



Sexual Education of Persons with Autistic Spectrum Disorders: Use of the Technique: 'Social Stories'

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Abstract

The difficulty in the area of social skills for persons with Autism Spectrum Disorders (ASD) is particularly visible in the area of sexuality and intimate relationships. Therefore, it is important to create a curriculum including information about sexuality and to address the individual and specific needs of persons with ASD. For this purpose we designed a study using Social Stories for conducting sexuality education following the criteria of Carol Gray. The main goal of our study was to assess the effects of the use of Social Stories to implement sexuality education with three participants with ASD. The individual sessions lasted for 45 min and they continued for a period of 6 months. The participants were tested and their parents interviewed before starting and after finishing 6 months of sexual education, and this allowed us to assess knowledge and behavioral changes regarding sexuality. The most significant changes were determined through assessment of the following areas: the private and reproductive parts of the body; changes occurring during the period of puberty; distinguishing pleasant and unpleasant touch; sexual relations and contraception. Our conclusion after analyzing results were that a period of 6 months implementing sexuality education through Social Stories was sufficient to upgrade and expand knowledge, but definitely was insufficient for noticing visible behavioral changes.

Keywords Sexuality · Sexuality education · Persons with Autism spectrum disorders · Social stories · Republic of North Macedonia

Introduction

In the diagnostic and statistical manual of mental disorders of the American Psychiatric Association, the Autism Spectrum Disorder is defined as a continuum of impairments in the area of reciprocal social communication and social interaction (criterion A) and

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restrictive and repetitive forms of behavior, interests or activities (criterion B). These symptoms are present from infancy and they limit or affect the everyday activities (criteria C and D) [1]. Particularly this triad of impairments (socialization, communication and imagination) of persons with ASD, has been clarified by a large number of scientists through the late development or lack of Theory of Mind or, the ability to understand what other people think and feel and on the basis of that understanding, to predict their behavior [2–4]. Late development or lack of Theory of Mind of persons with ASD directly affects social understanding and interactions, due to which the behavior of other people for the persons with ASD is confusing, unpredictable, even terrifying and often leads to social isolation, exclusion and lack of opportunities [5]. The Social Stories, designed by Carol Gray, address exactly the lack of Theory of Mind, and as individualized stories, they present the perspectives of thoughts, emotions and behavior of other people through description and clarification of signs in social situations and give directions on how to adequately respond to these signs. The aim of this study is to design Social Stories that shall be used for the purposes of sexuality education for persons with ASD and to evaluate the effects of their implementation i.e. to determine changes in knowledge of the participants through an inventory test for knowledge assessment in the area of sexuality and to determine the behavioral changes of the participants with ASD in the area of sexuality, by conducting an interview with their parents in relation to sexuality.

Theory of Mind and Social Functioning of Persons with Autism Spectrum Disorders

Difficulties understanding the thoughts, beliefs, intentions, desires, feelings and motivation of others are listed as one of the possible reasons for impairments in social communication and interactions of persons with ASD. Impairments in social communication and interaction of persons with ASD reflect difficulties in understanding the other person's points of view. Specifically an inability or a difficulty in understanding the above mentioned mental conditions and the difficulty interpreting that information in order to comprehend and predict another person's behavior are defined as a Theory of Mind [2]. A hypothesis, that persons with ASD have a lack of Theory of Mind was imposed by Wimmer and Perner in 1983. Through implementing tests of 'false belief,' it has been proved that persons with ASD cannot attribute a false belief to another person [6]. The ability to explain and predict the behavior of others, has been ranked as the first benefit or function of 'reading the mind', whereas the ability to understand communication is ranked as a second function of 'reading the mind' by [7]. The third essential role that the 'reading of mind' plays in accomplishing a successful communication is the ability to track the needs for information of the interlocutor, that is to estimate what information does the interlocutor need or does not need and what information should be provided so that the interlocutor can understand the communicative intention. In addition, for a successful communication the speaker should observe whether the message is well understood as he/she intended to or it should be rephrased [5]. The other function of the 'reading of mind' is self-consciousness and self-reflection [8]. In that direction, Wimmer and Perner, imply that the persons with ASD have difficulties in understanding that different people may hold a different opinion over a particular situation [6]. Empathy is also a function of 'reading of mind' that enables a certain person to reach a conclusion on how someone can interpret the events and how they might feel [9]. A large number of studies show that the persons with ASD have difficulty in redirecting their own perspectives while they are asking themselves what others think, instead of focusing only on what they themselves think, feel and are aware of [4, 10–15].

