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The influence of the Snoezelen method on postural stability and the risk of falls in people with paranoid schizophrenia

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Summary

Aim. The aim of the study was to describe the changes in the postural stabilisation, quality of life, cognitive functions and behaviour of patients with paranoid schizophrenia who have undergone the Snoezelen therapy and the auctorial sensorimotor exercise program.

Material and methods. The study was conducted on 55 patients aged 55 to 75 years. Group S underwent therapy in the Snoezelen room for nine weeks, group ES underwent the Snoezelen therapy and were also subjected to auctorial sensorimotor exercise programme, and group C were not given any therapeutic intervention. The Biosway portable balance system, the Berg Balance Scale, Tinetti Test and the Timed Up & Go Test were used to evaluate the effects of the therapy.

Results. In group ES, statistically significant changes were observed in all tested indicators; in group S such changes were observed in the Limit of Stability test, Tinetti Test and TUG test; while in group C, no statistically significant changes were found.

Conclusions. The Snoezelen therapy had a significant impact on changes in postural control rations and a reduced risk of falls. The auctorial sensorimotor exercise programme increased the impact of the Snoezelen room on postural stability measured using the Biosway platform and the risk of falls assessed using the TUG test.

Key words: balance, risk of falls, paranoid schizophrenia

Introduction

Schizophrenia is among the most serious and severe mental illnesses and is considered one of the most common causes of disability [1]. This disease not only affects the social functioning of affected individuals but also disrupts the functioning of their musculoskeletal system. Some of the basic problems related to the musculoskeletal system in patients with mental disorders are abnormalities related to body posture, balance and gait [2]. Balance is defined as the ability to remain upright and control body movement under static and dynamic conditions, and postural stability is the ability to regain lost balance [3]. Achieving this skill, even to a minimal extent, makes it possible to perform basic everyday activities such as walking, running, jumping, reaching for and lifting objects [4].

Postural stability and balance disorders in psychiatric patients may be caused by pharmacotherapy, vestibular system disorders and overall discomfort, among other factors [2]. Owing to overall discomfort, often resulting from mental disorders, psychiatric patients often become passive and reluctant to engage in physical activities, which deepens these disorders [5]. Additionally, patients with schizophrenia often experience sensory processing disorders and sensory-based movement disorders, which also cause postural abnormalities, increase the risk of falls and further impair daily functioning [6].

Emerging motor disorders and disturbances in the free performance of everyday activities lead to disorientation in behaviour, aggression, emotional lability and reduced self-esteem, which in turn may lead to a 'vicious circle' and exacerbate the symptoms of mental illness. Additionally, psychiatric patients risk intensifying both their mental symptoms and their motor problems if they experience a fall [2]. All these problems require multidimensional therapy and collaboration among many specialists, including physiotherapists and occupational therapists, whose therapeutic interventions support the pharmacological treatment of such patients [7].

Currently, innovative therapeutic programmes aimed at improving patients' cognitive functioning, including psychomotor coordination, memory, concentration and attention, are becoming increasingly popular around the world, which in turn may translate into improved postural stability and balance. These programmes use the phenomenon of brain neuroplasticity, whereby the stimulation of brain cells leads to the formation of new neuronal connections [8]. Among such therapies is the Snoezelen method, which was created in the 1970s in the Netherlands in response to the needs of people with profound intellectual disabilities. The Snoezelen method enables – through non-directive poly-sensory stimulation – finding new ways of communication with people with whom contact is limited for various reasons. A sense of safety, relaxation and comfort that allows the patient to calm down and open up to the therapist is provided in a specially equipped room in which the senses are stimulated by gentle vibrations, lighting effects and relaxing music. The appropriate decoration of the room is of course vital, but the most important element is the relationship that can be established between the patient and the therapist under these conditions. To become a fully professional therapist, one must undergo training in conducting this type of therapy. The World Experience Room also offers enormous opportunities in the process of therapy for individuals with mental disorders. Thanks to the elements of the room that stimulate the most important senses ensuring proper body position, that is, the visual, vestibular and proprioceptive systems, people with schizophrenia can improve the parameters of postural stabilisation [9, 10].

To the best of the authors' knowledge, there are no reports in the available literature on the effectiveness of the Snoezelen room on the motor functions of psychiatric patients. Therefore, this study aims to assess the effect of the Snoezelen room on improving postural stability and reducing the risk of falls in patients with paranoid schizophrenia.

