6 Aspects of Sexuality During Development in Autism Spectrum Disorder

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6.1 Introduction

Sexuality is a central dimension of a person's physical and psychological development, and it plays a fundamental role in shaping the individual's self-identity [1, 2]. In the past few years there has been an increased attempt to support people with developmental disabilities (e.g., autism spectrum disorder (ASD), Down syndrome, etc.) to experience all areas of their lives as normal as possible [3–5]. However, little attention has been paid to aspects of sexuality and romantic relationships in these populations [6].

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by impairments in two core domains: persistent deficits in social communication and social interaction across multiple contexts, and restricted and repetitive patterns of behavior, interests, or activities [7].

Although individuals with ASD experience the same aspects of sexuality (e.g., needs, desires, sex driven) as their peers, core symptoms of autism (i.e., deficits in social communication and social interaction) may impact on their ability to develop romantic and sexual relationships [8–12]. This implies that they may be not provided with the opportunity to achieve several developmental stages of their sexuality, which, in turn, can affect later well-being. For example, it is known that individuals with ASD are at an increased risk of sexual abuse or that they are more concerned with finding a partner [13, 14].

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Given the impact on long-term outcomes and well-being, understanding sexual development and sexual functioning in individuals with ASD is important in order to develop future research designs and interventions. To date, however, there has been little research on this topic in this clinical population.

In this chapter we examine characteristics of sexual development in ASD. Examination of the relationship between core symptoms of ASD and sexual relationships in children and adolescents with ASD may help clinicians disentangle factors likely associated with sexual well-being of individuals with ASD, in order to plan proactive prevention and intervention.

6.2 Sexual Development in ASD: The Role of Sex Hormones

Studies in nonhuman animals have demonstrated that the levels of sex hormones during early development have long-term effects on a variety of behaviors (e.g., learning, memory, play) [15]. Moreover, these studies have reported that hormones present during the prenatal period, including androgens (e.g., testosterone), act on the brain to induce sex differences in brain structure and influence human behavior [16]. Recent evidences have suggested that the brain is also sensitive to the effect of sex hormones during adolescence. These effects are relevant for the sexual development for several reasons. First, given that sex hormones refine neural circuits from early development to late development, adult sexual behaviors depend on appropriate exposure to these hormones during all stages of development. Second, if the brain is also sensitive to the effect of sex hormones during late development, pubertal timing can vary depending on the exposure to these hormones, and this can have different consequences on the behavior development (e.g., adverse behavioral outcomes of early puberty in girl). Finally, hormone deficiencies may be compensated only in part by social experiences.

Gender is the product of the interaction between an individual's biological sex and gender identity. Children start to be conscious about their gender between the ages of 18 months and 3 years [17]. The majority of children achieve their gender identity by the time they start to go to school, and, at that point, they start to be aware that their identity cannot change by the clothes they wear or the toys they play with.

Physical sexual maturation follows the normal developmental stages in individuals with ASD [18]. However, core symptoms of ASD, such as difficulties to develop and maintain relationships, lack of social insight, impaired theory of mind, reduced ability to empathize with others, or reduced social awareness, may delay or affect the achievement of gender identity [19]. Accordingly, studies have suggested that gay male or female sexual interest and bisexual sexual interest is more frequent in individuals with ASD [17, 20, 21]. Similarly, gender dysphoria is also common in individuals with ASD (see Sect. 6.4).

It has been speculated that fetal or perinatal exposure to elevated levels of male hormones may increase the risk for ASD. Specifically, the "extreme male brain" theory suggests that prenatal testosterone shapes the brain during fetal life toward masculinized cognition and behavior [22]. Auyeung et al. reported that fetal

testosterone measured from amniotic fluid relates positively to sexually differentiated play behavior in both girls and boys [23].

In line with this data, exposure to high levels of prenatal testosterone might be a risk factor for autism given that individuals with ASD demonstrate characteristics associated with masculinity, such as low empathy and high logical thinking [22].

Support for the influence of fetal sex hormones and later behaviors derives from a large body of research on women with congenital adrenal hyperplasia (CAH). CAH is a family of genetic disorders resulting from mutations of genes for enzymes mediating the biochemical steps of production of mineralocorticoids, glucocorticoids, or sex steroids from cholesterol by the adrenal glands (steroidogenesis) [24]. In the majority of these conditions, there is an excessive or deficient production of sex steroids that can affect the development of sex characteristics. If exposure to high levels of prenatal testosterone influences sexual development, women with this disorder should have masculinized cognition and behavior. In line with this thinking, studies on this population have reported that girls with CAH show increased preferences for male toys and activities and homosexual and/or bisexual orientations [25, 26].