Sexual Development and Need of Sexuality Education of Persons with Autism Spectrum Disorders

Compared to the sexuality resources that are available for persons with intellectual impairments, persons with ASD have limited access to sexuality resources adapted for their needs [16]. Same as peers, the adolescents and adults with ASD experience a typical physical development related to puberty such as: development of primary and secondary sex characteristics, emotional and hormone changes or sexual drives, but these individuals have no understanding on how they can be affected by these social changes [17]. For some persons with ASD the main reason for miscomprehending these changes may be particularly the communication impairments. As a result, a big number of adolescents and adults with ASD may have incomplete and incorrect information regarding sexuality [18]. Therefore, understanding the sexuality aspects, as well as the development of mutual and satisfying relationships, may be challenging for persons with ASD if no particular interventions are applied [19]. The lack of interest for mutually sharing experiences, the lack of social reciprocity, an egocentrism, a lack of understanding ‘unwritten’ social rules and lack of the development of a Theory of Mind have an additional impact on the sexual development of persons with ASD [20, 21]. The inappropriate sexual behavior arises as a result of sexual drives that appear in the adolescent period, but are not followed by socialization and understanding of social norms that shape the appropriate sexual behavior demonstrated by other persons of the same age [22]. The difficulties in communication are actually a barrier in establishing interpersonal and sexual relations [23] which particularly affect ASD persons in the period of adolescence, especially when considering the importance of that period for sexuality, and particularly sexual socialization and sexual identity [24]. A vast number of studies directed towards sexuality and ASD imply that most of the persons with average intellectual abilities and ASD are sexually active and often engage in sexual activities directed towards himself/herself (masturbation) [25–28]. On the other hand, a smaller number of persons engage in sexual activities with other persons [23, 27, 29]. In a broad study about sexual behavior conducted by Haracopos and Pedersen, including 80 participants, adolescents and adults with ASD (57 men and 23 women) it is clearly stated that persons with ASD are interested, involved and demonstrate sexual behavior, and in their opinion, a systematic approach is needed for educating persons with ASD on how to adequately demonstrate their sexual feelings [26].

Use of Social Stories in Sexuality Education of Persons with Autism Spectrum Disorders

Taking into consideration the fact that sexuality is experienced and expressed in thoughts, fantasies, desires, beliefs, attitudes, values, behaviors, practices, roles and relationships [30], i.e., the mental conditions for which persons with ASD demonstrate difficulties or incapacity to understand them, leads us to pose a legitimate question: How does a professional implement a sexuality education that would meet the unique needs of persons with ASD? In the sexuality education curricula of persons with ASD, sexual development is presented as an inseparable segment of the overall development of the personality. These curricula also emphasize the need of ensuring appropriate support in implementing sexuality education, which would be thoroughly adapted to the unique needs and potentialities of persons with ASD [23, 31–36]. The late development or lack of Theory of Mind of persons

with ASD have been pointed out by the authors of the sexuality education curricula, as a direct indicator of the challenges that ASD persons face with everyday social communication and interaction. In most of the materials, the authors suggest methods and techniques for implementation of sexuality education of persons with ASD, and for this, the Social Stories of Carol Gray are highly recommended. These Social Stories present an intervention and technique that was designed by Carol Gray in 1991 for persons with ASD, and they address the social excesses or deficits [37], that according to Wing, almost always is a feature of persons with ASD [38]. The goal of these Social Stories is to share relevant information such as where and when something is happening, who is involved, what is happening and why. These individualized short stories, illustrate and describe the signs in social situations and give directions on how to adequately respond to the signs [37]. In her latest book “The new social story book”, Gray emphasizes the major role illustrations play in comprehending the Social Stories. In that direction, she points out that besides choosing an effective and meaningful text, it is equally important to choose illustrations that would match the capacities and interests of the persons for whom the stories are designed [39]. If the late development or lack of Theory of Mind of persons with ASD is taken into consideration, the statements and behavior of neurotypical persons to the persons with ASD often will look as if they appear for no reason or meaning, by coincidence, with no warning or logic. Therefore, Social Stories particularly address the lack of Theory of Mind through representing perspectives of thoughts, emotions and behavior of other people. In 2006, Reynhout and Carter have done a preview of the empirically researched literature about Social Stories and they point out several possible explanations about the efficiency of the Social Stories as an intervention for persons with ASD. One of the explanations includes the concept of Theory of Mind [40]. In 2007, Balazs Tarnai and Pamela S. Wolfe proposed the Social Stories as a method for implementation of comprehensive sexuality education for persons with ASD and other development disorders [41].

