Research in Developmental Disabilities 89 (2019) 51–58

Contents lists available at ScienceDirect

Research in Developmental Disabilities

journal homepage: www.elsevier.com/locate/redevdis

Effects of Snoezelen—Multisensory environment on CARS scale in adolescents and adults with autism spectrum disorder

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ARTICLE INFO

No. of reviews completed 1

Keywords:
Autism spectrum disorder
Snoezelen sessions
Severity of ASD
Stereotypes/repetitiveness

ABSTRACT

Background: New classification system Diagnostic and statistical manual of mental disorders. 5th ed.(DSM – 5) includes sensory problems as one of the symptoms in diagnostic profile of Autism Spectrum Disorder (ASD). Researching the effects of sensory integration treatment may improve new approaches to the individuals with ASD. The objective of this study is to determine the effects of Snoezelen, multisensory environment on the severity of ASD and stereotyped/repetitive behaviours in adolescents and adults using CARS scale.

Method: The study involved 40 subjects with ASD associated with intellectual difficulties of both sexes, aged 15–35. The subjects were randomly divided into two groups: a control one (without treatment) and an experimental one (with treatment). The assessments were rated by CARS (Childhood Autism Rating Scale) before and after the three-month treatment.

Results: In the experimental group, there was a statistically significant difference of the total CARS score before and after the treatment ($p < 0.0005$). Comparing the results of both experimental and control groups, a statistically significant difference was found on total CARS score ($p < 0.0005$).

Conslusion: The results in the present study indicate that the continual sessions in Snoezelen room had effects on reducing severity of ASD and repetitive and stereotyped behaviours on CARS scale.

What this paper adds?

There is little research regarding treatment approach of sever forms of ASD through the process of growing up and adulthood. Research is mainly referred to younger age and highly functional autism.

The current study includes the population of adolescents and adults with ASD aged 15–35, when the severity of this neurodevelopmental disorder becomes intense.

The objective of this study is to determine the effects of Snoezelen, multisensory environment on the severity of ASD and stereotyped/repetitive behaviours in adolescents and adults using CARS scale.

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https://doi.org/10.1016/j.ridd.2019.03.007
Received 23 July 2018; Received in revised form 30 December 2018; Accepted 16 March 2019
Available online 29 March 2019
0891-4222/

Snoezelens sessions were carried out in Snoezelen room alternately and continually on a weekly basis in the period of three months.

The results indicate that the continual sessions in Snoezelen room had effects on reducing severity of ASD and repetitive and stereotyped behaviours on CARS scale.

Our research of effects of Snoezelen room sessions has the potential to enable new and more efficient methods of treatment of ASD, especially sever forms in adulthood.

1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by deficits in social interactions, social communication and stereotyped behaviours associated with sensory disorders occurring before the age of 3 (Rybakowski et al., 2014). Although the sensory processing challenges have been noticed since the first descriptions of autism spectrum disorders (Kanner 1943), it is only the classification system DSM-5 that includes sensory problems as the core symptom, i.e. diagnostic criterion. The previous absence of sensory disorders in diagnostic criteria was the result of the problems in recognizing sensory dysfunction in a strictly empirical way, whereas the focus was on obvious social cognitive symptoms (Sarah, Ryan, & Mark, 2015).

According to DSM-5, sensory processing disorders include hyper- or hypo-reactivity to sensory stimuli or unusual sensory interests in the environment, where hyper-reactivity is defined as an adverse response to sensory stimuli (specific sounds or textures, excessive smells), hypo-reactivity as an apparent indifference to sensory stimuli (pain or temperature-hot/cold) and sensory seeking as a strong desire for sensory intake (touching of objects, visual fascination with lights and movements) (American Psychiatric Association (APA), 2013; Tavassolia et al., 2017). Sensory symptoms as the main features of ASD, may indicate difficulties related to the condition, e.g. repetitive patterns of behaviour (Tavassolia et al., 2017; Boyd et al., 2010).

Repetitive sensory and motor stereotyped behaviours including rocking, repetitive use of objects, sensory seeking, refer to a severer disorder, appearing more often with individuals of lower cognitive abilities (Bishop, Hus, & Duncan, 2013).

