



OPEN ACCESS

EDITED BY

Farah El Zein,
Emirates College for Advanced Education,
United Arab Emirates

REVIEWED BY

Scott Tomchek,
University of Louisville, United States
Diana Marin-Suelves,
University of Valencia, Spain

*CORRESPONDENCE

Andréa Perosa Saigh Jurdi
✉ a.jurdi@unifesp.br

[†]These authors have contributed equally to this work and share first authorship

RECEIVED 09 June 2023

ACCEPTED 17 August 2023

PUBLISHED 30 August 2023

CITATION

Perosa Saigh Jurdi A, Baptista da Silva CC and Ferreira Roque Costa D (2023) The role of nursery school teachers in early intervention with children with signs of ASD. *Front. Educ.* 8:1237707. doi: 10.3389/feduc.2023.1237707

COPYRIGHT

© 2023 Perosa Saigh Jurdi, Baptista da Silva and Ferreira Roque Costa. This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

The role of nursery school teachers in early intervention with children with signs of ASD

Andréa Perosa Saigh Jurdi^{1*†}, Carla Cilene Baptista da Silva^{1†} and Daniella Ferreira Roque Costa^{2†}

¹Laboratory Education and Human Development, Department of Health, Education, and Society, Institute Health and Society, Federal University of São Paulo, Santos, São Paulo, Brazil, ²Laboratory Education and Human Development, Municipal Department of Education, Santos, São Paulo, Brazil

In Brazil, daycare as a social and economic reality for many families is consolidated as a natural context for the child and complementary to the family, and places teachers as important partners within an integrated system that involves the care of children from zero to 3 years old in the promotion of their full development. The experiences lived in daycare are decisive and fundamental in the child development process, and teachers as agents of intervention must be alert to possible early signs of change in the child's development. However, the practices of Brazilian daycare teachers have been little investigated with regard to school inclusion. In this sense, this research aimed to investigate the experiences of daycare teachers with children who present risk signs for Autism Spectrum Disorder (ASD). This is a qualitative exploratory research, with the participation of 10 teachers from public daycare centers in a city in the state of São Paulo. The information was obtained through semi-structured interviews that followed a script previously defined by the researchers. Data analysis was carried out using thematic content analysis. The results pointed out that the teachers' conceptions about development, permeated by their own ideas about education, care, family, and society, imply directly in their practices with the child and in the conduction of the case to other spheres. It was possible to verify the protagonism of the teachers who have in their effective practices care and play as intervention strategies in their actions. Gaps emerged regarding the communication between education professionals and the articulation between education and health. We identified the need for consistent intersectoral actions that favor the development of children who show early signs of ASD and value the role of the teacher in this process, also promoting inclusive educational practices.

KEYWORDS

autism spectrum disorder, early childhood education, early childhood intervention, inclusive education, teachers

Introduction

Autism Spectrum Disorder (ASD) are considered a heterogeneous group of neurodevelopmental disorders of unknown etiology (Conte et al., 2022). They are characterized by qualitative impairments in social interaction and communication, as well as repetitive and stereotyped patterns of behavior, interests, and activities (American Psychiatry Association, 2014).

The prevalence of ASD has significantly increased in the last 3 decades, and it is estimated to affect 1 in 54 children in the United States (McCarty and Frye, 2020). Possible reasons for this increase are related to changes in diagnostic criteria, increased awareness of parents and society about the disorder, and the development of specialized services for ASD. In Brazil, to date, there are no reliable estimates regarding the prevalence of autism. The last census conducted by the Brazilian Institute of Research and Statistics (IBGE) included questions about autism, but so far, we have no data results. Due to the scarcity of information, information from the regional office for the Americas of the World Health Organization (PAHO/WHO) and also from the United Nations (UN) is used. In both, a prevalence of 1 in 160 is reported (de Souza Freire and Nogueira, 2023; Gorianelli et al., 2023).

Signs of ASD are being identified at an increasingly early age, and theoretical advancements based on empirical data point to the importance of providing favorable conditions for early childhood development in order to promote better skills, participation, and quality of life. A prospective study with high-risk babies and another with mothers of children with ASD suggest that signs of ASD generally appear in the second half of life, being more evident between 12 and 24 months. According to these studies, the main warning signs are related to changes in language and communicative expressions, followed by repetitive behaviors, behavioral changes, and social isolation (Zwaigenbaum et al., 2019; Homercher et al., 2020).