The Current Study

Taking into consideration the features of late development of Theory of Mind, the theoretic goal of the study is to improve the theories of development of social skills and sexuality education of persons with ASD. In that direction the central question was defined: How does one conduct sexuality education that will enable access to appropriate information in the area of sexuality for persons with ASD and, at the same time, remains responsive to the challenges arising from the lack or late development of Theory of Mind? The main goal of the study is to design Social Stories according to the individual needs of the participants for sexuality education in order to conduct the sexuality education and to evaluate the effects of Social Stories as a technique for implementation of sexuality education for persons with ASD.

Methods

Participants and Description of the Curriculum

This study includes three participants with ASD between the ages of 11–15. The sexuality education curriculum was implemented through conducting individual sessions that lasted for 45 min in a period of 6 months. The participants were selected on the basis of their

developmental period—puberty. All three of them are primary school students and receive supports from special educator. In order to maintain anonymous identities of the participants, the study uses pseudonyms instead of their real names (Table 1).

Data Collection

Three data instrument tools were used in the study.

Inventory Test for Analysing the Understanding of Sexuality

This test has been implemented with the purpose of determining the knowledge of the participants about sexuality before and after the implementation of sexuality education. There are two versions available for the inventory test, one for male participants and the other one for female participants. In two of the versions, each of the questions was followed by an illustration, visually representing the question. In this way the participants perceive the question in both an auditory and visual way, which improves the participant's level of understanding the concept of the question posed. The inventory test has been created for the purposes of this study. The test contains questions from the topics covered in the stories for sexuality education (body parts, private and public places, puberty etc.)

Interviewing Protocol

The purpose of interviewing the parents of the participants is to gain information about the challenges that parents and their children face in relation to their sexual development as well as to gain information about the benefits of sexuality education through the implementation of Social Stories. The parents of the participants were individually interviewed before and after the sexuality education was conducted in a time span of 20–30 min. In the interview before the implementation of the sexuality education the parents were asked to share their views regarding the current phase of sexual development their child is going through and the challenges they are facing with their current understanding. In the interview conducted after the sexual education the parents were asked to describe the changes they have noticed in their child, in regards to knowledge and behavior. The semi-structured interview contained 3 close-ended and 4 open-ended questions. The open-ended question gave the parents opportunity to provide authentic information and as much information as they felt comfortable to share, without imposing answers from the interviewer. Some of the questions are presented in the analysis of the results.

Observation Protocol

For the data collection purposes, during the sexuality education, behavior and reactions of participants, like level of interest and attention, were observed and their remarks/comments of the topics covered were recorded. The level of their interest and attention were rated in two levels (low and high). A high level of interest and attention included reading the story and describing the illustrations. A low level of interest referred to an absence of these two activities during the session.

Table 1 Data of the participants included in the study

Name	Mio	Ana	Leo
Gender	Male	Female	Male
Grade	6	6	9
Age	11	12	15
Diagnosis	ASD low level of intellectual functioning	ASD average level of intellectual functioning	ASD Asperger Syndrome
Characteristics of the participants	Speech delay, developmental delay of intellectual, socio-emotional and motor functions; Assistance needed for personal hygiene, space orientation, estimating and handling safety situations; Low academic and social skills.	Delay of socio-emotional developmental and partially delayed motor functions; Independently takes care of herself; Superficial friendship relations; Difficulties in analysing social situations; Good academic skills; Particularly interested in drawing;	Delay of socio-emotional developmental and motor functions; Independent in taking care of himself; Strongly interested in buses and riding on a bus; Low social skills; Good academic skills; Responsible in fulfilling the assigned duties;
Social Stories	Written in 1st person, following the criteria of Carol Gray	Written in 3rd person, following the criteria of Carol Gray	Written in 3rd person, following the criteria of Carol Gray

Table 1 (continued)

Name	Mio	Ana	Leo
Number and topics of Social Stories	14 Social Stories My body; Private and Public Space; My intimate parts of the body; Why do I wear clothes; Where can I be naked; I am taking a bath; How do I grow and change; Wet dream; Masturbation; What is pleasant; What is unpleasant; Pleasant touches; Unpleasant touches; Types of relationships;	15 Social Stories Parts of the body; Private and public space; Maja's intimate parts of body; Why does Maja wear clothes; Where can Maja be naked; Maja's growth and development; Maja's reproductive system; Menstruation; Menstruation hygiene; Pleasant touches; Unpleasant touches; Types of relationships; Dino's body; Dino's growth and development; Dino's reproductive system;	20 Social Stories Parts of the body; Private and public space; Dino's intimate parts of the body; Why does Dino wear clothes; Where can Dino be naked; Dino's growth and development; Erection—wet dream; Masturbation; Dino's reproductive system; Pleasant touches; Unpleasant touches; Type of relationships; Sexual feelings; Sexual intercourse; Pregnancy; Contraception; Sexually transmitted infections; Maja's intimate body parts; Maja's reproductive system; Maja's growth and development;
Number of individual sessions	24	15	15

Materials

The data collected in the assessment process, before the implementation of the sexuality education, was used for designing the Social Stories for sexuality education. Following the criteria of Carol Gray, the content of the Social Stories was individualized according to the needs and capacities of the participants. The stories were developed by a special educator who has 7 years of experience in working with students with ASD and who had been conducting sexuality education for persons with ASD and intellectual impairments. Additionally, for the purpose of enhancing the understanding of the Social Stories, 668 illustrations were designed by a professional illustrator, enabling visual support to the participants.