Material

The study group consisted of 55 patients (33 women and 22 men) aged 55 to 75 years who were diagnosed with paranoid schizophrenia and were permanent residents of one of the social welfare homes in the Lesser Poland Voivodeship. People qualified for the study were randomly assigned (by coin toss) to three groups:

– Group S (n =18) included people undergoing therapeutic sessions in the Snoezelen room;
– Group ES (n = 19) consisted of people subjected to the auctorial sensorimotor exercise programme and therapeutic sessions in the Snoezelen room;
– Group C (n = 18) was the control group, which was not subjected to any therapeutic interventions (see Table 1).

The trial was blinded (the person conducting the study did not know the allocation of patients to groups).

Table 1. **Characteristics of the examined persons**

Characteristic	Study group												p
	Group S				Group ES				Group C				
	$\bar{x}$	SD	Min	Max	$\bar{x}$	SD	Min	Max	$\bar{x}$	SD	Min	Max	
Age [years]	64.5	6.7	55	75	60.5	5.7	55	73	61.9	5.3	55	75	0.1250
Body height [cm]	158.9	8.8	143	171	160.9	11.4	142	185	166.2	10	145	185	0.0850
Body weight [kg]	67.5	12.2	51	94	78.8	15.1	39.1	101.3	74.4	14.6	48.9	106.3	0.0562
BMI [kg/m^2]	26.8	4.7	19.5	35.3	30.1	4.6	19.4	37	27	5.4	17.7	39.5	0.0714

$\bar{x}$ – arithmetic mean, SD – standard deviation, Min – minimum; Max – maximum; p – significance of differences

Research patients took antipsychotic drugs such as Perazin, Zolaxa, Tisercin, Decaldol, Orizon and Ketilept. None of the patients took medications that had a significant impact on the musculoskeletal system. Among the comorbidities, some patients had hypertension and diabetes.

Participation in the study was voluntary. Each person willing to participate in the project was informed about its detailed course and the possibility of resigning from the study at any time. Before joining the research programme, patients were examined by an attending physician and a psychologist, who made a preliminary assessment to exclude patients with contraindications to therapy in the Snoezelen room. Consent to conduct the research project was obtained from the Bioethics Committee No.160/KBL/OIL/217.

The inclusion criteria for patients in the project were:

- diagnosed mental illness – paranoid schizophrenia,
- mental health status permitting participation in the study (assessed by the clinical psychologist),
- functional fitness status permitting tests and exercises on the stabilometric platform (assessed by the attending physician),
- no contraindications to physical exercise,
- age between 55 and 75 years,
- consent to participate in the study.

The exclusion criteria for the study were:

- a lack of informed consent to participate in the research project and study,
- age < 55 and > 75 years,
- no consent from the attending physician and psychologist for participation in the study,
- interruption of the therapeutic programme while it was in progress,
- participation in another form of therapy during the project, apart from standard treatment in social welfare homes.

Method

The research team consisted of individuals who had experience in working with psychiatric patients, were authorised to conduct Snoezelen therapy and also held academic positions at universities in scientific and research roles.

Research tools

To determine the basic morphological indicators and the inclusion/exclusion criteria, a single measurement of body weight, body height and BMI calculation was performed. Each patient (regardless of group membership) was assessed twice using a stabilometric platform, the Berg Balance Scale (BBS), the Tinetti test (Performance-Oriented Mobility Assessment – POMA) and the Timed Up & Go (TUG) test. In groups S and ES, the first measurement took place before the start of the physiotherapeutic programme and the second after its completion (nine weeks later). In control group C, two measurements were also made and the time interval between them was nine weeks.

Martin-type anthropometer (Seritex, New York, USA)

Body height was measured with an accuracy of 0.1 cm. The patient's height was measured from the top of the head (vertex) in the horizontal plane to the plantar surface of the feet (base).

Tanita scale (Tanita Corporation, Tokyo, Japan)

Body weight was determined with an accuracy of 0.1 kg.

Body Mass Index (BMI)

The most popular index in the world for assessing body fatness, calculated according to the formula: weight/height^2 (kg/m^2) [11].

