents | Outcomes | Follow-Up |
|---|---|---|---|---|---|---|
| [46] | Supporting Teens with Autism on Relationships (STAR) 12 weeks | Experimental/RCT | Length: *facilitator-led intervention group (FG)* (N = 31): twelve 30-minute sessions, once a week; parents: six 90-minute sessions plus homework assignments, biweekly. *Self-guided intervention group (SG)* (N = 25): twelve 30-minute sessions, once a week, completed independently (parents should check the completion of the program); parents: 1 h a week on homework assignments. *Control group (CG)* (N = 28): twelve 30-minute sessions, once a week, children completed worksheets with their parents. Setting: FG in the local library; SG and CG at home Trainer: FG: postdoctoral fellows in clinical psychology with an expertise in ASD; SG and CG: self-guided Modality: FG: individual sessions for children, group sessions for parents. SG and CG: individual session Topics: puberty (e.g., reproductive maturity, hygiene); relationships (e.g., friendships, attraction, interest in others, communicating with peers, establishing and maintaining friendships, distinguishing between friends and romantic relationships, negotiating relationship boundaries, inappropriate versus appropriate behaviors for different contexts); sexual feelings and behavior (e.g., masturbation, shared sexual behavior); maintaining sexual health (e.g., STIs, sexual orientation, gender identity, sexual harassment). Strategies: structured delivery of content, simple visual diagrams, concrete language, sample conversations between parents and their children and common questions from teens with ASD with sample answers, online interactive program that leverages ASD individuals' learning strengths in visual instruction and a practical application of concepts and skills | Children/adolescents and parents (parents learnt strategies to support their children's learning of skills to navigate relationships, sexual health, and sexuality). | (1) Feasibility and acceptability: the SG had the lowest completion rate, suggesting that the program was not feasible and acceptable. Youth participants indicated that the curriculum was informative; they expressed some discomfort in discussing sexuality with their parents and about the language used in the worksheets. Parent feedback was positive. (2) Comparing the facilitator-led intervention group and the self-guided intervention group: no significant differences in youth sexuality knowledge, youth social self-efficacy, youth social knowledge, parent sexuality knowledge, parental confidence in discussing sexuality topics, positive parental expectancy in discussing sexuality with their children. (3) Comparing the treatment groups: the program increased the FG's and SG's knowledge about sexual health and development to a greater extent than the CG's. There was a trend toward a greater increase in parent sexual knowledge in the FG and SG compared to the CG. | No |
| [47] | Program name not reported 6 months | Non-experimental | Length: fifteen to twenty-four 45-minute sessions, once a week or bi-monthly Setting: school Trainer: special educator Modality: individual session Topics: private and reproductive parts of the body; changes occurring during the period of puberty; distinguishing pleasant and unpleasant touch; sexual relations and contraception. Strategies: individualized social stories developed by a special educator; illustrations to enhance the understanding of the social stories and enable visual supports | Adolescents and parents (parents gained information about the challenges in sexual development and the benefits of sexuality education through the use of Social Stories). | (1) The participants improved their knowledge about all the topics and demonstrated certain changes in their sexual behavior. (2) All parents emphasized that the period between the completion of the sexuality education and the interview was short for noticing major behavioral changes in their children. (3) During every individual session, the participants' level of interest and attention to the story was rated as high by the trainer. | No |