Speculating, this pattern could also provide an explanation regarding the high rate of gender dysphoria found in females with ASD [17]. In more detail, exposure to prenatal testosterone in females with ASD could lead to masculine self-perception and, in turn, to perceive themselves as more masculine than their peers.

6.3 Sexuality and Romantic Relationships in Children and Adolescents with ASD

Early studies on sexuality in ASD heavily focused on the description of behavioral problems and difficulties in this field [27]. However, recently it has been always more accepted that sexuality is a part of the normal development, and there has been a growing interest toward psychosexual functioning in adolescents with ASD [3, 28, 29]. In the past, it was thought that people with ASD were indifferent to relationships with others, except for the necessity to satisfy their needs. This belief was disconfirmed by recent research, which has shown that individuals with ASD are interested to communicate and socialize with others, and in social, affective and romantic relationships [29–32].

As previously suggested, individuals with ASD go through the same sexual development as their peers. However, social communication and interaction deficits may affect their ability to develop romantic and sexual relationships [8–12]. For example, individuals with ASD have a reduced ability to understand rules of social interaction and difficulties in understanding people's behavior and feelings, which are necessary to establish sexual and romantic relationships.

This imbalance between physical and social maturation becomes particularly clear during adolescence, when individuals start to develop friendships and start to have their first romantic and sexual relationships. It is worth noting that

among the other barriers that affect sexual development in individuals with ASD, there is the fact that parents are commonly overprotective, and this can limit the already limited opportunities that people with ASD have to interact with peers [33].

Furthermore, psychosexual functioning may also be affected by other autistic features, such as sensory sensitivity. For example, people with ASD can be both hypersensitive and hyposensitive to sensory stimuli. Hypersensitivity can make the physical contact unpleasant, thus making the sexual experience unbearable. On the other hand, hyposensitivity may result in difficulty to became aroused or reach the orgasm which, in the worst cases, can lead females to experience a female orgasmic disorder or a female sexual interest/arousal disorder and males to have a delayed ejaculation or an erectile disorder [7, 34].

Overall, studies on sexuality and romantic relationships in individuals with ASD have reported contrasting results [13, 28, 30, 35]. For example, Dewinter et al. explored self-reported sexual behaviors, interests, and attitudes of 50 high-functioning adolescent boys with ASD compared with a control group of 90 boys [30]. Results of this study showed that the two groups were remarkably similar in terms of sexual behaviors: they fell in love, started to masturbate, and experienced their first orgasm in the same period. However, boys with ASD were more tolerant toward homosexuality compared to the control group. Moreover, a substantial part of boys with ASD reported to had experienced other partnered sexual behaviors. Similarly, Strunz et al., evaluating interest and experience in romantic relationships in 229 high-functioning adults with ASD, found that the majority of them (73%) were both interested and engaged in a romantic relationship [35]. In addition, individuals with ASD whose partner had a diagnosis of ASD, were also more satisfied with their relationship.

On the other hand, a recent study found that adolescents with ASD engaged in fewer social behaviors, had less sex education, fewer sexual experiences, and more pronounced concerns for the future compared to typically developing peers [13]. Accordingly, Dewinter et al. comparing a sample of 30 adolescent boys with ASD to 60 boys in the general population found that the proportion of boys with ASD that had no partnered sexual experience was larger than in the control group [28]. In addition, half of the ASD sample indicated some regrets about their first experience with sexual intercourse, and the majority of them did not use protections.

As a general consideration, it has to be noticed that severity of autism symptoms has been reported to be associated with problematic aspects of psychosocial sexual functioning in individuals with ASD, such as excessively thinking about sex, public masturbation, stalking, and sexual offenses. However, all of these studies involved only high-functioning participants [32, 36–40].

Taken all together, these findings suggest that people with ASD, and in particular during adolescence, could benefit from specialized sex education programs [13] (see Sect. 6.5).