Sampedro-Tobón et al. (2013) state that, besides the family, teachers are the second professionals who express concern about the warning signs of child development. According to the authors, teachers' daily observations of the child's interactions with peers, play behavior, and communication serve as an important source of information, evaluation, and referral for specialized assessments. They also play a crucial role in early intervention, assisting the family and promoting the child's development.

Balcells et al. (2019) state that the main international organizations such as United Nations Educational, Scientific and Cultural Organization (UNESCO), Organization for Economic Co-operation and Development (OECD), and the European Agency for Special Needs and Inclusive Education (EASNIE) emphasize that early childhood education should be inclusive and of quality. Among the 10 principles advocated by the European Commission is a team of professionals, including well-qualified and trained teachers, with working conditions that include time for observation, reflection, and planning, teamwork, and collaboration with families.

In this sense, daycare, as a social and economic reality for many Brazilian families, consolidates itself as a natural context for the child and complements the family, placing teachers as important partners within an integrated system that involves caring for children from 0 to 3 years old in promoting their comprehensive development.

Nunes and Rodrigues Araújo (2014) emphasize the importance of early childhood education as an intervention setting, as children spend full or partial periods in school. Another important factor highlighted by the authors is the objective of early childhood education to promote comprehensive development, encompassing different aspects such as physical, psychological, intellectual, and social. However, according to the authors, Brazilian studies that consider daycare and preschool as contexts for early intervention

practices and teachers as agents of intervention are still scarce in the national scenario.

With the visibility of ASD worldwide and the increasing number of diagnosed individuals, early childhood education is faced with questions about how these children learn and the role and function of the environment in this process (Gómez-Marí et al., 2021). Based on the literature in the field, the study addressed the following research questions regarding daycare teachers' perception of their role in detecting early signs of ASD: (1) How do teachers experience their work in daycare with children showing early signs of autism? (2) How do these professionals structure their pedagogical practice to promote comprehensive development and ensure the right to equity for children who may exhibit early signs of the disorder? and (3) What challenges do teachers face in their daily professional practice regarding children with early signs of ASD?

Study design

This study investigated the experiences of daycare teachers with children showing signs of risk for ASD. The research employed a qualitative methodology and is classified as an exploratory study, which aims to provide a deeper understanding of the problem, making it more explicit. The process of qualitative investigation assumes that research is an interactive process between the researcher and the research participants, being descriptive and analytical, focusing on people's words and behaviors as primary data (Minayo, 2014).

The teachers' speeches/narratives were used to analyze the experiences of these professionals in promoting child development and the challenges they face in education and care for children with developmental impairments. The narratives were collected through semi-structured interviews, which addressed the topics identified through the research questions. The interviews were conducted by the same researcher who is part of the group of authors.

Data collection instrument and procedure

As a data collection instrument, a semi-structured interview script was developed, consisting of guiding questions divided into two sections. The first section gathered participants' sociodemographic data regarding age, length of training, work experience in daycare, and postgraduate education. The second section of the script contained open-ended questions about the experience with students showing early signs of ASD, strengths and challenges of the role of daycare teachers, and coordination between the education and health sectors in supporting children with early signs of ASD. For example: Describe the actions to promote child development developed in the daycare center; and What is your experience with children with autism? In your professional practice, have you detected early signs of ASD risk? How did you guide your action based on this? What are the developmental delays presented by a child you consider at risk of signs of ASD do you consider at risk of signs of ASD? How do you structure your pedagogical practice with these children? How do education and health articulate in the follow-up of this child, after the diagnosis? and Talk about the issues that enhance your work with children at risk of development. In addition to the open-ended questions in the interview

script, the teachers were allowed to provide free comments on the relevant topics. This allowed for a deeper exploration of the study's questions, ensuring freedom and flexibility for the interviewees (Bogdan and Biklen, 2010; Minayo, 2014). Prior to the interviews, a script was analyzed by an expert in Early Intervention and by two Early Intervention professionals who met the criteria for inclusion in the study, but who did not take part in the study as participants. According to the guidelines provided by the expert and the two Early Intervention professionals, changes were made to the structure of the script, the language used and the type of questions. According to Bogdan and Biklen (2010), this script validation procedure allows the researcher to evaluate the language that is used, to gain an understanding of the questions that are made and to analyze the need to change or incorporate new topics in the original script.