The Biodex platform (Biosway, New York, USA)

It is a balance measurement device equipped with an appropriately configured platform and monitor. It also includes a foam covering to imitate unstable ground during one of the available tests. Biosway can help to assess balance, as well as improve it using the included training programmes. The platform offers three standardised testing protocols and six interactive modes of training to match different problems and levels of fitness. The device provides a repeatable and objectively reliable assessment of neuromuscular control and balance on both stable and unstable ground. It can also help to evaluate treatment progress and document the rehabilitation of patients with balance disorders.

During the study, the Limits of Stability (LoS) test was performed using the BioSway platform. Each patient's ability to maintain a static balance on a hard and stable surface was assessed. The examination was performed after familiarising the patient with the examination procedure. The LoS test assesses a participant's ability to maintain their centre of pressure outside the plane of support. The LoS for balance in a standing position are determined based on the maximum angle at which a participant can tilt away from the vertical position without losing balance. During each assessment, nine points were displayed on a screen. The participant was asked to look at the monitor and shift their body weight to make the cursor move from the centre of the screen to a flashing point and back again as fast as possible [12].

Berg Balance Scale (BBS)

This is a tool for assessing balance, risk of falls and the ability to maintain a stable position while performing various activities. The patient was assessed while performing the following motor tasks (starting with easy tasks and gradually increasing the scale of difficulty): changing position from sitting to standing; standing without help; sitting down without support; changing position from standing to sitting; transfer; standing with eyes closed; standing with feet together; lifting objects from the floor; standing on one leg; torso twists with stationary feet; reaching forward while standing; 360-degree rotation; stepping up; standing in one line; and doing a tandem stance. The activities performed were assessed on a five-point scale from 0 to 4, and the maximum number of obtainable points was 56. The number of obtained points indicated a patient's level of independence. The following scale was used to interpret the results: 41–56 – independent, 21–40 – walks with assistance, and 0–20 – dependent [13].

Tinetti test (Performance Oriented Mobility Assessment – POMA)

This test is used to assess the risk of falls, balance and gait. The form assesses 16 features, the first nine of them concerning balance while sitting, standing up, sitting down, turning, being thrown off balance, while the second part assesses seven features regarding the patient's gait, considering the initiation of gait, length, height and symmetry of gait, continuity of gait, gait path and the body position the patient adopts while walking. The patient follows the examiner's instructions and can obtain 0 to 2 points for each feature, depending on the degree of detected abnormalities. A score below 26 points indicates the existence of a risk of falls, and a score below 19 points indicates a five-fold increase in this risk [14].

Timed UP & GO (TUG) Test

The test is used to assess functional fitness and the risk of falls. To perform the test, one needs: a stable chair with a height of 46 cm, a measuring tape that will determine a distance of 3 m, a cone marking the boundary beyond which one should make a turn and a stopwatch to measure time. Before the procedure is performed, the patient is informed about the test, sits on the chair, then gets up on command 'start', walks the designated distance, turns 180 degrees in the designated place, returns to the chair and sits down. Time measurement begins when the examiner gives the command and ends when the patient moves to a sitting position. If the time needed to perform the test exceeds 14 seconds, the risk of falls is increased; more than 30 seconds suggests the need to use a walking aid [13].

The auctorial sensorimotor exercise programme

The programme lasted nine weeks. Sensorimotor exercises were divided into 45-minute sessions, which were conducted twice a week. Each time, the sensorimotor exercises were divided into three parts:

- The first part (approx. 10 min) was the warm-up part and was intended to prepare the patient for exercise, improve blood supply and oxygenate the body and muscle tissue. The warm-up included exercises for performing active movements in all joints of both the upper and lower limbs.
- The main part (approx. 25 min) was aimed at strengthening the muscles responsible for postural stabilisation, as well as improving coordination and balance. In this part, patients exercised in lying, four-point kneeling and sitting positions, using equipment such as a gymnastic mattress, a large gymnastic ball (diameter 85 cm), a small therapy ball (diameter 25-27 cm), a pneumatic sensorimotor cushion and a thera-band tape. Postural stabilisation, sensori-

motor, strengthening and balance exercises were used. Each exercise was repeated 8-10 times.
– The last part (approx. 10 min) was to calm the nervous system and relax activated muscles. This part used elements of Schultz's autogenic training, massage with an exercise ball and stretching exercises.

