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Original Article

Socialization of children with autism spectrum disorder complicated by concomitant disorders

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ABSTRACT

The article describes the difficulty of socialization and adaptation of children with autism spectrum disorders (ASD) complicated by concomitant disorders to the conditions of modern society. Considering that the integration process of children with ASD into the social environment is a multifaceted process of personality development and adaptation in a social atmosphere, the authors conducted an experimental approbation of the socialization model for children with autism spectrum disorders (ASD) complicated by concomitant disorders. The socialization model contains modules that reveal issues such as organizational and substantive. The main directions of the socialization model are technologies, principles of support and guidance, competence of the specialists, indicating the necessary criteria for assessing socialization, taking into account the characteristics of children with ASD, complicated by concomitant disorders, in conditions of special and inclusive education. According to the experimental study, established the socialization model aimed to increase the independence of children with ASD, the ability to organize social relationships, and participate in educational and extracurricular activities. The implementation (application) of the model makes it possible to normalize and improve quality of life of children with ASD, complicated by concomitant disorders, and their integration into the educational environment.

Keywords: Socialization model, Autism spectrum disorders, Mental retardation, Concomitant disorders, Education and upbringing of children with ASD, Impaired communication and social interaction

Introduction

The difficulties of socialization for children with autism spectrum disorders (ASD) is one of the urgent problems of childhood that requires the close attention of pedagogical, psychological, and medical sciences. Across the world, the increasing number of children with autism spectrum disorder is frightening. According to international statistics, ASD exists in one child out of 100. The data of psychological, medical, and pedagogical consultations (PMPC), in the Karaganda region confirm the trend of stable growth in the number of children with autistic spectrum. For example, in 2017 107 children, however in 2023, it grows up to 967 [1-8].

At the 10th revision of the International Classification of Diseases (ICD), ASD was introduced by a medical diagnosis of F84.0 Childhood autism. At the ICD-11th revision, six types of ASD are presented under the code 6A02 (6A02.0-6A02.5) indicating the presence/absence of intellectual disability, functional language, and functional speech. Generally, the ICD-11 revision

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refers to ASD complicated by concomitant disorders. The latest data from the World Health Organization (WHO) indicates that autism exists in about one child out of 100. However, according to the results of early studies, the real numbers are much higher. The prevalence of autism spectrum in third-world and developing countries is unknown [9-19].

Moreover, from the latest data from the US Center for Disease Control and Prevention (CDC), autism spectrum disorders have been registered in 1 out of 36 children (aged 8 years). Autism has been detected in 4% of boys and 1% of girls. Since 2021, the growth in prevalence has increased by 22% and 37.9% of children have intellectual disability [20-27].

In the Republic of Kazakhstan, as reported by the Psychological, medical and Pedagogical Consultations Center (PMPC) by the time of January 1st, 2024, 16,710 children and adolescents with autism spectrum were counted, which is 8.2% of the total number of children with special educational needs. As a result, 7.6% (1,278) of young children, 39.6% (6,616) of preschool children, and 52.8% (8816) of school-age children. There are 2,943 children enrolled in special educational institutions, 4,181 in inclusive education centers, and 1,226 children studying at home conditions. In comparison with the data for 2023, the growth was up to 1,670 children.

Today, there are no official statistical data reflecting the intellectual development of children with autism spectrum disorders and those with concomitant disorders, and believed that from unofficial reports, more than 40% of children have intellectual disability.

Statistics for the Republic of Kazakhstan reflect the global trend of an increase in the number of children with ASD. The growth of statistical data indicates a significant leap in the early detection of autism spectrum disorders, which is a significant step toward the successful socialization of children.

Frequently, ASD and concomitant disorders often occur with indications of hearing, vision, musculoskeletal disorders, intellectual disabilities, mental health issues, severe speech disorders, as well as endocrine and somatic diseases. The range of neurological disorders in children with ASD is wide and covers early delayed and disharmonious psychomotor development, sensory disorders, motor stereotypes, speech and articulation disorders, motor and vocal tics [28-33]. While choosing the methodical part of diagnostic and correctional care for children with ASD, it is necessary to remember the above features that lead to slow and disharmonious psychomotor development.

Currently, one of the priority requests of parents (legal representatives) is the introduction of children with autism spectrum disorders into the educational system of both special and secondary schools. The basis for the successful adaptation of students to the requirements of society and the staff of an educational organization is communication skills [34-49].