**Table 4.** *Cont.*

| N | Program Name and Length | Study Design | Procedure/Type of Intervention | Person Targeted by the Intervention and Role of Parents | Outcomes | Follow-Up |
|---|---|---|---|---|---|---|
| [48] | Program name not reported 3 months | Non-experimental | Length: seven to seventeen 40-minute sessions, once or twice a week<br>Setting: participant's bedroom and a small classroom at the Institute of Systematic Behavior Analysis<br>Trainer: a doctoral candidate and a lead researcher conducted the sessions; a graduate student recorded the sessions<br>Modality: individual session<br>Topics: body parts and puberty changes; contrasting appropriate with inappropriate means for reaching self-satisfaction; teaching steps for masturbation<br>Strategies: pictures, worksheets with closed-type questions, true or false type questions, social stories, other educational and printed material, videos | Adolescent and parents (parents assessed the treatment effectiveness and evaluate the social validity of the results; they were also trained to ensure consistency in providing appropriate answers to their son's questions). | (1) There were improvements in all topics.<br>(2) The participant's knowledge regarding adolescence and sexuality increased.<br>(3) The participant had a small decrease in problematic behavior.<br>(4) Parents reported a slight decrease in their child's anxiety after treatment was introduced.<br>(5) Pertaining to anecdotal data, there were no essential differences between baseline and treatment.<br>(6) Both parents were greatly satisfied with the results of the intervention: (a) open communication between father and son; (b) the father learned how to approach his son and to be systematic in teaching him skills related to sexual behavior. | The adolescent's problematic behavior declined to a great extent after 3 weeks; the decline did not last after 5 weeks |

## 3. Results

The analysis included 18 papers that were published between 1983 and 2022 (Tables 1–4). The interest in the topic of sexuality education and intervention specifically addressed to people with ASD is quite recent, as 17 out of 18 papers were published from 2008. The past literature, in fact, mainly referred to persons with intellectual and/or developmental disabilities, including participants with heterogeneous diagnoses. The articles were drafted by authors from the USA and Europe.

The studies had different "objectives", "informants", and "targeted person". The first group of papers reported advice, methods, and support strategies for interventions (10 studies, years of publication: 1983–2022; Tables 1 and 2). Three studies collected information directly from persons with ASD [34,35,40], two articles discussed the point of view of parents or educators [36,39], and five papers reported the perspective of scholars, trainers, or researchers in the field [31–33,37,38]. According to the selection process, all the papers concerned advice, methods, and support strategies specifically meant for persons with ASD. They were addressed to adolescents or young people, except for one study [35] which included persons up to 61 years of age. One study was specifically designed for girls [39].

Regarding "intervention topics", the following were identified: biological and reproductive area (e.g., anatomy and physiology, puberty, gender differences, pregnancy, and birth control); health and hygiene (e.g., body care, health and wellness, body and disease, STDs/HIV prevention, masturbation, and menstruation); relationships (e.g., social skills, different kinds of relationships, friendships and intimacy, interpersonal behavior, feelings, and expression, dating, marriage and parenting, sexual orientation, sexual language, and unspoken rules); self-protection/self-advocacy (e.g., sexuality as a positive aspect of self, sense of self, self-esteem and self-worth, personal rights, diversity in sexual desires, inclusion of alternative intimate relationship structures and sexualities, appropriate/inappropriate touching, appropriate/inappropriate public/private behaviors, decision making, personal boundaries, protection against abuse, saying "no" to nonconsensual sex

and high-risk behaviors, sexual discrimination), issues related to the use of technology (e.g., social navigation).

For what concerns "mode of intervention delivery", all the ten studies analyzed in Table 1 emphasize the importance of developing interventions that should be tailored and individualized, as interventions should consider the great heterogeneity within the group of individuals with ASD. In particular, 2 of the 10 studies support the need for a thorough assessment of both the children with ASD and their developmental context [34,38]. One study specifically stresses not to forget the impact of culture on attitudes when planning an educational program [34]. Moreover, four papers support the idea that sex education should be an ongoing process through the life course that begins early on, especially for basic skills, so that individuals with ASD can acquire habits and information related to how to maintain good health as early as possible [31,34,35,39].

Four studies emphasize the importance of adopting a perspective toward sexuality education aimed at generalizing skills potentially relevant in multiple contexts [31,32,36,37]. Related to this, during the skill acquisition process, it is important to involve all those who take care of people with ASD: experts should promote consistency and collaborative work among families, schools, and mental health professionals. To this end, four studies reported that one of the main goals should be creating a supportive environment that provides information consistent with those promoted by professionals [31,33,37,39]. This is a key aspect for retaining the competencies acquired by individuals with ASD. Besides of the consideration of the broader context, three papers emphasize that the involvement of people with ASD themselves should not be forgotten [32,34,35].