Repetitive and stereotyped behaviour is followed by various sensory experiences through searching or avoiding certain stimuli and may be caused by imbalance between sensory accuracy and modulation of upper to lower brain structures (Lawson, Rees, & Friston, 2014), as a result of the lack of integrative cognition due to information overload on lower perception levels (Belmonte et al., 2004). It is important to consider fluidity and variability of sensory dysfunction in ASD.

Interventions focused on sensory integration can help reduce problem behaviours in many individuals with a developmental disability including ASD. It is considered that a treatment in a sensory room affects neuroplasticity, irrespective of age. Jean Ayers intervention model was based on three principles: neuroplasticity which makes brain changes possible, active engagement as a precondition for neural changes and enriched multi-sensory environment (sensory rooms) needed for guiding neural changes process (Miller, Nielsen, Schoen, & Brett Green, 2009).

Sensory integration treatment implies an active participation of users in multisensory environment - sensory rooms. There are two types of sensory rooms: interactive for youngsters, children and Snoezelen room, mainly used in individuals with moderate or severe cognitive difficulties (pervasive developmental disorders, autism spectrum disorder or dementia), with the purpose of improving the condition and social interaction (Chalmers, Harrison, Mollison, Molloy, & Gray, 2012). Nowadays, Snoezelen rooms are increasingly used as a tool in different approaches, aiming to improve mental health (http://www.otinnovations.com/clinical-practice/sensory-modulation/sensory-rooms-in-mental-health-3/http://www.otinnovations.com/clinical-practice/sensory-modulation/sensory-rooms-in-mental-health-3/).

Multisensory therapy in Snoezelen room is developed for adults with intellectual disabilities who have a variety of challenging behaviors to induce relaxation by receiving considerable attention which can be of therapeutic value (Hogg, Cavet, Lambe, & Smeddle, 2001; Chana, Yuen Fung, Wai Tong & Thompson, 2005).

Snoezelen is a multi-sensory environment designed to provide multiple stimulation opportunities covering all the sensory channels (Lancioni, Cuvo, & O'Reilly, 2002). The equipment in Snoezelen can provide visual, auditory, olfactory, tactile, vestibular and proprioceptive sensory input (Kaplan, Clopton, Kaplan, Messbauer, & McPherson, 2006).

The philosophy of Snoezelen is based on non-directive and non-threatening approaches (Fava & Strauss, 2010). The term Snoezelen is derived from two Dutch wotds sniff and doze - "snuffelen", meaning to seek out or explore, and "doezelen", which means to relax; this multisensory approach originated and was developed in Holland between 1975 and the late 1980s (Chana, Yuen Fung, Wai Tong & Thompson, 2005; Cuvo, May, & Post, 2001; Fava & Strauss, 2010).

1.1. Importance of this study

The effects of Snoezelen, multisensory environment represent a challenge compared to behavioural interventions (Chalmers et al., 2012; Devlin, Healy, Leader, & Hughes, 2011). There is little research regarding sever forms of ASD through the process of growing up and adulthood. Research is mainly referred to younger age and highly functional autism.

The current study includes the population of adolescents and adults with ASD aged 15–35, when the severity of this neurodevelopmental disorder becomes intense. Research of sensory symptoms related to ASD has the potential to indicate the nature and psychopathology of the disorder in a more comprehensive way and enables new and more efficient methods of treatment (Hazen, Stornelli, O'Rourke, Koesterer, & McDougle, 2014).

The objective of this study is to determine the effects of Snoezelen, multisensory environment on the severity of ASD and stereotyped/repetitive behaviours in adolescents and adults using CARS scale.

2. Method

2.1. Participants

At the beginning of the study there were 58 potential participants, out of which 48 were included in the research, while 40 participants fulfilled the requirements of the study. Two participants gave up, while six participants from experimental group did not attend Snoezelen sessions regularly.

The study involved 40 subjects with ASD associated with intellectual difficulties of both sexes, aged 15–35. Prior to the beginning of the research, the written consent was obtained from the parents/caregivers, since the users of the daycare centres are individuals with severe ASD and are all taken care of by their parents. The research also gained the approval of the Ethic Committee of the Faculty of Medical Sciences, University of Kragujevac, Serbia.

The sample was selected by applying diagnostic criteria ICD 10 for diagnosing pervasive developmental disorders. Diagnosis was established or confirmed by experienced child psychiatrists and met full criteria for ASD on Autism Diagnostic Interview-Revised (ADI-R).