Sessions in the Snoezelen room

The Snoezelen room in which the therapeutic sessions were conducted was certified by the Polish Snoezelen Association (ISNA-MSE Polska). Owing to the examined patients' condition, it was a white room. It was equipped with a water bed, an LED projector for rotating discs (colour, picture and gel discs), a mirror ball, a fibre optic curtain, a suspended sky with stars, a rocking sofa and a pouffe for sitting on, among other things. In accordance with the principles of conducting therapy in the Snoezelen room, therapeutic sessions were unstructured sessions without a specific script (non-directive method). The person conducting the study (the first author) was appropriately trained and had obtained a first-degree certificate authorising her to conduct sessions using the Snoezelen method. The therapist conducted the sessions in accordance with the rules of conduct in the room, that is, an appropriate atmosphere, own decision, own pace, appropriate duration, repetition, selected stimulus proposal, appropriate attitude and appropriate care. Therapeutic meetings took place twice a week and lasted 30 minutes.

Statistical methods

The statistical analysis of the collected data was carried out using the Statistica ver. 13 statistical package and a Microsoft Office Excel spreadsheet. Arithmetic mean and standard deviation were used to describe quantitative variables. To assess the differences in the results obtained by patients at two time intervals, before and after the therapy, a non-parametric Wilcoxon signed-rank test was used. The Kruskal–Wallis ANOVA test was applied to compare progress in the studied groups. In all tests performed, the level of statistical significance was $p < 0.05$.

Results

Analysing the LoS values in the studied groups, an improvement in stability (decrease in the LoS value) was observed in groups S and ES, by an average of 0.17 points and 0.34 points, respectively, between measurements, and these were statistically significant changes. In group C, the body stability of the patients deteriorated (the LoS value increased by an average of 0.16 points), but this change was not statistically significant. In intergroup comparisons after therapy, it was observed that only patients from group ES achieved a statistically significant improvement in body stability. Their assessments using the LoS indicator are compared to those of patients from the other groups (Table 2).

Table 2. **Results of the Limits of Stability (LoS) test in the studied groups before and after therapy**

Indicator	Group S				Group ES				Group C				Intergroup comparison (after therapy) (*p*)
	Before therapy		After therapy		Before therapy		After therapy		Before therapy		After therapy		
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	
LoS	4.25	1.52	4.08	1.54	5.16	1.30	4.82	0.34	4.63	1.31	4.79	1.32	S-ES = 0.1465 S-C = 0.1134 ES-C = 0.0001*
Between measurements comparison (*p*)	0.0262*				0.0005*				0.1650				

$\bar{x}$ – arithmetic mean, SD – standard deviation, p – significance of differences, * – statistically significant differences

Analysing the values obtained during the BBS test in the studied groups, an improvement in balance was observed in groups S and ES. In group S, the BBS test results increased by an average of 1.21 points between measurements, but this change was not statistically significant. In group ES, there was an increase of 1.00 points on average between measurements and this was a statistically significant change. In group C, the patients' body balance deteriorated by an average of 0.32 points between measurements, but this change was not statistically significant. In intergroup comparisons after therapy, it was observed that patients from groups S and ES achieved a statistically significant improvement in body balance compared to patients from group C. Comparisons of patients from group S to those from group ES did not reveal any statistically significant relationships (Table 3).

Table 3. **Berg Balance Scale (BBS) results in the studied groups before and after therapy**

Indicator	Group S				Group ES				Group C				Intergroup comparison (after therapy) (*p*)
	Before therapy		After therapy		Before therapy		After therapy		Before therapy		After therapy		
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	
BBS	36.68	6.35	37.89	7.51	35.89	7.75	36.89	8.17	34.84	6.54	34.53	6.24	S-ES = 1.0000 S-C = 0.0263* ES-C = 0.0111*
Between measurements comparison (*p*)	0.0776				0.0033*				1.2579				

$\bar{x}$ – arithmetic mean, SD – standard deviation, p – significance of differences, * – statistically significant differences

Analysing the values obtained in the Tinetti test (POMA) in the studied groups, an improvement in the indicators was observed in groups S and ES by an average of

0.78 points and 1.37 points, respectively, between measurements, and these changes were statistically significant. In group C, the Tinetti test results deteriorated (a decrease by an average of 0.42 points), but this change was not statistically significant. In intergroup comparisons, it was observed that patients from groups S and ES achieved statistically significant improvement in body stability compared to patients from group C. Comparisons of patients from group S to those from group ES did not reveal any statistically significant relationships (Table 4).