Next, five studies suggest different ways of presenting contents related to sexual education to people with ASD [32,34,36,39]. The most suitable educational formats might be those using direct, clear, and simple teaching methods that provide information in an interactive and deferred manner. It seems important to communicate information explicitly using examples and normalizing differences among individuals. Moreover, the use of visual materials, such as pictures or photographs associated with the most appropriate behaviors, has been suggested to be the most effective one. In addition, people with ASD can be given lists containing various steps that enable them to cope with the most complicated situations. In this case, pictures of typical social situations can be used to raise awareness about their emotions and to enact the most appropriate behaviors. Many papers stress the importance of using various techniques and strategies, but not all of them turn out to be easily accessible. In fact, two studies emphasize the importance of considering the issues of cost and access [36,39].

Finally, five studies support the use of evidence-based strategies and the need for a more in-depth and specific evaluation of the effectiveness of the intervention strategies used for sex education [32,33,36,37,40].

Two further studies suggest using an evaluative procedure to provide parents with feedback concerning their offspring's skills and to possibly revise the strategies used for sexuality education [32,36].

Regarding the main "instructor/s" for delivering an intervention to people with ASD, four out of the 10 relevant studies emphasize the primary role of parents in educating their children on sexual health [31,33,36,39]. In fact, families should be involved in planning and implementing sociosexual curricula, as they are primary sources of information for every individual and are likely to produce lasting changes in their offspring. Nevertheless, families might require some extra support, such as dedicated healthcare professionals and schools with specifically trained staff. ASD experts could be valuable resources for parents, and their presence can promote consistency and foster collaborative work. One study also shows that interventions should be co-facilitated by both a neurotypical adult serving as a role model and an autistic adult in which individuals with ASD can mirror themselves [40]. This study also suggests that the intervention should take place online to include a wide range of different participation styles, should include people of all genders, and should explicitly use a neurodiversity model as the basis for the content.

Regarding Table 2, we sought to identify the main "methods and support strategies" used to convey psychosexual information to people with ASD, and their "usefulness". To this end, we analyzed 6 of the 10 studies already reported in Table 1. Of these, four studies recommend the use of Social Stories to prepare individuals for puberty-related changes or to help them find solutions to difficult situations already occurred [32,33,37,39]. Two studies support the idea that ABA-based intervention strategies could be successful in sexuality education to promote greater skill acquisition and reduction in unwanted behavior related to sexuality [33,37]. Two studies suggest the use of electronic/IT-based strategies (e.g., videos, video games, websites, mobile device applications) that offer the greatest potential for the engagement of people with ASD thanks to a compelling visual display, the possibility of simulating social environments, and a high rate of interactivity [36,39]. Finally, two studies propose for girls only the use of visual calendars for menstruation [34,39]. Other useful methods include life-sized dolls for the concept of public/private body parts; vibrating watches or smartwatches for menstruation-related hygiene; visual strips for teaching skills in a sequence; "my touching rules" and "circle of intimacy" for topics and situations related with "touch and personal safety"; "relationship circle" to visually indicate different kinds of relationships; photos and life-story work to help building a sense of self; and Social Behavior Mapping to understand the impact and the motivation behind an inappropriate sexual behavior.

The second group of eight studies reported the description and the effectiveness of the selected interventions (eight studies, years of publication: 2012–2021; Tables 3 and 4). The studies were conducted in a limited number of "countries": four were run in the USA [41,43,44,46], two in The Netherlands [42,45], one in Greece [48], and one in the Republic of North Macedonia [47]. Overall, the "participants" taking part in the intervention studies listed in Table 3 were 324, ranging from 9 to 19 years of age.

The intellectual level of participants was above borderline cognitive functioning (i.e., IQ $\geq$ 70) in three studies [42,45,46], not specified in four studies [41,43,44,47], and low in the remaining study [48]. All the participants were diagnosed with ASD before the beginning of the study or as an inclusion criterion to be enrolled in the study. In some cases, a prior diagnosis was made; in others, it was confirmed by a clinical psychologist, or additional tests/interviews were administered in order to determine ASD severity. Comorbidity with other conditions was not declared in the studies; therefore, we could not report on this potentially interesting variable.