Results Analysis

Data collection for the study was conducted in a time period of 6 months. Since the study included only 3 participants, who are on different parts of the spectrum, the findings were presented in-depth through case studies. Therefore the data was organized around the answers from the inventory test. The answers from pre and post inventory test were compared for every participant in order to determine the changes in their knowledge regarding sexuality. The findings from the interview with the parents were used to present the behavioral changes that the participants demonstrated as a result of the stories for sexuality education.

Interview with Parents Before the Implementation of the Sexuality Education

The analysis is presented as follows:

Question What physical changes have you noticed with your child due to sexual development? The three sets of parents, noticed changes in growth and development of their children, i.e. increase in weight and height. Additionally, they reported particularly visible change in the hair appearance on body areas typical for the adolescent period, such as underarms, intimate body parts, face, arms and legs. Also, parents pointed out the activation of sweat glands and the appearance of unpleasant underarms smell. Leo and Ana's parents noticed that their children began to take a shower more often, since they became more conscious of the unpleasant smell caused by sweating. Erection was noticed by Leo and Mio's parents, whereas Ana's parent pointed out the first occurrence of menstruation.

Question In your opinion, what sort of information does your child need about the sexual development period that he/she is going through at the moment? The three sets of parents pointed out that the information about the period of adolescence, growth and development would be beneficial for their children. Additionally, Leo and Ana's parents stated their belief that information about fancying someone and appropriate behavior between boyfriend and girlfriend would be of a huge importance for Leo and Ana.

Question What changes have you noticed in the behavior of your child due to sexual development? Parents noticed changes in the way their children started to communicate. Leo was described as more 'decisive', Mio as 'disobedient and stubborn' and Ana as 'nervous and emotionally sensitive'. Leo and Mio's parents shared that their children have

already started ‘touching and rubbing’ their penises. Leo performs this activity in a private room—a restroom, whereas Mio often performs this activity in public areas such as the living room. Additionally, Ana’s parent pointed out that Ana express greater interest in boys, and she talks about this with her older sister. For that reason, she began to pay more attention to herself, like choosing clothes, maintaining hygiene etc.

Evaluation of the Knowledge of the Participants Before and After the Implementation of Sexuality Education

The results from the inventory test, conducted before and after the sexuality education, were compared in order to determine the changes in the participant’s knowledge.

The results of the topics in which participants have greatly improved their knowledge and have gained new information as well, were presented as follows:

Growth and development In terms of growth and changes, only Ana has precisely pointed and sorted out the presented developmental periods (baby, child, girl, woman, old woman), whereas Leo has precisely pointed and sorted out only the developmental periods that he has been through (baby, child, boy). Mio, with the lowest preknowledge, has managed to point out only the first developmental period (baby). After the implementation of the sexuality education, Leo correctly points and sorts out all of the developmental periods and additionally, adequately names them: “*Dino was first born and he was a baby. Then he grew up and became a child. He grew even more and he became a boy and the puberty started. Then he became a man, he grew old and became an old man.*” As in the evaluation of knowledge before the implementation of the sexuality education, Ana precisely points out the stages of development. Additionally, she has pointed out several features of the period of puberty that she is going through at the moment: “*Here, Maja is a girl. She has just entered the period of puberty, she is in her menstrual period and hair has appeared to various parts of her body*”. Mio has precisely pointed out the stages of development. The educator assisted him in starting a sentence for the purposes of listing the developmental stages: “*When I was born I was...*”, “*Then I grew and I became...*” “*Then I grew even more and became...*” etc. Compared to the evaluation of knowledge before the implementation of the sexuality education, at the beginning Mio had correctly pointed out only one developmental stage (baby), now Mio, with the educator’s assistance, points out all the stages of development and names them correctly, which was not the case before the implementation of the sexuality education.