Table 4. **Results of the Tinetti test (POMA) in the studied groups before and after therapy**

Indicator	Group S				Group ES				Group C				Intergroup comparison (after therapy) (*p*)
	Before therapy		After therapy		Before therapy		After therapy		Before therapy		After therapy		
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	
POMA	22.39	2.81	23.17	2.77	22.47	2.76	23.84	2.69	21.47	4.91	21.05	5.01	S-ES = 0.8822 S-C = 0.0191* ES-C = 0.0004*
Between measurements comparison (*p*)	0.0117*				0.0022*				0.0935				

$\bar{x}$ – arithmetic mean, SD – standard deviation, p – significance of differences, * – statistically significant differences

When the values of the fall risk assessment in the TUG test in the studied groups were analysed, a reduction in the risk of falls between measurements was observed in groups S and ES, by an average of 0.47 s and 1.11 s, respectively, and these changes were statistically significant. In group C, an increased risk of falls was observed (the duration of the TUG test increased by an average of 0.20 s), but this change was not statistically significant. In intergroup comparisons after therapy, it was observed that only patients from group ES achieved a statistically significant decrease in the risk of falls compared to group C (Table 5).

Table 5. **TUG test results in the studied groups before and after therapy**

Indicator	Group S				Group ES				Group C				Intergroup comparison (after therapy) (*p*)
	Before therapy		After therapy		Before therapy		After therapy		Before therapy		After therapy		
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	
TUG	15.33	2.6	14.86	2.55	14.28	3.06	13.16	2.95	15.14	2.26	15.34	2.05	S-ES = 0.4036 S-C = 0.1269 ES-C = 0.0010*
Between measurements comparison (*p*)	0.0313*				0.0019*				0.1590				

$\bar{x}$ – arithmetic mean, SD – standard deviation, p – significance of differences, * – statistically significant differences

Discussion

The treatment of schizophrenia should be based on the principles of multidisciplinary therapy, including physiotherapy, especially since some authors report that regular exercise programmes may have a beneficial effect on the physical and mental health and well-being of individuals with schizophrenia [7]. The available literature lacks reports on the impact of the Snoezelen method on motor functions in psychiatric patients, and only a few authors discuss the impact of this therapy on other aspects of schizophrenia [9]. This is a pretext to look for evidence confirming the effectiveness of this form of therapy on the motor skills of psychiatric patients.

Among the motor symptoms characterising mental disorders, such as schizophrenia, special attention should be paid to postural stabilisation and impaired functions of sensory systems, especially since some authors point to disturbances or to an unfavourable pattern and level of use of sensory information to maintain balance in such patients, among others, when the centre of gravity is shifted [15]. Machingura et al. [16] studied the effect of sensory modulation therapy on 41 patients with schizophrenia who were hospitalised. They showed that individuals with this type of disorder obtained different results in the assessment of sensory processing compared to healthy individuals. Moreover, the functional behaviour, stress level, general health and social functioning of patients participating in therapeutic intervention focused on sensory stimulation improved.

Klages et al. [17] assessed the effect of the Snoezelen room on the balance of patients with dementia. Their study involved 19 nursing home residents, and the assessment tools included the Romberg test with eyes closed and open, the TUG test and the Functional Reach Test. The study lasted six weeks and patients participated in Snoezelen sessions twice a week. Although the obtained results did not show statistically significant changes in the indicators, observations of participants' interactions with elements of the Snoezelen room, such as image-induced head and eye movements and vibration sensations, showed which events, according to the authors, could be used to create specific multisensory stimulations that enhance balance.

Nygård et al. [18] assessed the effectiveness of strength training and its impact on the quality of life of people with schizophrenia. The study involved 48 people who participated in strength training twice a week for a year. The results showed improvement in the exercise parameters and the quality of life of patients with schizophrenia. In our study, a statistically significant effect of the Snoezelen method on improving postural stability was obtained. Balance in psychiatric patients was assessed using both the stabilometric platform and the BBS. In the case of the stabilometric platform, the assessment of the LoS showed that the best results were achieved by individuals participating in classes in the Snoezelen room combined with the auctorial sensorimotor exercise programme (group ES). Only patients from this group achieved statistically significant improvement in balance both between measurements and compared to the control group. The significance of the change may have resulted from additional stimulation of the proprioceptive and vestibular systems during training aimed at these senses, which could have consequently increased body awareness and improved the balance-related reactions of the patients. Those who underwent Snoezelen sessions alone significantly improved only the indicators between measurements, while the balance of people from the control group actually worsened, although this was not a statistically significant change.