"Inclusion criteria" to participate in the interventions widely varied across the studies, mainly due to specific study aims (see Table 3 for details).

"Recruitment of participants" was conducted in different ways across the studies, i.e., through children's hospitals [46], children's schools [47], nonprofit organizations [44], parent groups [41], through internet postings [43], or within the context of large mental health care organizations [42,45]. One study (in which there was only one participant) did not report information concerning recruitment [48].

The "study aims" overall encompassed the willingness to test the effectiveness of the specific intervention conducted. The effectiveness of the intervention, in turn, was determined in different ways by the authors. In some cases, participants' knowledge of specific concepts (for example related to puberty) was evaluated before and after the intervention; in other cases, parents were asked if they noticed an improvement in their offspring's behavior or if they spotted an application by their children of the taught concepts. Other studies aimed at testing the feasibility/acceptance of specific interventions delivered to ASD individuals with particular features. Another study aimed at decreasing socially unacceptable forms of sexual behavior and had the further aim of assessing generalization effects of the intervention to new contexts. Moreover, half of the studies also aimed at checking whether the acquired knowledge and skills were maintained at the follow-up.

Due to the heterogeneity of the studies, the "measures" used in each research are different and reflect the specific aims of the researchers. Multiple measures can be found in each study. Informants could be parents and/or trainers and/or children/adolescents

themselves. Moreover, different types of tools were adopted: questionnaires, scales, interviews, tests, inventories, surveys, and observations. Those tools could be already existing or adapted from existing ones or created ad hoc.

The content of Table 4 aims at systematizing specific information from the included studies that are useful to understand which features likely favored the effectiveness of the intervention.

As far as the study design is concerned, most studies adopted a non-experimental "design", in that a control group was not included (see Table 4). The nature of the design did not prevent the authors from conducting pre- and post-test phases of the research. Nonetheless, only two studies [45,46] managed to employ an experimental approach. These two studies randomly allocated participants either to the intervention or to the control group, and both groups were composed of participants with similar characteristics (age, diagnosis, and intellectual functioning).

The "length" of the whole program varied between two and nine months. Regarding the "procedure/type of intervention", the number and frequency of the intervention sessions considerably varied among the studies. Specifically, between 3 and 35 sessions were implemented, which could have a daily/weekly/bimonthly frequency and could last between five minutes and two hours. In most of the studies, individual sessions were organized [41,42,45,47,48]; two studies adopted group sessions only [43,44], and one study used both individual and group format [46].

In six out of eight studies, the intervention was led by a professional [42–45,47,48]. In one study, the intervention was conducted by both a professional and the mothers of the participants as co-trainers [41]; in another study, the intervention group was partly guided by a trainer and partly self-guided [46]. Interventions took place in different settings: at home when targeting private behaviors (i.e., masturbation or menstruation) or when self-guided [41,48], or at school/autism centers/local library when required by the protocol or in case of group sessions [43–45,47]. The setting was not specified in two studies adopting the same program [42,45].

The main topics addressed within the training sessions were biological and reproductive functions related to puberty; sexual health and personal hygiene; skills needed for building and maintaining healthy romantic and amicable relationships; self-protection/self-advocacy regarding sex and intimacy; and the safe use of technology to acquire correct information regarding sexuality.

Among the strategies used in the intervention studies, the following can be found: stories, leaflets, worksheets, illustrations, and videos. All of these strategies share these common features: they contain clear and concise descriptions, direct and explicit instructions, step-by-step concrete explanations, and massive use of visual and realistic materials. Moreover, in most cases, interactive use of the materials was promoted.

In the totality of the studies, both adolescents and their parents were the "person targeted by the interventions". Nonetheless, the "role of parents" could vary. In some studies, parents were informed about their offspring's improvements and new acquisitions to enhance generalization and ensure consistency [42,44,45,47,48]; in other studies, parents took an active part in interventions for learning new strategies to adequately support their children's achievements [43,46]. In one last study, mothers played a co-trainer role [41].