Masturbation Leo and Mio are not familiar with the term “masturbation”. Before the implementation of the sexuality education, Leo has described this activity as itching the penis “*A boy is sitting on the couch and he’s itching its penis*”, whereas Mio barely notices this activity. He is focused on the activity well known to him, i.e. the one that he has experience with—sitting. “*The boy is sitting.*” After the implementation of the sexuality education, Leo precisely points out the given activity “*The boy is masturbating, he is touching his penis*”. Mio correctly describes the activity visually presented in the illustration “*He is touching his penis*”. Additionally, on the multiple choice question: “*What is the boy doing? Eating or masturbating?*” Mio answered: “*Masturbating*”. Compared to the evaluation of Mio’s preknowledge of masturbation, before the implementation of the sexuality education, now Mio correctly and independently describes the activity and from the choices offered chooses the appropriate term to name the activity.

Erection Leo and Mio do not use the term “erection” in naming the presented illustration. Leo correctly describes the illustration, but he does not apply the term erection “*His*

penis is hard”, whereas Mio barely recognizes the change presented in the illustration and his answer is: “*Nothing*” happened to the boy. After the implementation of the sexuality education, Leo correctly uses the term erection in describing the given illustration “*His penis is erected and he had a wet dream*”, whereas Mio manages to describe the illustration “*Hard penis*” correctly and independently, but does not name the activity as an “erection”.

Wet dream Leo and Mio are not familiar with the term “wet dream”. Leo notices only the change of the penis “*The boy has noticed that his penis is hard*”, but he hasn’t noticed the sperm on his pyjamas. Unlike Leo, Mio hasn’t even noticed the change of the penis, answering that the boy has noticed “*Nothing*”. After the implementation of the sexuality education, Leo recognizes and correctly names the fluid on the pyjamas “*He has seen sperm on his pyjamas*”. When asked “*what does the boy have on his pyjamas?*” Mio doesn’t give an answer, but when given multiple choice options like: “*What’s that on his pyjamas, urine or sperm?*” he manages to point out the correct answer “*sperm*”. Mio didn’t manage to name the changes of the penis presented on the illustration, independently, without assistance. But, he had no doubts in choosing the correct option, after he has been given two answer options by the educator.

Pleasant and unpleasant touches In all the given illustrations, Leo precisely makes a distinction between pleasant and unpleasant touch, but he does not specify body language or facial expression as a reason for distinguishing the type of touch. He follows blanket rules like: “*It’s good to give a hug, that means love*”. “*He/she shouldn’t be kissed in the cheek*” and in various situations, he is subjectively interpreting the illustrations: “*I feel uncomfortable when my hand is being hold*”. In this way, Leo does not distinguish the type of touch from the aspect of the person presented in the illustration. After the implementation of the sexuality education, as well as before the sexuality education, Leo correctly identifies the type of touch, but now in distinguishing the different touch, he does not follow blanket rules or personal points of view; instead, he is noticing the body language and facial expression of the person presented on the illustration. “*It’s unpleasant touch. The girl is sad, as if she’s confused. The taxi driver shouldn’t be touching her leg*”; “*That touch makes her feel comfortable. She is hugging him too. If she feels uncomfortable, she won’t hug him back*”; “*It’s unpleasant touch. I can see it by his face, he is angry. And by his hands. He is not hugging her*”; “*It’s pleasant touch. He is smiling and holding the girl’s hand. If he feels uncomfortable, he won’t hold her hand*”. Ana, just like Leo, has precisely identified the type of touch, but unlike him, she manages to interpret it by the facial expression of the person presented in the illustration “*Well, I can see it on her face that she feels uncomfortable*”; “*It’s unpleasant, I can see it on his face*”. Although Ana cannot precisely describe the look on his/her face, yet she uses it as a criterion for distinguishing the type of touch, but just like Leo, she does not point out the body language as a distinguishing criterion. After the implementation of the sexuality education, Ana also notices the body language of the person presented in the illustration. “*It’s pleasant. I can see it on her face, plus she is hugging him*”; “*Pleasant. He is holding her hand*”; “*Unpleasant. I can see it on his face, he wants to move away from her, he feels uncomfortable*”. Before the training, Mio didn’t manage to identify the type of touch correctly. Since the terms “pleasant” and “unpleasant” were abstract and unfamiliar to Mio, they were replaced with the terms: “He/she feels good” and “He/she doesn’t feel good”. Mio gives the same answer “he/she doesn’t feel good” for all the demonstrated situations in the illustrations and does not elaborate the answer. After the sexuality education has been implemented, Mio, with the educator’s assistance in describing the facial expression and body language, manages to distinguish the type of touch, using the terms “pleasant” and “unpleasant”. All of the participants,

within their capacities, have greatly improved in distinguishing the type of touch as pleasant and unpleasant.