Thus, creating conditions for the development of communication capabilities and the gain of social skills for children with autism spectrum disorders, becoming a priority task for educational organizations.

Consequently, the process of education and socialization of children with ASD requires a thorough study of existing problems: the current models of education and socialization of children with mental health and intellectual disability mechanically transferred to children with ASD without taking into account the peculiarities of their development. Lack of experience at the level of primary and secondary educational systems, no approaches have been developed for designing variable educational programs for children with ASD in conditions of special and inclusive education, complicated by concomitant disorders. Furthermore, the study of the socialization issues for children with ASD complicated by concomitant disorders, and possible ways to solve problems are justified by the stable growth of this group of children.

Materials and Methods

The study aims to analyze the effectiveness of the socialization model for children with autism spectrum disorders complicated by concomitant disorders.

Furthermore, the article used such a research method as a pedagogical experiment, divided into three categories such as ascertaining, formative, and control stages.

The pedagogical experiment was carried out in 3 general education schools (schools No. 25, 27, 5, and 12 children in total) and 6 special schools (No. 4 and No. 6 in the city of Karaganda, No. 10 in the city of Balkhash, No. 9 in the city of Saran, No. 5 in the city of Temirtau, No. 7 city of Shakhtinsk, 52 children in total) in the Karaganda region. The total number of children with ASD complicated by concomitant disorders amounted to 64 individuals, among them 20 children with communication and social interaction disorders and mental retardation (group 1); 20 school students - with communication and social interaction disorders and mild intellectual disabilities (group 2); 24 - with communication and social disorders interactions and moderate intellectual disabilities (group 3). It is important to note that in the experiment, the pilot group.

During the pedagogical experiment, four levels of socialization skills were identified in children with ASD complicated by concomitant disorders. First, maladaptive (low or no motivation to learn, often with facts of undesirable behavior, low level of the cognitive sphere), minimal (low motivation to learn, superficial or formal attitude to communication, demonstration of auto-aggression, aggression, self-stimulation, situational understanding of speech). Intermediate (formation of motivation for learning, rare facts of undesirable behavior, socially acceptable behavioral skills). Lastly, optimal (average level of motivation to learn, absence of facts of undesirable behavior, sufficient level of cognitive development, proficiency in verbal speech or means of alternative communication).

To determine the initial level of socialization, several diagnostic tools were used, where research methods of the emotional-volitional and cognitive spheres were applied and interpreted taking into account the communicative and intellectual characteristics of each child with ASD complicated by concomitant disorders. The leading diagnostic tools were

methods of observation, questioning, and questioning of parents (and legal representatives).

The level of socialization of children with ASD is determined by comparing the results obtained during the diagnosis. According to the results, the level of socialization of children with ASD was determined as (maladaptive, minimal, intermediate, or optimal). During the control stages of the pedagogical experiment, diagnostic methods were used by authors such as N. G. Luskanova (2012), A. I. Barkan (1987), A. Abrams (2016), A. V. Khaustova (2014), A. R. Luria (1995), J. Ravena (1936), K. Machover and F. Gudinafa (2002).

The socialization diagnostics of children with ASD complicated by concomitant disorders using the above methods at the confirming stage showed the following distribution of children according to the selected four levels. Each level is characterized by a different degree of severity. Thus, at the maladaptive and minimal levels, a low degree of severity is the best result for children in the group. Respectively, a high degree of severity is the statement of the worst results. At the intermediate and optimal level, on the contrary, a low degree implies the worst results and a high degree implies the best results for children **(Table 1)**.

Results and Discussion

Table 1. Distribution of children by socialization levels at the ascertaining stage of the experiment

Group of examinees	Maladaptive level: degree of severity			Minimum level: degree of severity			Intermediate level: degree of severity			Optimal level: degree of severity		
	Low	Med	High	Low	Med.	High	Low	Med.	High	Low	Med.	High
Group 1 (n=20)	5%	10%	0%	20%	10%	15%	5%	5%	0%	0%	5%	25%
Group 2 (n=20)	10%	10%	30%	35%	5%	10%	0%	0%	0%	0%	0%	0%
Group 3 (n=24)	8%	8%	42%	38%	4%	0%	0%	0%	0%	0%	0%	0%

Analyzing the experiment results discovered that the optimal level of socialization was revealed in six children only in the first group – children with a combination of ASD and mental retardation. These children learn at the basic level of education, receive special psychological and pedagogical assistance from psychologists, speech pathologists, and speech therapists in a special boarding school for a long time.