6.4 Inappropriate Sexual Behaviors, Paraphilic Behaviors, Gender Dysphoria, and Risk of Sexual Abuse in ASD

Inappropriate sexual behaviors (e.g., public masturbation, excessive masturbation, stalking), paraphilic behaviors (e.g., pedophilia, frotteurism, etc.), sexual dysfunctions, gender dysphoria (GD), and higher risk of sexual abuse are often described in adolescents with ASD [18, 32, 36–40]. These inappropriate sexual behaviors can cause significant distress in individuals with ASD, may became a significant stressor for families, have a negative impact on quality of life, and can put this population in danger of experiencing sexual victimization with all the negative impact that it can have on the individual's mental health and well-being.

6.4.1 Inappropriate Sexual Behaviors

Inappropriate sexual behaviors often reported in adolescents with ASD are mainly related to public masturbation, excessive masturbation, and stalking [18, 27, 41, 42].

These behaviors may be explained by the fact that even if adolescents with ASD have the same sexual needs as their peers, lack of social awareness and skills, and deficits in theory of mind can lead these individuals to not always act suitably to the social setting. For example, the normal physical changes that occur during puberty can cause a sexual urge, and multiple stimuli can become sexually exciting; however, the lack of social awareness can bring these individuals to undress in presence of others and to engage in public masturbation [27, 41, 42]. In general, it has to be noted that public masturbation has been described mainly in low-functioning adolescents with autism. Instead, it seems that high-functioning individuals with ASD practice masturbatory behaviors, but not in public [39].

Excessive masturbation has also been described in adolescents with ASD [27]. Several things can be hypothesized to cause this inappropriate behavior. First, it can be possible that excessive masturbation might be related to hyposensitivity often present in individuals with ASD: these individuals may perseverate in masturbation due to altered tactile sensitivities that may result in low pleasure's perception and difficulty in reaching the orgasm [39]. Second, excessive masturbation can be a self-stimulatory behavior caused by the lack of other alternatives for sexual tension [27]. Finally, sexual knowledge, such as masturbatory techniques, is also acquired interacting with peers. However, deficits in social interaction lead adolescents with ASD to have less opportunities to interact with other adolescents. Therefore, excessive masturbation, caused by poor masturbatory technique, can be due by a limited sex education.

Another inappropriate social behavior that is often described in individuals with ASD is stalking. This behavior can be explained by some characteristic impairments present in individuals with ASD. Specifically, deficits in theory of mind (i.e., the ability to understand what someone else is thinking) or difficulty to interpret

correctly interpersonal cues (e.g., verbal or nonverbal cues from other people to communicate that the individual is unwanted) may lead these individuals to misunderstand social relationships. Repetitive interests and insistence on sameness can be expressed as a perseverative focus on a desired person. This behavior can also put individuals with ASD at risk to engage in stalking behavior.

6.4.2 Paraphilic Behaviors

Knowledge on paraphilic and/or unusual sexual behaviors, (e.g., pedophilia, fetishism, transvestism, exhibitionism, voyeurism), in individuals with ASD, comes largely from case studies [18, 39, 43–48]. Therefore, there is a lack of information regarding the prevalence of paraphilic disorders in this clinical population.

Hellemans et al., investigating sexual behaviors in 24 institutionalized, male, high-functioning adolescents and young adults with ASD, found that two participants involved in the study were primarily attracted to young, prepubescent girls [39]. In more detail, one had a platonic interest in young girls, whereas the other one met diagnostic criteria for pedophilia. Moreover, another participant included in this study met criteria for a diagnosis of fetishistic disorder.

Dozier et al. described a case of a 36-year-old man with ASD displaying foo-shoe fetishistic behaviors who responded to treatment using a response-interruption/time-out procedure [47].

Similarly, Coskun et al. presented a case of a 13-year-old male with ASD and fetishistic behavior successfully treated using mirtazapine [48].

Some hypothesis has been suggested to explain the relationship between paraphilic behaviors and ASD. In particular, restricted and repetitive interests, attention to details, different sensitivity to sensory inputs, or unusual interest in sensory aspects of the environment may contribute to these behaviors in individuals with ASD [49]. However, further researches on this topic are needed.

6.4.3 Gender Dysphoria

Gender dysphoria is defined as a marked incongruence between one's biologic sex and current gender identity that cause significant distress and impairment [7].

Several case reports have described the presence of a comorbid gender dysphoria in individuals with ASD [45, 50–53].

A recent study assessing the presence of ASD in a sample of 204 children and adolescents referred to a gender identity clinic found a surprisingly high rate (7.8%) of comorbid occurrence of ASD and gender dysphoria [54].