The inclusion criteria for all study participants were: signed parent/caregiver consents, diagnosis confirmed by ADI-R scale, ICD 10 diagnostic criteria fulfilled.

The exclusion criteria for the participants were: unsigned parent/caregiver consents, giving up during the research, daycare centre beneficiaries without ASD, experimental group participants unable to attend the Snoezelen sessions regularly, general condition deterioration of the participants.

The subjects were randomly divided (using a table of random numbers) into two groups: a control one (without Snoezelen sessions) and an experimental one (with Snoezelen sessions).

2.2. Design

The study was composed of two stages: first, pre-sessions measurement of functional areas – severity of ASD, repetitive/stereotypic behaviours (activity level, relationship with object, adapation to changes) and second, post-sessions measurement after three-month sessions in the Snoezelen room. Functional areas were assessed by therapists who rated CARS scale (Childhood Autism Rating Scale) before and after three-month Snoezelen sessions.

The functional areas findings were compared between the two groups (control and experimental) based on the therapist evaluations. The report-givers were not informed which group the participants were assigned to.

The thearapists are special educators who are in charge of facilitating activities, and taking care of users' stay in daily centres and who know them very well. They, as not being researchers, only gave reports about the participants.

Snoezelen sessions were conducted by the special educator, trained in the field of sensory integration and engaged as an educator on institutional educational programme of Snoezelen use.

The experimental group attended the sessions in the Snoezelen room 3 times a week for 3 months (36 sessions in total). Each session lasted 30 min, in groups of three participants. (Fava & Strauss, 2010; Singh et al., 2004; Lancioni et al., 2002) The control group participants were not involved in the sessions in the Snoezelen room. Participants of both groups were engaged in usual daily scheduled activities in daycare centres (e.g. arrival, breakfast, music/occupational therapy, snack, speech, walking/gym, lunch, craft time/watering the plants, snack, going home). (https://www.andnextcomesl.com/2014/04/free-printable-daily-schedule.htmlhttps://www.andnextcomesl.com/2014/04/free-printable-daily-schedule.html)

Baseline: measurement of functional areas for all participants obtained by medium value.

Pre-sessions: measurement of functional areas made before 3-month Snoezelen sessions by report givers (therapists) for both groups.

Post-sessions: measurement made 3 months after the first measurement for all participants by report givers (therapists). Experimental group attended 36 Snoezelen seassions for that period while the control group did not.

2.3. Settings

The Snoezlen room (30m2) is a specially designed multisensory environment, equipped by Rompa programme without daylight (light stimuli are adjusted as for other senses), with floors and walls being completely padded in white. The equipment consists of a set of sensory tools:

- A projector presenting images on the wall from rotating disks purposely designed for sensory room (nature scenes - dolphins and underwater world);
- A liquid-filled disk and a rotating color changing disk displaying spotted light with special light effects;
- Aromatherapy spray emitting essential oil fragrance to stimulate olfactory receptors;
- A fibre optic thread 2 m long, with density of 150 strands, safe to touch, bite, fold (when folded it makes fascinating sparkling effects)
- Interactive bubble tubes (lava lamp), 1.5 m tall, placed on a cushioned platform in the corner between two mirrors (110 cm × 150 cm).

Additional tools expanding the range of sensory integration activities are: shimmering curtains of fibre optics, vibrating chair (filled with special material adjusting to the body position and transferring sound vibrations from the inside), a proper-sized cushioned swing, UV lamp, soft massage balls – "snakes", vibration cushions with pockets for foot massage, auditing stimulation speakers in the room corners with sounds of nature – sea, ocean, heart beating, rain, water, streams, leaves, wind, bird chirping).

The sessions were carried out in a multi-sensory environment – Snoezelen room, designed to provide constant sensory stimulation for different senses: proprioceptive, tactile, visual, auditory, olfactory and vestibular without involving cognitive abilities of intellectual functions (Champagne & Sayer, 2014; Chana et al., 2005; Watling & Dietz, 2007).

In Snoezelen room the users could relax following their own rhythm, receiving stimulation and initiating demand-free activities. The therapist acted gently, discretely, monitoring their engagement and sharing their experience. Verbal instructions were given in a form of short sentences, while demonstrating available tools without insisting on immediate task performance. The aim of the treatment was to gradually take the activities over and slowly embrace them which stimulated the senses (Champagne & Sayer, 2014; Watling & Dietz, 2007).