An intermediate level was recorded in two children also only in the first group, whose intellectual state corresponded to the borderline, between mental retardation and mild intellectual impairment. Such children had an average level of motivation, mechanically, but followed the rules of behavior in the classroom, showed a situational interest in communication, understood speech and simple instructions. In addition, children possessed either alternative communication skills or verbal speech at the stage of formation (corresponded to the general underdevelopment of level I speech).

The minimum level was found in all three groups of 29 examinees. Teachers noted in their behavior, facts of undesirable behavior, auto-stimulation, aggression and auto-aggression, low memory level (children could not remember and reproduce words, objects) and verbal speech was absent, situational understanding of speech, partial formation of self-service skills and neatness [50].

The maladaptive level was detected in three groups of 27 subjects. The children's behavior is characterized by aggression, auto-aggression, auto-stimulation, low levels of verbal and non-verbal intelligence, and short-term mechanical memory. Such children did not accept the rules of behavior in the group (they ran away from the classroom, violated school discipline, there were facts of aggression towards students and teachers), gross violations of educational activities or lack of formation were noted. The basic skills of neatness and self-service, are at the stage of formation or partially formed [51].

The allocation of children within each group according to different levels and degrees of severity and the results of the confirming stage of the experiment are presented in quantitative indicators in **Table 1**.

After the experiment aimed at increasing the level of socialization in children with ASD complicated by concomitant disorders, a repeated diagnosis was carried out based on the developed Model, which showed the following changes, shown in **Table 2**.

Table 2. Allocation of children with ASD by levels of socialization at the control stage of the experiment

Group of examinees	Maladaptive level: degree of severity			Minimum level: degree of severity			Intermediate level: degree of severity			Optimal level: degree of severity		
	Low	Med	High	Low	Med.	High	Low	Med.	High	Low	Med.	High
Group 1 (n=20)	0	5%	0	15%	15%	0	5%	0	25%	0	10%	25%
Group 2 (n=20)	0	5%	30%	35%	10%	0	0	0%	20%	0	0	0
Group 3 (n=24)	4%	4%	38%	13%	33%	0	0	0	8%	0	0	0

A high degree of severity of the optimal level was found in seven children of the first group. Behavioral changes: cases of undesirable behavior were no longer recorded, acceptable norms of behavior in the classroom formed, understanding of speech improved, the level of development of nonverbal and verbal intelligence increased, and a steady interest in communication appeared. The rest of the children who were at this stage of socialization began consciously performing with the norms of behavior in the classroom, and their level of motivation increased [52, 53].

Twelve children from three groups reached the intermediate level of varying severity. Such dynamics occurred due to a decrease in the number of recorded facts of undesirable behavior, aggression, and auto-aggression; more acceptable social behavior skills were established. Speech in some children began to correspond to the general underdevelopment of speech of I-II levels and I. The nature of the implementation of techniques that determine verbal and (or) non-verbal intelligence has moved to a medium-low level (but still within the framework of their general intellectual development) [54].

The minimum level of varying severity was found in 26 children from different three groups. There are some positive qualitative changes in children's behavior. The improvement occurred due to the gradual formation of skills of neatness and self-service, the time of "retention" in the classroom increased by more than 10-15 minutes, the first prerequisites for the possession of non-verbal means of communication appeared, anxiety, aggression, and auto-aggression decreased, etc [55].

The maladaptive level is still observed in 19 children. By the end of the study, one of the students having not mastered the general educational curriculum for children with mental retardation transferred on the recommendation of the PMPC. In order to, a make simpler training program without focusing on the requirements of the state mandatory standard of education (for children with mild intellectual disabilities). In children of this level, the dynamics in the motivational-value, cognitive-evaluative, socio-functional, and communicative components of social adaptation were unstable and insignificant [56, 57].

The allocation of children within each group according to different levels and severity, the results of the control stage of the experiment presented in quantitative indicators in **Table 2**.