The results obtained using the BBS confirmed the findings from the stabilometric platform in relation to patients from the second group, who also, in this study, demonstrated a statistically significant improvement in balance both between measurements and compared to the control group. The control group itself also achieved the same result as on the platform (a statistically insignificant deterioration in balance), and patients from group S (who had sessions in the Snoezelen room without the auctorial sensorimotor exercise programme) achieved a statistically insignificant improvement between measurements, while their balance significantly improved compared to the control group.

With age, the symptoms of individuals suffering from schizophrenia change in nature. While productive symptoms, such as hallucinations, decrease, motor problems become significantly worse, physical activity declines, and both mobilisation and willingness to act deteriorate. Reduced physical activity is one of the most common causes of falls. Observing the degree of fall risk is another important element in assessing postural stability, particularly in older adults [19]. In 2018, Tsai et al. [20] conducted a meta-analysis that aimed to assess the risk of falls in patients with chronic schizophrenia. In total, 561 patients were evaluated and observed for 18 months. During the observation period, 40 patients (approximately 7%) experienced falls. The strongest association was observed between falls and low physical activity of the study participants. Stubbs et al. [21] examined more than 22,000 older people hospitalised in London hospitals with hip fractures resulting from falls. The authors showed that mentally ill individuals fell over four times more often than their mentally healthy peers and clearly indicated that there was a sudden and enormous need to implement fall prevention programmes for psychiatric patients.

One of the proposed therapies aimed at reducing the risk of falls was presented in a study by López-García et al. [22]. They conducted a pilot study on 20 older adults diagnosed with cognitive disorders. The intervention involved training consisting of several simple strengthening exercises. The results showed a significant impact of the training on reducing the risk of falls in people with dementia. Research on reducing the risk of falls in individuals with schizophrenia was also conducted by Ikai et al. [23]. They examined 49 people with schizophrenia, assigned to two groups (experimental and control). Participants in the experimental group took part in an eight-week yoga programme. The authors observed a significant reduction in the risk of falls in the experimental group, both immediately after completing the therapeutic programme and eight weeks after its completion, while no such relationships were found in the control group.

In our study, prior to the intervention, all groups showed a high risk of falls, as confirmed by both the TUG and Tinetti tests. After completing the programme, the results from both tests indicated a significant impact of both the Snoezelen method alone (group S) and the Snoezelen method combined with the auctorial sensorimotor exercise programme (group ES) on reducing the risk of falls in the studied psychiatric patients. In the case of comparisons to the control group, only group ES achieved statistically significant differences in both tests, while group S showed significant improvement only in the Tinetti test. Such results indicate that the auctorial sensorimotor exercise programme, which involved postural stabilisation exercises, additionally strengthened the functioning of the systems stimulated during Snoezelen sessions.

A properly selected therapeutic method increases the interest and commitment of mentally ill individuals to continue physical activity. Our study has shown that the Snoezelen method can be an attractive and effective therapy that improves postural stability and reduces the risk of falls in patients with schizophrenia, which in turn may have a positive impact on other symptoms of this illness. The beneficial effect of both the Snoezelen method and the auctorial sensorimotor exercise programme highlights the importance of a multi-faceted approach in the therapeutic process. However, the impact of this method on specific therapeutic problems remains open and encourages further research in this direction.

Study limitations

These studies should be continued to examine how Snoezelen therapy affects the well-being of psychiatric patients. Improving well-being may influence the improvement of postural stability in this group of people. Additionally, it would be worth assessing the durability of the achieved therapeutic effects by performing additional examinations, for example, one month after completing the therapeutic programme. It would also be valuable to conduct research on a larger group of patients.

Conclusions

1. The Snoezelen therapy had a statistically significant impact on improving postural control indicators in patients with paranoid schizophrenia.
2. The Snoezelen therapy had a statistically significant impact on reducing the risk of falls in patients with paranoid schizophrenia.
3. The auctorial sensorimotor exercise programme increased the impact of the Snoezelen room on postural stability measured using the Biosway platform and the risk of falls assessed using the TUG test.

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