The sessions were conducted by a special educator/therapist and were attended by groups of 3 participants at a time. Before entering the Snoezelen room they took off their shoes and then chose the place in the room on their own. The therapist who provided sessions first demonstrated and named each stimulus and guided the participant to activate or to use the equipment appropriately (e.g. fibre optic threads when folded made sparkling effects, holding soft massage balls, vibrating "snakes" put on shoulders, vibration cushions with pockets for foot massage). After that, the therapist encouraged them to move around and change the place in the room, for example use a swing, a vibration chair or a memory foam bed, sit near lava lamp and mirrors. If the participants refused a suggested activity, the therapist allowed them to keep on with their first choice. Since the sessions in the Snoezelen room imply the non-directive approach, the participants were free to move around the room and make free choice of sensory equipment (Fava & Strauss, 2010). In this way the participants accepted the multisensory environment as friendly, relaxing and safe. Thus, over time they were given opportunities to enhance the range of activities including those they had previously refused.

2.4. Instruments

Autism Diagnostic Review-ADI-R, is used for diagnosing autism, treatment planning and differentiating autism from other developmental disorders. ADI-R is administered to parents and the interview is composed of 86 questions and estimates three functional domains: language/communication, reciprocal social interactions, restricted, repetitive and stereotyped behaviours and interests. ADI-R has been widely used as it provides effective and reliable categorical results (Rutter & LeCouteur et al., 2003). Diagnosis was established or confirmed by experienced child psychiatrists and met full criteria for ASD on Autism Diagnostic Interview-Revised (ADI-R).

Childhood Autism Rating Scale (CARS) is used for identifying individuals with autism and determining severity of autism symptoms. The assessment is performed by direct observation of children over age 2. The rating time is 5–10 min. The scale is composed of 15 items completed by a therapist. The content areas assessed represent primary outcomes of the research: social, emotional, communication skills, repetitive behaviours, game organization and everyday activities (routines) and unusual sensory interests. Each item is scored from 1 to 4 including scoring in half point (1.5–2.5–3.5). The total CARS score refers to an overall severity of ASD. According to the total score, there are 3 categories: severe autism (scores from 37 to 60), mild to moderate autism (scores from 31 to 36) and non-autistic range (scores 15 to 30). The items integrated in the CARS and the Total score, each measuring functional areas of repetitive/stereotyped behaviour and avoidance of changes, being the subject of our research are as follows: activity level, relationship to objects, adaptation to changes (Papavasiliou, Nikaina, Rizou, & Alexandrou, 2011; Schopler, Van Bourgondien, Wellman, & Love, 2010).

2.5. Statistical analysis

The sample size of 40 participans, 20 in each group, was calculated by G power statistical programme, taking alpha 0.05 and study power 0.08, based on proposed difference in total CARS score between two measurements. (Papavasiliou et al., 2011)

The data were processed by methods of descriptive statistics (mean value, median, standard deviation), as well as by methods of analytical statistics to estimate difference in significance and connectivity.

Numerical variable distribution normality was checked by Shapiro-Wilk and Kolmogorov-Smirnov tests. For comparing mean value variables of two populations, *T* test was used for independent samples. The difference between repeated measures was assessed by paired *T*-test. Numerical variable connectivity was calculated by Pearson test of linear correlation.

3. Results

The background information on the sample of 40 participants with pervasive developmental disorders by ICD 10 and autism spectrum disorder, confirmed by ADI-R is presented in the following demographic table (Tables 1 and 2).

All the participants fulfilled the inclusion criteria to be the sample in the study and during the study their general condition was not changed, no medication was received.

They all were engaged in usual daily scheduled activities in daycare centres (e.g. arrival, breakfast, music/occupational therapy, snack, speech, walking/gym, lunch, craft time/watering the plants, snack, going home) (https://www.andnextcomesl.com/2014/04/free-printable-daily-schedule.html). Therapy/intervention programmes, such as speech, music/occupational therapy, walking/gym,

Table 1
Demographics table of the participants.