On the other hand, a comparative assessment of the levels of socialization (maladaptive, minimal, intermediate, and optimal) was carried out in accordance with the levels of the Socialization Model in the confirming and control stages of the experiment **(Tables 3-6)**.

The obtained data was statistically processed using the IBM SPSS Statistics 15 application program. The presence of a common intergroup variance was confirmed by single-factor analysis of variance (ANOVA). The intergroup variance is considered statistically significant at the $p<0.01$ level. The results of a comparative analysis of the data on the determination of the maladaptive level are presented in **Table 3**.

Table 3. Comparative analysis of the results for determining the maladaptive level

Group of examinees		Maladaptive level					
		Ascertaining experiment			Final experiment		
		High	Medium	Low	High	Medium	Low
Group 1 (n=20)	M±m	19,35±1,5	6,0±1,1	4,0±0,8	12,8±2,1*	4,0±0,6*	8,2±1,1*
Group 2 (n=20)	M±m	37,4±5,6	6,2±0,9	3,4±1,1	27,7±1,1*	9,5±1,2*	9,9±1,3*
Group 3 (n=24)	M±m	4,4±0,8	4,8±1,3	1,9±0,8	2,3±1,0	2,9±0,7*	3,2±1,1*

Note: * - significance level $p<0.01$

When analyzing the data obtained in the final experiment in group 1, children with impaired communication and social interaction with mild intellectual impairment had a high maladaptive level and made up to 12.8±2.1, average - 4.0±0.6, low - 8.2±1.1 ($p<0.01$, respectively). In the second group, children with impaired communication and social interaction with an average intellectual disability had a high maladaptive 27.7 ± 1.1, average - 9.5 ± 1.2, and low -9.9 ±1.3. Whereas, in the third group, only the average and low maladaptive levels of 2.9±0.7, and 3.2±1.1 (respectively) were determined in patients with mental retardation. **Table 4** shows the results of a comparative analysis of the definition of the minimum level.

Table 4. Comparative analysis of the results for determining the minimum level

Group of examinees		Minimal level					
		Ascertaining experiment			Final experiment		
		High	Medium	Low	High	Medium	Low
Group 1 (n=20)	M±m	9,25±1,0	1,8±0,7	13,5±1,3	11,4±1,2*	5,1±0,9*	9,5±1,2*
Group 2 (n=20)	M±m	*3,8*±0,8	*5,1*±0,8	*16,5*±1,4	*7,1*±1,4*	*8,1*±1,0*	*10,1*±1,5*
Group 3 (n=24)	M±m	13,7±1,6	6,6±1,2	7,6±0,9	4,1±1,3*	2,4±0,7*	2,7±1,1

Note: * - significance level $p<0.01$

When determining the confidence level in group 1, children with impaired communication and social interaction with mild intellectual impairment had a high minimum level equal to 11.4±1.2, average -5.1±0.9, and low - 9.5±1.2 ($p < 0.01$, respectively). In the second group, children with impaired communication and social interaction with an average intellectual disability had a high minimum level of 7.1±1.4, an average of 8.1±1.0, and a low of .10.1±1.5. Whereas, in the third group, only high and average minimum levels of 4.1±1.3, 2.4±0.7 (respectively) were determined in patients with mental retardation. **Table 5** reports the results of a comparative analysis of the intermediate-level definition.

Table 5. Comparative analysis of the results for determining the intermediate-level

Group of examinees		Intermediate level					
		Ascertaining experiment			Final experiment		
		High	Medium	High	High	Medium	Low
Group 1 (n=20)	M±m	4,0±0,8	4,8±0,6	3,7±0,8	7,6±1,1*	7,7±0,9*	1,5±0,6*
Group 2 (n=20)	M±m	*3,2*±1,3	*2,5*±0,8	*1,5*±0,6	*4,5*±0,8*	*5,9*±1,0	*3,1*±1,2
Group 3 (n=24)	M±m	8,4±0,9	13,2±0,8	11,9±0,*8	13,0±1,1*	15,0±0,7*	7,8±1,3*

The reliability level in group 1 in children with impaired communication and social interaction with mild intellectual impairment was set at a high intermediate level and amounted to 7.6±1.1, average -7.7±0.9, low -1.5±0.6 ($p < 0.01$, respectively). In the second group, children with impaired communication and social interaction with an average intellectual disability had a high intermediate level of 4.5±0.8 ($p < 0.01$). Whereas, in the third group, only a high intermediate level of 13.0±1.1, average-15.0±0.7, low - 7.8±1.3 ($p < 0.01$) was determined in patients with mental retardation. **Table 6** shows the results of a comparative analysis of determining the optimal level.