It has been speculated that several factors may contribute to the high rate of gender dysphoria in individuals with ASD. First, the exposure to high levels of prenatal testosterone (see Sect. 6.2). Second, sensory issues characteristic of ASD can play a role for these individuals in the development this disorder. Specifically, individuals with ASD may perceive sensory stimulus differently from the general population.

They might have preferences for specific sensory inputs, or tactile sensations, and can chose, for example, their clothes basing on these preferences and independently from the social norms [17]. Finally, core symptoms of ASD may interfere with the development of gender identity (see Sect. 6.2) [17, 20, 21].

However, literature on the connection between these disorders is scarce, and more systemic researches are needed.

6.4.4 Sexual Victimization

It has been reported that individuals with ASD are at increased risk of sexual victimization [13, 55]. However, studies on this topic are still limited. Lower levels of sexual knowledge may contribute to unsafe sexual relationships (e.g., not using the condom) and eventually to sexual victimization, sexual violence, and sexual abuse.

For example, Brown-Lavoie et al. found that individuals with ASD had less perceived and actual knowledge and experienced more sexual victimization than individuals without ASD [55]. Of interest is that individuals with ASD obtained more sexual knowledge from nonsocial sources, such as television and Internet, compared to their peers. Moreover, a concerning rate of individuals with ASD (70%) reported to have experienced sexual contact victimization and sexual coercion victimization.

Again, possible explanations for the relationship between poor sexual knowledge and high rate of sexual victimization can be found in the communication and social deficits characteristic of ASD. For example, individuals with ASD may have restricted opportunities to interact with peers, which, in turn, can impact on their lower perceived and actual sexual knowledge. In the same way, deficits in theory of mind can lead an individual with ASD to be less able to understand others' negative intentions, or what is safe and unsafe.

Given the relationship between sexual knowledge and victimization, sex education seems of particular importance in this clinical population (see Sect. 6.5).

6.5 Psychosexual Education and Sex Interventions for Children and Adolescents with ASD

Several studies have highlighted the need and importance of psychosexual educational programs for individuals with ASD [3, 38, 55]. To date, interventions that focus on the psychosexual development of children and adolescents with ASD are, however, limited [56, 57].

Although numerous educational programs on sexuality have been developed for people with developmental delay (e.g., intellectual disability, psychomotor retardation), these programs are not generally appropriate for individuals with ASD due to the fact that they do not take in consideration the communication and social impairments that are characteristic of this clinical population [58].

Until a few years ago, only three educational programs on sexuality were specifically developed for individuals with ASD [58]. In more detail, the Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) program includes a specific sexual education curriculum concerning how to (1) develop appropriate behaviors and habits, (2) address issues of personal hygiene, (3) understand sexual anatomy and functioning, and (4) explain different kind of social relationships [59]. The Devereux Center proposed a model that included in its curriculum a wide variety of topics (ranging from personal hygiene to marriage) [8]. Finally, the Benhaven School focused mainly on personal care and appropriate behaviors as it is directed to people with very severe symptoms [58].

It has to be noticed, however, that none of these programs had been systematically and quantitatively investigated.

Only recently, the first randomized controlled trial investigating the effects of a psychosexual training program (i.e., Tackling Teenage Training (TTT) program) for adolescents with ASD has been published [56]. In this trial, 189 adolescents with ASD were randomized to an intervention condition ($n = 95$) or a waiting-list control condition ($n = 94$). The intervention has been developed for adolescents with ASD from 12 to 18-years-old with a normal or high-functioning cognitive ability, and includes 18 weekly individual core sessions, in which adolescents with ASD receive information regarding several topics (i.e., psycho-education), alternated with exercises (e.g., behavioral rehearsals, and knowledge and insight quizzes). The results of this study provided evidences that the TTT program is effective in increasing social responsiveness and in decreasing problematic sexual behaviors in adolescents with ASD.

Overall, these results suggest that further longitudinal research is needed to investigate how an increased sexual knowledge can improve subsequent well-being in individuals with ASD.

Conclusion

Sexuality is a central aspect of a person's physical and psychological development [1, 2]. In the past decade, there has been an increased interest on this topic. However, studies on sexual development and sexual functioning in individuals with ASD are still scarce. Given the impact of these aspects on long-term outcomes and well-being, further researches are needed to determine best practices for prevention and treatment.

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