The interviews were conducted individually and provided a privileged space for obtaining contextualized information imbued with values and representations. In this way, it was possible to achieve the proposed main focus. Due to social distancing norms established by the World Health Organization (WHO) and the Government of the State of São Paulo due to the COVID-19 pandemic, the interviews were conducted remotely. The digital platform Google Meet® was used for the interviews. The interviews took place from September to November 2020 and lasted an average of approximately 50 min. From an ethical point of view, participants were informed about the risks of the virtual environment electronic media or non-face-to-face activities, due to the limitations of the technologies used. This includes the limitations of the researchers to ensure total confidentiality and/or potential risk of its violation. Regarding the guarantee of reliability and security, the participants were informed that the Google Meet® Platform, which records interviews for study purposes, guarantees in its privacy policy that customers own the data that is stored, and the records are stored encrypted. The recordings on google meet are directed to the drive of the person responsible for creating the virtual room. In this way, the data were stored in a non-shared folder on the drive of the researcher responsible for the research. The teachers interviewed were informed at the presentation of the research that the interview data would be analyzed using thematic analysis.

Procedure

The research was approved by the Education Department of the Municipality located on the coast of the State of São Paulo, with approximately 424,599 inhabitants and by the Ethics Committee on Human Research of the Federal University of São Paulo, in accordance with Resolution 466/12, under the number 4.017.364. All research participants signed a Consent Form, which requested permission for audio recording during the individual interview.

To initiate the research, the Municipal Education Department was contacted via email to request a list of students with special needs enrolled in Early Childhood Education units during the 2020 academic year. Based on this information, a screening was conducted to identify units that served children aged 0–3 years with special educational needs. The next step of the research was to contact the 13 daycare directors who served these children, sending them an invitation with a brief description of the study. From this initial contact, seven directors showed receptiveness and made arrangements during pedagogical meetings, facilitating contact with the teachers.

Sample

The study included 10 teachers who met the pre-established inclusion criteria: they were graduates in Pedagogy, worked as teachers in the Municipal Education Units in the city of Santos, and were currently teaching in daycare. These professionals had a work experience with children with Autism spectrum disorder ranging from 1 to 3 years, and had attended at least two training courses in ASD.

To maintain confidentiality and anonymity, the research participants will be referred to by the initials of their names (Table 1).

The participants in the study are all female, aged between 39 and 58 years old, and work in the public education system in the city of Santos. Their work experience in daycare ranged from 2 to 25 years. All teachers had experience with inclusive education for children with special educational needs. They all have a degree in Pedagogy, and only two of them do not have a postgraduate degree. Regarding postgraduate courses, only three participants mentioned specific courses in special and inclusive education, one teacher mentioned a postgraduate course in autism, and no teacher has a background in early intervention.

Data analysis

The interviews were transcribed and analyzed using content analysis method of Bardin (2011), which involves identifying and categorizing the frequently addressed themes in the participants' statements regarding the investigated subject. Data analysis started with the transcription of all interviews, in order to assure the collection of recording units that would translate the necessary and pertinent content according to the research goals and the theoretical framework of the research, and which represent the basic units for the categorization of data (Bardin, 2011). In this phase, we searched for regular patterns in the information that had been collected, with the aim of defining coding three thematic categories. The system of categories used in this research followed an inductive analysis (Bardin, 2011). A set of techniques was used to safeguard the reliability of the criteria used in this study, namely: credibility, through the technique of peer debriefing, validation (Bogdan and Biklen, 2010; Coutinho, 2011).

The analysis of the teachers' accounts followed the steps of pre-analysis, exploration of the material, treatment of results, inference, and interpretation. The participants' statements were grouped into *post hoc* analysis categories. The data analysis was carried out by two researchers of the group independently and then the analyses were compared.