Types of relationships In most of the presented situations, Leo precisely distinguishes an appropriate from inappropriate behavior in the demonstrated type of relationship. But, as in the distinguishing of the type of touch, Leo instead of focusing on the demonstrated type of relationship, he follows blanket rules. “No, that’s not appropriate. Because no one should touch the intimate area”; “It’s inappropriate. You are not allowed to kiss elder people.”. He actually implements the same rule in all of the situations, regardless of the given context. Unlike Leo, Mio has no pre-knowledge whatsoever about different types of relationships. For all the situations, presented on the illustrations, he gives the same answer “It is not good” i.e. he believes the behavior is inappropriate. Although the response “It is not good” it’s the correct option for some of the illustrations, yet Mio’s tendency to provide the same response for all of the illustrations, confirms that he has no pre-knowledge about types of relationships, i.e. the appropriate behavior in those relationships is unknown to him. Before the sexuality education has been implemented, Ana has successfully managed to distinguish appropriate from inappropriate behavior in a given type of relationship. However, Ana does not specify the type of relationship, but the space in which the activity is taking place: (“No, it’s not appropriate. It looks like they’re in the living room”), and Ana does not discuss the facial expression of the person, (“Yes, it is ok. It looks like Elena is comfortable.”). Ana uses blanket rules of behavior (“No, because he cannot touch her breast”) and talks about the possibility of other people seeing this activity, (“No, because someone can see them). Ana also discusses the difference in age between the people in the presented situations (“No, because he is much older than her”) After the sexuality education has been implemented, all of the three participants have demonstrated significant improvement about the different types of relationships and appropriate behavior. Ana and Leo precisely depict the inappropriate behavior presented in the situation of the illustrations. But this time, they make an evaluation on the basis of the type of relationship that the two characters have on the illustration. Leo realizes that one particular activity can have a different outcome in a different context. Mio, just like Ana and Leo, precisely evaluated the given situation, yet he hasn’t managed to point out the type of relationship as a criterion. He only responded about what the characters in the given illustration should or should not be doing relative to the presented relationship.

Sexual intercourse Before implementing the sexuality education, Leo didn’t recognize the sexual intercourse presented on the illustration at all. He only managed to identify the kissing “The boy and the girl are kissing”. Leo correctly pointed out one of the activities the boy and girl are doing on the illustration. This shows that he is unaware of what sexual intercourse looks like. After the implementation of the sexuality education, Leo has described the actions presented on the illustrations in details: “They are kissing, they are touching their intimate body parts, his penis is in her vagina, which means they are having a sexual intercourse.”

Sexually transmitted infections Before implementing the sexuality education, Leo has named the changes of the vagina and the penis presented on the illustrations as spermatozooids, which implies that Leo lacks information about the symptoms of sexually transmitted infections. After the implementation of the sexuality education the changes in Leo’s knowledge about sexually transmitted infections are obvious. He names the changes on the illustration as an infection. “He/she has an infection. It seems like they didn’t use a condom. They should see a doctor.”

Contraception Before implementing the sexuality education, Leo identified the condom as a penis, the IUD (intrauterine contraceptive device) as a vagina, whereas he is totally

unfamiliar with the birth control pills. After the implementation of the sexuality education, Leo has correctly pointed out the contraception methods like: condom, IUD and birth control pills. He also has provided additional information related to the above mentioned terms: *“The IUD can be inserted in the vagina for 3 years.”*; *“These are birth control pills. The girl is taking these pills, not Dino”*.

Observation Data

During every individual session, the level of interest and attention of the participants for the story was rated as high. Ana, Leo and Mio read the stories and described the illustrations, according to their cognitive abilities. Ana and Leo read the stories and described the pictures independently, whereas Mio needed support from the educator in the process of reading the story and describing the illustrations.

Interview with Parents After the Implementation of the Sexuality Education

The analysis is presented as follows:

Question What behavioral changes have you noticed with your child, due to the elaborated Social Stories?