To evaluate the effectiveness of the programs, "outcomes" such as changes observable in youth/parents, and feasibility and acceptability of the program were taken into account. Particularly, changes in youth can be grouped into cognitive and behavioral outcomes. Specific tools were indeed used to assess their knowledge and understanding of concepts regarding sexuality, to measure changes in their sexually related behaviors (in terms of increase in appropriate behaviors and decrease in inappropriate ones), generalization of acquired knowledge, and behaviors to new contexts and therapists. Changes in parents can be identified with reference to their satisfaction with the program, improvement in communication with their children, and a decrease in their concerns related to their children's inappropriate sexual behaviors (and their negative consequences). Moreover, a

specific set of outcomes concern the feasibility and acceptability of the program, which were investigated by asking for feedback from youth and parents on the activities, gathering parental satisfaction, and comparing different conditions (looking at specific parameters such as the completion rate of the program).

As many aspects were examined by each study, it is not possible to state whether a specific intervention was more effective than another. In fact, each study showed strengths in addressing some issues but limitations in addressing other issues. Moreover, it must be noted that the generalizability of results is hampered by the specific features of each sample (such as number and age of participants, diagnosis and level of intellectual functioning, sample composition, degree of parental involvement, intervention setting and modality, length and frequency of sessions).

Finally, regarding "follow-up", this was conducted in half of the studies. The results of the follow-up phase were gathered within different time frames: in two interventions after a short time (i.e., after three/five weeks and after one month; 44, 48); in the other two after a long time (i.e., after one year; 41, 45). Positive outcomes were always maintained at follow-up, except in one study, in which the second follow-up showed that the improvements did not last.

## 4. Discussion

The current systematic review had four main aims. The first and the second aims were reporting the good practices regarding a structured sexuality education intervention, and describing the intervention on psychosexual education targeting youth with ASD. The contributions analyzed in this systematic review addressed the need that arose from the larger literature about psychosexual education for persons with and without disabilities reported in the introduction: filling the lack of sexual knowledge and appropriate sexual health education is crucial to protect persons with ASD from internalizing negative stereotypes promoted by society regarding their sexuality [19], and to reduce the risk of engaging in inappropriate sexual behaviors, developing paraphilias, or being victims or perpetrators of abusive behavior [6,20,21]. Interestingly, a shift in perspective is observable comparing the literature published in with the contributions.

A third aim was addressed in the current systematic review: checking the congruence between the literature suggesting recommendations for sexuality interventions (10 papers) and the features of the actual interventions that we retrieved (8 papers). The analysis showed that the recommendations were essentially included in the intervention studies.

One recommendation was to involve all those who take care of people with ASD and three papers emphasized that people with ASD themselves should serve as trainers. Indeed, in the totality of the intervention studies, both adolescents and their parents took part in the programs; usually, the intervention was led by a professional and none of the studies reported the engagement of instructors with ASD. Parents' involvement was usually explained to support individuals with ASD to better generalize the new acquisitions.

The literature suggesting recommendations also stressed that sex education should be an ongoing process and should start as early as possible. In six intervention studies out of eight, children were involved at a starting the age of 9–12 years, the longest program duration was nine months, and parents were usually involved, probably to try and guarantee a long-lasting effect and consistency of the provided information.

The intervention topics suggested in the recommendation literature were actually covered by the programs: biological and reproductive functions related to puberty; sexual health and personal hygiene; skills needed for building and maintaining healthy romantic and amicable relationships; self-protection/self-advocacy regarding sex and intimacy; safe use of technology to acquire correct information regarding sexuality.

All of the advice studies also emphasize the importance of developing tailored and individualized interventions—indeed, six programs included individual sessions.

Concerning the teaching methods, the interventions shared common features strictly related to enhancing the chance of effective learning in people with ASD, thanks to the

use of clear and concise descriptions, direct and explicit instructions, step-by-step concrete explanations, and visual and realistic materials; the interactive use of the materials was also a common technique.