Results

This section presents the main themes based on the collected qualitative data. After analyzing the content of the interviews, three thematic categories were identified and addressed the study's research questions: (1) Teachers' observation regarding the development and detection of early signs of ASD; (2) Teachers' strategies regarding children with early signs of ASD; and (3) Collaboration between the health and education sectors and with the family. All participants' statements contributed to the definition of categories, however, for the

TABLE 1 Characterization of participants.

Teachers	Age	Years as a teacher	Years as a daycare teacher	Educational background	Post-graduate studies
L	53	20	6	Pedagogy	—
N	57	35	13	Pedagogy	—
S	52	24	12	Mathematics, Pedagogy	Orientation, Inclusive education, and Early childhood education
V.L.	53	25	12	Pedagogy, History	Autism and special needs education
F	39	17	13	Pedagogy	Early childhood education and literacy
G	52	25	25	Pedagogy	Educational law
T.B.	44	6	2	Pedagogy	Pedagogical education and supervision
T.	41	15	11	Pedagogy	Master's degree in History
V.M.	48	24	13	Pedagogy	Early childhood education
V.C.	39	17	2	Portuguese, Pedagogy	Clinical and institutional psychopedagogy

presentation of results only the most representative excerpts were selected for this article.

Observation by teachers regarding child development and the detection of early signs of ASD

This theme encompassed content related to the detection of early signs of ASD or developmental delays. Of the 10 participants interviewed, seven teachers reported that the routine and frequency of day care allow them to be privileged professionals in the observation of developmental changes. In the daily activities of the daycare, one teacher identifies signs of developmental alteration in the difficulties the child presents with feeding, interaction, and speech, as shown in the following excerpt: "(...) likes to play alone, you talk, call, call, she does not listen, has selective hearing, does not like noise, often covers her ears when the room is too noisy, the whole class was without diapers, but she could not be toilet trained" (Teacher S.).

Another teacher reports on signs that she considers revealing of developmental alterations: "The issue of speech, where some were already uttering simple syllables, but he did not babble, he would take us by the hand and lead us to the water cooler when he wanted water, he had strange behaviors, like he could not stay in a music circle, he could not stay in a reading circle, he wanted to throw everything" (Teacher L.).

Observation is the most commonly used resource by teachers to monitor child development. They consider that being with the child every day makes the teacher the professional who knows the child and their habits and behaviors the most. "We know every step they take, everything that happens, their quirks, and when you do an assessment at the end of the semester, at least for me, I close my eyes and see that child. I know what they do, I know who they are" (Teacher L.).

Through daily observation, daycare professionals participate in the detection of risk signs. "For us, it's daily observation, there's no other way. Observation and documentation. Our best tool is documentation. OBSERVE AND WRITE, OBSERVE AND WRITE, because then when you have to write a report, you already have everything, it's already prepared" (Teacher V.L.).

Even though they pointed out behaviors common to the disorder, four teachers mentioned that it is important to consider the uniqueness of each child in the process of detecting behaviors that differentiate them from other children. "(...) if you do not have a differentiated perspective on the children, an individualized perspective, you will not be able to see that the child needs an intervention" (Teacher G.).

According to Teacher T., daily contact with the child enables the teacher to detect risks of ASD, "whether throughout the day, over the months, in the routine, you can perceive the process. (...) I believe that early childhood education teachers, even daycare teachers, are prepared to identify, inform, guide, and have conversations with the parents so that they have relevant information and seek help" (Teacher T.).

All interviewed teachers agreed that daycare is a space for promoting child development and that the teacher plays a role in early intervention: "We teachers end up being agents of early intervention because we have a lot of experience. Even when a little baby comes at 4 or 5 months, we can already see a difference when they are not in line with their age group" (Teacher G.).

Strategies of teachers in relation to children with early signs of ASD

This category analyzed the actions and strategies used by teachers to promote the development of children.