All of the parents emphasized that the period between the completion of the sexuality education and the interview is relatively short for noticing major behavioral changes with their children. Leo's parent noticed that he has been slightly mysterious, when asked to talk about one of the topics from the Social Stories, he denied talking about it saying it is his own business. *“I think it's due to the content of one of the Social Stories”*. Additionally, Leo's parent added that other changes with Leo's behavior haven't been noticed. *“His behavior is the same, the only difference is he is slightly mysterious now”*. Major behavioral changes were noticed with Mio and Ana's behavior. Mio's parent noticed some physical changes as a result of the adolescence period he is going through. *“Well, he would stand in front of the mirror, looking at himself, raising his hands and looking at his underarms”*. Also Mio has started implementing the rules of behavior in public and private space *“Now, he closes the door of his room more often. He didn't use to do that before. It's the same situation when he goes to the restroom. I used to close the door of the restroom, or tell him to close it, now on multiple occasions I have noticed that he closes the door himself. When he takes a shower, he says: “I am naked”, which he has been aware of previously, but he never said it”*. In relation to touching the intimate parts of the body in public, Mio's parent noticed slight improvement in his behavior: *“I can't say he doesn't touch his penis in public anymore, but he does that more seldom”*. Mio's parent has barely noticed any behavioral changes in Mio's reactions when people are touching him *“Mio used to back off if he didn't want a kiss or a hug”*. Ana's parent has noticed changes in her behavior about setting rules for public and private space. Ana has asked her parents, to knock on the door, before entering her room. *“She showed me the story and said that we have never knocked on the door, before entering her room”*. Additionally, her parent noticed that she now closes the door when she spends more time in her room. Also, she started changing the pad when she is in her period. *“I have noticed that when she is in her period, she goes to the restroom more often. I asked her if she has a stomach ache, but she told me she was only checking if her pad should be changed. She was aware of this even before, but often I reminded her.”*

Question In your opinion, how do these behavioral changes, that you have noticed, affect the everyday life of your child?

The three of the parents responded that the behavioral changes demonstrated by their children's improvements made their everyday life much easier. *"I believe that Leo now has lots of misunderstandings clarified, following the content elaborated in the Social Stories. If he reads the stories, I am sure he thinks that information is necessary. He will enrol to secondary school in September. For him, that will be a new environment and he will need some time to get used to it. Therefore, I think the Social Story about types of relationships, will be of a great benefit to him. Of course, we are there for him too, if he needs any help. And not only that story. I believe that the content of all the Social Stories, would be beneficial to him in the future. He is already a grown up boy and he should know what the other children know, he shouldn't feel as if he is left behind."* Unlike Leo's parent who emphasized the behavioral changes which are important for building social relationships with peers, Mio's parent pointed out the changes about appropriate behavior and self-awareness. *"I can see that he is more self-conscious about his own body and he tries to apply the same things from the illustrations in the Social Stories. As I said previously, it sometimes comes to his mind that he should close the door when he goes to the restroom. He seldom touches his penis now, when surrounded by people. Step by step, there's still a lot to be learned."* Ana's parent has brought out the understanding of the changes occurring during the adolescent period as a crucial change affecting the quality of the everyday life of her daughter. *"She learned a lot of new things. I believe this information will be beneficial to her now and in the future as well. Particularly for understanding the period she is going through now. As with every other teenager, she is going through some changes in behavior as well."*

Discussion

More than 30 studies have been carried out, presenting the effects of applying Social Stories in development and improvement of social skills and behavior of persons with ASD and other developmental disorders. Only in two studies, the study of Wolf and Tarnai in 2008 and the study of Guitterez in 2016, the Social Stories are applied and suggested as a technique of implementing sexuality education of persons with ASD. In our country, three studies have been carried out about sexuality and the need of implementing sexuality education of persons with disabilities and ASD. In all of the studies the same pattern of recommendations is followed for further action in the field of sexuality education of persons with disabilities and ASD i.e. implementation of sexuality education through applying appropriate education materials that would meet the needs and capacities of the persons with disabilities and ASD. [42–44]. Taking into consideration the analysis of the results after the implementation of the sexuality education, it can be seen that the participants have significantly improved their knowledge in the area of sexuality. The interest that the participants demonstrated for the illustrations, confirms Gray's claim that illustrations play a major role in understanding the Social Stories, by pointing out that besides choosing a text which is effective and meaningful for the person, it is equally important to match the illustrations with the capacities and interests of the person being taught. [39]. Our results are scientifically confirmed by Wolfe and Tarnai who pointed out that Social Stories are implemented for the purpose of preparing the persons with ASD for the changes and peculiar situations

occurring during the different stages of sexual development and at the same time to offer solution for certain problematic situations [41]. Besides the similarities of our results with those from the study of Wolfe and Tarnai, our results also confirm that the Social Stories are a productive technique to use for implementation of sexuality education of persons with ASD. In this way, we have answered the central question of our study: “How to implement sexuality education which will give access to adequate information in the area of sexuality for persons with ASD but also respond to the challenges arising from the lack or late development of Theory of Mind”? Additionally, Wolfe and Tarnai also point out that they haven’t found any study in the literature that analyzes the effects of Social Stories applied in the implementation of sexuality education [41]. Almost 10 years later, we have come to a similar comprehension while reviewing the literature available for conducting sexuality education of persons with ASD by using Social Stories. The only study that analyses the Social Stories effect from a scientific-practical point of view, in this case specifically about inappropriate sexual behavior, i.e. touching the intimate body parts in public, is the study conducted by Gutierrez in 2016. Even though the need for sexuality education of persons with ASD is widely recognized [28, 45] the number of suitable materials needed to implement sexuality education of persons with ASD, although relatively expanded [23, 31–36] it is still at an average level compared to the materials available for persons with intellectual disabilities [16]. From a theoretical point of view, the Social Stories as a tool for conducting sexuality education of persons with ASD, besides being recommended by Wolfe and Tarnai [41] the Social Stories are also recommended by Wolfe, Condo and Hardaway [46], but there has been no practical research supporting their recommendation. The only study that practically analyses the Social Stories effect in the process of implementing sexuality education is the study conducted by Gutierrez [47]. This only confirms the global significance and uniqueness of our study.