	Mean, range		
Age at study entry	23.70 ± 4.15 (16-35 years)		
Gender		n	Percent
	Male	29	72.5
	Female	11	27.5
	Male/female ratio	2.64	
ASD severity by CARS			
	moderate	5	12.5
	severe	35	87.5
Condition of intellectual disability			
	F70	2	5.0
	F71	9	22.5
	F72	20	50.0
	F73	9	22.5
Duration of programmes attended in Day care centre	11.37 ± 5.68 (1-25 years)		
Intervention programmes before entering Day care centre			
	SES	25	62.5
	none	15	37.5

F70 - Mild, F71 - Moderate, F72 - Severe, F73 – Profound, SES – Special educational school.

Table 2
Sample description - ADI-R values for each domain and intellectual disability level for all subjects.

	Condition of intellectual disability	N	Mean ± SD	Min	Max
ADI-R - A	Mild	2	27.50 ± 0.71	27.00	28.00
	Moderate	9	27.89 ± 1.36	26.00	30.00
	Severe	20	27.95 ± 1.70	24.00	30.00
	Profound	9	28.89 ± 1.36	26.00	30.00
	Total	40	28.13 ± 1.54	24.00	30.00
ADI-R - BV	Mild	2	10.50 ± 0.71	10.00	11.00
	Moderate	9	16.77 ± 4.63	12.00	23.00
	Severe	20	14.70 ± 3.50	11.00	25.00
	Profound	9	17.89 ± 5.16	13.00	25.00
	Total	40	15.66 ± 4.37	10.00	25.00
ADI-R - B	Mild	2	10.50 ± 0.71	10.00	11.00
	Moderate	9	12.67 ± 1.87	8.00	14.00
	Severe	20	13.15 ± 1.46	8.00	14.00
	Profound	9	13.67 ± 0.50	13.00	14.00
	Total	40	13.03 ± 1.51	8.00	14.00
ADI-R - C	Mild	2	7.50 ± 2.12	6.00	9.00
	Moderate	9	10.22 ± 1.20	8.00	12.00
	Severe	20	9.25 ± 1.37	7.00	12.00
	Profound	9	9.22 ± 2.22	6.00	12.00
	Total	40	9.38 ± 1.64	6.00	12.00
ADI-R - D	Mild	2	3.00 ± 0.00	3.00	3.00
	Moderate	9	3.67 ± 1.00	3.00	5.00
	Severe	20	3.85 ± 0.99	3.00	5.00
	Profound	9	3,89 ± 0.93	3.00	5.00
	Total	40	3.76 ± 0.95	3.00	5.00

ADI-R – A - quality of reciprocal social interaction, **ADI-R - BV** – communication disorders in participants with developed speech, **ADI-R – B** – communication disirders in participants with delayed speech, **ADI-R – C** restrictive, repetitive behaviour, **ADI-R – D** age of disorder recognition. **Condition of Intelectual disability**: **Mild** - F70, **Moderate** – F71, **Severe** - F72, **Profound** – F73.

craft time/watering the plants, were implemented twice a week.

The total CARS score in the first measuring of both groups (control and experimental) had an average value of 45.57 ± 5.55, minimal value of 36.00 and maximal 56.50. In the experimental group, there was a statistically significant difference of the total CARS score before and after the 3 –month Snoezelen sessions. The Total score was significantly decreased ($p < 0.0005$) referring to ASD severity (value decreased for 5.20 ± 1.83 on CARS). In the control group which was without the treatment, there was some deterioration with no statistical value ($p = 0.377$) on CARS (value increased by −0.65 ± 3.22) (Table 3).

Comparing the results of both experimental and control groups, a statistically significant difference was found on total CARS score ($p < 0.0005$). The significant difference was also noticed in the functional areas of CARS relating to repetitive/stereotypic behaviours: CARS - 13 – activity level in the experimental group was 0.50 ± 0.54, and in the control group -0.10 ± 0.45 ($p < 0.0005$), CARS - 5 – relationship to objects in the experimental group was 0.40 ± 0.35, and in the control one 0.03 ± 0.41 ($p = 0.004$), CARS - 6 – adaptation to changes in the experimental group was 0.70 ± 0.34 while in the control group it was -0.18 ± 0.46, which

Table 3
CARS values pre - and post - sessions for experimental and control group.