The fourth aim concerned the effectiveness of the programs on psychosexual education. Overall, no intervention proved to be successful both in increasing psychosexual knowledge and in promoting appropriate sexual behaviors (and/or reducing inappropriate ones). Notably, only one study obtained acceptable results both in cognitive and behavioral aspects. Nonetheless, this was a single case study, and behavioral improvements did not last in the long term.

On the positive side, it must be acknowledged that seven out of eight studies did show cognitive improvements in the involved subjects right after the intervention. Of these, three studies even showed maintenance of such positive outcomes at follow-up. One study was not successful in that adolescents' knowledge did not increase significantly between pre- and post-test. However, the authors attributed this result to methodological shortcomings (i.e., questions were too easy to detect differences in post-test).

Looking at the positive long-term consequences detected in half of the studies—at least on a cognitive level—the pattern of results could suggest that the program structure of all these studies was effective. Nonetheless, only one of these studies implemented a rigorous methodology (RCT experimental design), which also had the largest sample. Therefore, when planning a psychosexual intervention with ASD adolescents, nowadays professionals should try and follow the structure of this program (Tackling Teenage Training Program, TTT). Specifically, TTT has a quite long global duration and requires an intensive commitment by participants and their parents. Indeed, participants are engaged in individual 1-hour sessions on a weekly basis, covering several topics through the use of different kinds of structured exercises. Importantly, this program entails a main role of a specifically trained professional, with longstanding and certified expertise and experience in the field. Parents join the intervention not as co-trainers, but as scaffolders and facilitators in promoting consistency with the training, in order to favor the generalization of acquired knowledge/competencies and stimulate communication with their offspring. Moreover, the results of this successful study highlighted that the younger participants benefited more from the intervention, suggesting the importance of planning timely trainings that begin as soon as possible and that cover the whole life span.

*Limitations and Future Directions*

In this section, we discuss the main limitations concerning the intervention studies included in the current systematic review. The limitations are described together with indications for future research.

The first limitation is that the number of studies meeting the inclusion criteria was scant and the number of participants in all but two studies was below 30. This hampers the generalizability of the results, especially considering the limited number of countries in which the studies were conducted. Moreover, there was a high prevalence of male participants (258 out of 324), that on the one hand reflects the higher prevalence of ASD in the population but, on the other hand, might lead to a neglect of young girls' psychosexual needs and issues. It is known that girls on the spectrum receive a delayed diagnosis or do not receive it at all [49]. This calls for further efforts in planning tailored interventions specifically addressing female needs.

Another important shortcoming that we faced in analyzing the included studies was the marked heterogeneity in participants' intellectual functioning or the lack of this crucial information (missing in half of the studies). Future research should carefully consider this parameter together with the potential comorbidities in order to develop appropriate training.

A further limitation concerns the methodology of the interventions: as highlighted in Section 3, only two of them had an experimental/RCT design and only half of the studies planned a follow-up phase. The lack of a control group affects the validity of the

interventions and speaks to the fragility of the results reported in the studies. Researchers interested in advancing our knowledge of evidence-based interventions should pay specific attention to the study design by including a control group and possibly adopting an RCT approach.

## 5. Conclusions

This systematic review contributes to the literature by analyzing the topic of sexuality education and the psychosexual interventions specifically addressed to people with ASD, and by showing at which conditions such interventions are effective. Sexuality education programs should be early, tailored, and easily translatable in practice to better address the needs along the autistic spectrum. In line with recent trends in the field of research with and for persons with disabilities, the interventions should be informed by autistic people themselves in order to hear and take into account their own voice. Moreover, long-term maintenance of positive outcomes is warranted by interventions realized by expert professionals (trained ad hoc and constantly supervised), coupled with specific strategies/indications provided to parents so that they can efficiently support their children. Furthermore, our analysis highlighted the lack of evidence-based strategies and instruments that are sensitive enough to detect behavioral changes, which are the desired outcomes of every intervention. To conclude, this contribution allows for critical reflection on the need for validated interventions that can help people with ASD to acquire useful skills and appropriate sexual behavior to experience sexuality and relationships positively and healthily.

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