Table 6. Comparative analysis of the results to determine the optimal level

Group of examinees		Optimal level					
		Ascertaining experiment			Final experiment		
		High	Medium	High	High	Medium	Low
Group 1 (n=20)	M±m	3,3±3,8	1,5±0,7	1,7±0,7	3,6±0,9*	2,6±0,7*	1,2±0,4*
Group 2 (n=20)	M±m	*1,9*±2,2	*1,4*±0,6	*1,5*±0,6	*2,1*±0,6*	*2,0*±0,7*	*1,5*±0,6*
Group 3 (n=24)	M±m	7,7±1,1	5,15±0,7	8,9±1,0	12,1±3,9	10,8±1,1*	1,9±0,7*

Note: * - significance level $p < 0.01$

When determining the confidence level in group 1, children with impaired communication and social interaction with mild intellectual impairment had a high optimal level and amounted to 3.6±0.9, average - 2.6±0.7, low - 1.2±0.4 ($p < 0.01$, respectively). In the second group, children with impaired communication and social interaction with an average intellectual disability had a high optimal level of 2.1 ±0.6 ($p < 0.01$), an average of 2.0±0.7, and a low of 1.5±0.6. Whereas, in the third group, only the average optimal level of 10.8±1.1 was determined in patients with mental retardation, and the low level was 1.9±0.7 ($p < 0.01$).

Thus, the presence of a common intergroup variance is confirmed by the method of univariate analysis of variance (ANOVA) and the reliability of the results of experimental studies. There is a reason to reject the null hypothesis and accept an alternative one, which leads to an unambiguous conclusion. The level of socialization of children with ASD, complicated by concomitant disorders of the pilot group is higher, due to the use at the formative stage of the experiment of a model aimed at increasing children's independence, ability to establish social relations, and participation in educational and extracurricular activities.

Conclusion

Thus, the recorded changes in the socialization level of children in the pilot group are positive. During the formative stage of the pedagogical experiment, the components of the socialization model of children with ASD complicated by concomitant disorders used the method of applied behavior analysis (ABA), the method of environmental adaptation, the TEACCH method, and the PECS system. Additionally the methods of social stories, sensory integration, and active inclusion in the process of children's socialization with ASD, as well as their parents and neuro-typical peers. While working with children, different tools adapted to the special educational needs of each child (visual schedule, visual instructions, cards, tokens, etc.) and used format of information delivering as educational, extracurricular, correctional, and developmental activities.

The research was carried out in the areas of correcting maladaptive behavior, forming a stereotype of educational

behavior, communication skills, and social interaction skills, also expanding ideas about self-analyzing and social environment, and developing social orientation. It is based on the implementation of the principles of the socialization model. The principle of focusing on the special educational needs of children made it possible to achieve a deep individualization process. Moreover, the principle of consistency in assessing the needs of children made it possible to respond promptly to the influence of various environmental factors. The interaction and coordination principles of the specialist's actions of the psychological and pedagogical support service, teachers, and parents (legal representatives) contributed to building a clear idea of actions. The principles of content variability and individualization of the psycho-corrective work, education, and priorities of the formation of life-long competencies influenced the achievement of each child.

Consequently, introducing the socialization model concluded that the model allows to normalize and improve the quality of life of most children with autism spectrum disorders (ASD) complicated by concomitant disorders. Important to note that positive and qualitative changes in the process of socialization depend not only on the created exact conditions that contribute to increasing the level of independence. Also, by the ability to establish social relations and participation in educational and extracurricular activities, but also largely on the nature and severity of the types of developmental disorders associated with ASD. In such cases, children need to prolong the period of study, for a longer learning and upbringing process to obtain a stable desired result. In the absence of positive dynamics or with insignificant results, recommended, based on international experience, to consider the introduction of "co-teaching", the inclusion of teaching assistants in the staff of special schools, which is due to the need for children in a deeply individualized support of the educational process. At present, Kazakhstan has already gained positive experience in accompanying children with teaching assistants in secondary schools, which, therefore, needs to transfer to the conditions of a special school.

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