	Experimental			Control		
	Pre-sessions Mean ± SD	Post-sessions Mean ± SD	p	Pre-sessions Mean ± SD	Post-sessions Mean ± SD	p
CARS	45.85 ± 6.29	40.65 ± 5.55	< 0.0005	44,90 ± 4,81	45,55 ± 4,20	0.377
CARS - 13	3.00 ± 0.76	2.50 ± 0.45	0.001	3,08 ± 0,62	37,18 ± 0,49	0.330
CARS - 5	2.80 ± 0.59	2.40 ± 0.44	< 0.0005	3,05 ± 0,48	3,03 ± 0,41	0.789
CARS - 6	2.83 ± 0.54	2.13 ± 0.43	< 0.0005	2,95 ± 0,63	3,13 ± 0,51	0.110

CARS - Total score of ASD**, CARS - 13** - activity level, **CARS - 5** - relationship to objects **CARS - 6** - adaptation to changes.

was highly statistically significant ($p < 0.0005$).

In the first measurement (pre - sessions) according to CARS score for all participants, 35 were categorized as severe autism (scores from 37 to 60) and 5 as mild to moderate autism (scores from 31 to 36). In the experimental group in the beginning there were 16 paricipants categorized as severe autism and 4 participants as moderate autism, while after the 3 – month Snoezelen sessions 2 participants changed the category from severe to moderate autism. In the control group in the beginning there were 19 participants in severe category by CARS score and 1 in moderate autism category who moved to severy category 3 months after the first measurement (Fig. 1).

4. Discussion and implications

The research findings demonstrate the positive influence of Snoezelen sessions in adolescents and adults with severe form of ASD accompanied by low intellectual functioning.

The present study underlines the importance of multisensory environment - Snoezelen room, taking into account the improvements shown on CARS. The Snoezelen sessions had positive effects on total CARS score, i.e. severity of ASD and specific areas of CARS scale - stereotyped/repetitive behaviours (activity level, relationship with object, adapation to changes). There was a statistically significant improvement, meaning a decrease in repetitive and stereotypic behaviours and severity decrease in autism spectrum disorders in the experimental group after 3 - month sessions in Snoezelen room.

Some research has shown that this type of sensory environment (Snoezelen) can decrease aggressive and/or self stimulatory behaviours in adults with intellectual disabilities and challenging behaviours (Kaplan et al., 2006; Cuvo et al., 2001; Shapiro, Parush, Green, & Roth, 1997).

In addition, the findings suggest that the improvements of stereotyped/repetitive behaviours may decrease severity of ASD and improve general adaptation. The findings in the study of the psycho-educational programme effects on CARS scores and short sensory profile, were similar (Papavasiliou et al., 2011).

The study demonstrated that the control group without sessions in multisensory environment had no significant changes in CARS scale values.

These results may be explained by the fact that the multisensory environment represents a friendly, relaxing surrounding with non-directive approach, providing adequate sensory stimulation for different senses, unlike everyday environment demands which cause stimuli accumulation overflow already occurring at the point of information input (Belmonte et al., 2004; Watanabe & Rees, 2016). Sessions in Snoezelen room are designed to engage sensory activities without involving cognitive abilities of intellectual functions (Singh et al., 2004; Lancioni et al., 2002). Adequate stimulation in enriched sensory environment enhances sensory experiences and has strong effects on regulatory mechanisms of the nervous system, thus activating self-initiative for more adaptive

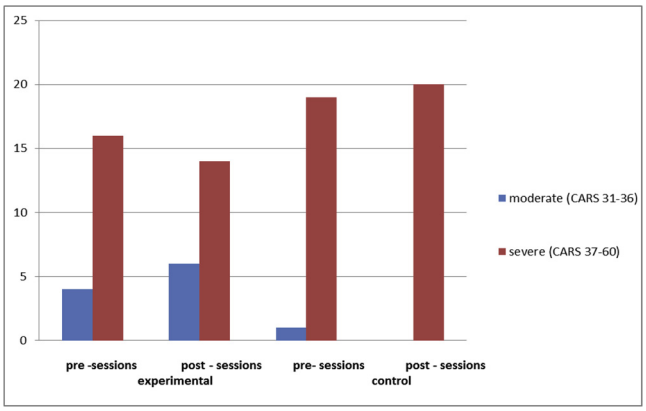

Fig. 1. CARS – Category frequency in ASD control and experimental group pre- and post-sessions.

behaviours in everyday situations (Watling & Dietz, 2007). Through everyday activities such as demands of the environment – exposure to different sounds, lights, voices; everyday routines – getting dressed/undressed (fabric texture, tactile, proprioceptive stimuli); nutrition (taste, smell, food texture), different sensory inputs are received, causing a persistent pressure and stress. Individuals with ASD are usually described as individuals suffering from chronic stress having difficulties in adapting to changes in the outside world, with strong affective symptoms in each age group with anxiety prevalence exceeding the general population (Vasa et al., 2013).