Limitations and Benefits of the Study

One of the first limitations of the study is the selection of the participants. Two of the participants share relatively similar characteristics and have a high functioning level of autism, whereas the third participant has a low functioning level of autism. Therefore, a sufficient diversity in the way of functioning of the participants was not obtained so the chance was lost to compare results from a more heterogeneous group. Additionally another limitation is the sample size of three participants. The third limitation of the study refers to the time period of the study. Following the results it can be concluded that 6 months may have been sufficient to upgrade and expand knowledge, but definitely the period of 6 month was insufficient for noticing visible behavioral changes. Yet, this timeframe was determined because of the time limit of the academic research for a maximum period of 1 year. Because of this, the period of 1 year was used for theoretical research (6 months) and practical research (6 months). The period of only 6 months of practical research restricted us to conduct sexuality education with only three participants. Therefore conducting longitudinal study for at least 5 years and observing the changes in knowledge and behavior of 30 or more persons with ASD will definitely give more in depth insight about the influence the sexuality stories could have over the behavior and socio-sexual life. The data and information about sexuality of persons with ASD are limited. Therefore, because of the relatively small amount of literature and materials available about sexuality, the number of illustrations available for implementation of the sexuality education was even lesser. For the purposes

of this study 668 illustrations were designed, out of which 321 illustrations were designed for the Social Stories of the male participants and 347 illustrations were designed for the Social Stories of the female participant. In addition, these Social Stories are actually the first material in Republic of North Macedonia that covers sexuality education of persons with ASD, which is being considered as the first benefit of our study. A second benefit of this study is the direct effect of promoting the scientific research area and practical access in the work of persons with ASD. For implementing sexuality education of persons with ASD, Social Stories can be used by any person in need of them, such as persons with ASD, experts working in the field of ASD, parents or tutors of persons with ASD and nursery persons. With that said, our study contributes to the quality of life improvement of persons with ASD in Macedonia in the field of sexuality. The third benefit of this study is the applicability of the Social Stories in educating persons of the whole autism spectrum. Two versions of the Social Stories were designed. Male and female versions of the Social Stories were designed that match the needs and capacities of persons with high functioning level of autism and one male and female version of the Social Stories were designed to match the needs and capacities of persons with low functioning level of autism.

Recommendations

The persons with ASD are not socially isolated from other people in the society. Therefore, it is necessary to raise awareness to the public about the needs and benefits of implementing this type of education to persons with ASD. Taking into consideration the fact that parents are the primary educators of their children, it is indispensably important to educate them on the needs and benefits of conducting a high quality sexuality education. Preece and Trajkovski say that in reviewing the training and education resources for parents of persons with ASD, the number of resources for training of parents of persons with ASD, has significantly increased compared to the several published papers for educating parents. The topics covered in this training are primarily focused towards comprehending ASD, the effects of the basic difficulties of the condition, socialization and social communication, the effects of restrictive and repetitive interests, sensory and behavioral disorders [48]. The absence of topics covering sexuality of persons with ASD is evident. Additionally, it is also necessary to educate the staff and people working with ASD persons, because they should be the initiators and instigators in the process of conducting the sexuality education. A curriculum for sexuality education in the kindergartens, schools, daily care centers and small group homes that support living services of persons with special needs should all be designed following the unique features of persons with ASD in order to meet their individual needs.

Conclusion

This study has been directed towards determining an adequate technique for implementing sexuality education of persons with ASD and as a result of it, to determine behavioral changes and changes in knowledge of persons with ASD through implementing sexuality education. Theoretically, before and after the implementation of the sexuality education, together with the participants and following the interviews conducted with the parents, it has been determined that the participants have improved their knowledge about all the

topics covered and they also simultaneously demonstrated certain changes in their sexuality behavior. Our study has met the goals and questions imposed before its implementation. Even so, we recognize the need for more studies in the area of sexuality education of persons with ASD implementing the usage of Social Stories.

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