Taking all this into consideration the outcomes of the study suggest that sessions in multisensory environment should be attended continually on a weekly basis to improve adaptive functioning everyday activities.

All participants from the experimental group had lower CARS values after 3 – month Snoezelen sessions, but only some of them moved from severe to borderline moderate category of ASD. That can be explained by the fact that they initially had lower values in the severe category (CARS scores 37–60) in pre-sessions measurement which led them to borderline moderate category (CARS scores 31–36) in post-sessions measurement. More important improvements were made in individuals with higher values in the severe category by CARS score after Snoezelen sessions, although the severity range was not changed.

CARS scores decrease was significant after 3-month Snoezelen sessions, which is an important finding for effective intervention planning programmes in adults with severe ASD and for those professionals who show skepticism about this approach in this population.

Multisensory therapy promoted participants' positive emotions and relaxation, psychological well-being (Chana, Yuen Fung, Wai Tong & Thompson, 2005). There are different views on the purpose of Snoezelen, some indicating the lack of evidence supporting multisensory therapy – Snoezelen as a treatment and emphasising high costs to set up in institutions (Chana, Yuen Fung, Wai Tong & Thompson, 2005), while others promoting the development of Snoezelen to enriched institutional settings which are usually sensory deprived (Hogg et al., 2001). The study on the effects of multisensory environment on participants with developmental disabilities demonstrated that the users were happier and more relaxed after the therapy, not excluding the possibility of other qualitative benefits. (Chana et al., 2005). Additionally, Snoezelen practice has been developing in a way to achieve wider educational and therapeutic objectives (Hogg et al., 2001).

4.1. Implications

The current study results can also suggest that the preservation of the acquired level of adaptive abilities requires sensory integration treatments in Snoezelen rooms alternately and continually on a weekly basis. In this environment, recognized as relaxing and friendly, with the adequate sensory intake, the users can easily achieve self-regulation and sensory modulation to prepare better for everyday activities. It is obvious that continual sessions in multisensory environment can provide a tendency of condition maintenance and improvement.

The study of Fava & Strauss, 2010, which compared the effects of Snoezelen room in different age groups showed that only children with ASD, accompanied by intellectual disability, reduced behaviour problems. Additionally, the study indicated that first short-term effects were observed after 10 sessions of treatment suggesting that the approach should be intense and frequent in order to be effective (Fava & Strauss, 2010).

It is also important to notice that in the present study individuals with severe forms of ASD showed great enthusiasm, cooperation and readiness to get involved in the treatment. The willingness was obvious when coming to the sensory room and following the rules at the entrance – to take off shoes, wait in the group of three and enter the room together. These are some of the usual everyday activities which can cause a lot of problems to this population. Additionally, while staying in the sensory room, they demonstrated initiative – approached the tools, tried activities without performing repetitive and stereotyped activities as much as they usually do.

4.2. Limitations of the study

The primary limitations of this study relate to the small sample size, age difference of the participants and the limited treatment duration of three months.

The sessions in multisensory environment were carried out by the same therapist; the effects of the therapist-participant interaction should be considered. The further research ought to be longer and the groups undergoing the sensory integration treatment conducted by various therapists need to be compared.

The majority of previous studies reported positive outcomes of behavioural treatments, while the effects of this treatment have not fully been examined (Papavasiliou et al., 2011; Seida et al., 2009).

5. Conclusion

The results in the present study indicate that the continual sessions in Snoezelen room had effects on reducing severity of ASD and repetitive and stereotyped behaviours on CARS scale. The adaptation level in everyday activities increased.

It is important to maintain a low intensity and frequency level of behaviour problems and a high level of positive behaviour patterns for better life quality of both the clients and their caregivers (Fava & Strauss, 2010).

Further research requires the analysis and verification of the same targeted behaviour after longer intervention periods, for example 2 months, in order to determine the time of re-intervention needed for maintaining the effects of sessions in multisensory environment.

Declarations of interest

None.

Funding sources

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgements

The authors acknowledge the support from Day Care Centre for Children and Adolescents with Developmental Disabilities for enabling the research in the sensory Snoezelen room.

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