The situations that promote children's experiences in the daily activities of the daycare ensure their right to coexist, play, participate, explore, express themselves, and get to know themselves. These rights must be clear and guide the organization of space, selection of materials, time management, routine of personal care, as well as the proposals and investigations that the teacher plans to carry out with the children. "The actions developed in the daycare are quite varied, we use various types of materials, from non-structured materials to the line of movement, it's quite diverse, (...) to develop multiple skills, developing all the senses, activities with mirrors, fine motor coordination with different materials like grains, bubble wrap, so, in daycare, we use a wide range of materials" (Teacher V.L.).

Entering this collective environment provides a set of actions that enable broad and diversified experiences and learning, complementary to the family. Therefore, teachers' actions should be based on theoretical, practical, methodological, and intentional foundations within a critical, reflective, and conscious pedagogical approach that integrates care and education, an inseparable binomial of early childhood education, promoting play and interactions, the foundational pillars in this stage of education. "I see early childhood education as the foundation because it is there that you discover, where you can address all the difficulties that this child has. (...) they do play, but it is through play that we develop numerous skills in these children, where we perceive the difficulties, including socio-emotional aspects of the family" (Teacher N.).

The teachers spoke about the importance of play for promoting child development in this age group: "The promotion of development happens through play, through interactions with the children. While the children play, we observe. While they play, they learn. While they play, they communicate, even without verbalizing. But in their movements, you already know what they are thinking, what they want to say. So, we interact with them to foster their development" (Teacher T.).

The account from Teacher G. reinforces the role of play for learning: "Play is what develops the child the most. If you promote a play activity, whatever it may be, sometimes you do not even need a toy, just a tree leaf, and you can promote the child's full development" (Teacher G.).

In addition to the physical spaces and materials in the daycare, which encompass more objective aspects, there is also the environment where more subjective aspects are situated. This includes interpersonal relationships and requires the teacher to have a sensitive outlook, attentive listening, and detailed observation focused on addressing the children's individual needs. "Until the end, I doubt the signs, I do what is within my reach, rethink strategies, change approaches, adapt activities. I assume that any delay is on my part, in my teaching" (Teacher L.).

Welcoming the child, interpreting their expressions, and respecting their pace are perceptions of the teacher that make all the difference in daily life. "We try to do what we can within our possibilities. When we notice that a child has difficulty transitioning to a new environment, but we need to move to another place, then one teacher goes with the rest of the class while another stays to attend to that child, you know? Sometimes we even have to pick them up" (Teacher V.L.).

In identifying the child's distress and refusal to eat in front of a colorful plate, the teacher describes how she handled the situation. In addition to offering food for nourishment, she provided an opportunity for the child to participate and share with peers in the context of mealtime. "In the case of food, I noticed that every time there were very colorful items on the plate, he would not eat, especially when it was pasta. So, I removed it, there was pasta and grated carrots with peas, a bunch of things, and he would get lost" (Teacher V.L.).

Among the participating teachers, some refer to the need for specific training on ASD to support their professional practice. However, in general, strategies are developed based on classroom experiences. "So, we sought a lot of information. We read a lot because we wanted to know how to handle it. In reality, we guessed a lot of things, and the family was also expecting us to provide feedback" (Teacher N.).

Most participants mention taking general courses offered by the Department of Education as part of their continuing education. However, they find these courses insufficient and disconnected from their everyday professional practice. "The training I have is the training provided by the local government. It's a very surface-level thing because sometimes the day-to-day reality is much richer than just going there and listening to someone talk about things that do not relate to the child I have" (Teacher L.).

Only one teacher mentions specific training on ASD based on another professional experience that made her feel the need to seek knowledge in the field. "I completed a post-graduate program solely focused on autism because I had been working for several years in mediation, and my primary target audience was children with autism. I realized that I needed to deepen my understanding" (Teacher V.L.).

Articulation between the health and education sectors and with the family

The participating teachers highlight the importance of collaborative work with other professionals in the daycare, the significance of dialogue with professionals attending to the child, and the need to establish dialogues and partnerships with the healthcare sector. The importance of intersectoriality and interdisciplinarity in the care of young children with developmental alterations implies avoiding pathologizing discourses that reduce the child and their family to a diagnosis. The coordination of multiple actors, including teachers and families, leads to new forms of care, support, and possibilities for learning and development for these children.

One of the key interlocutors is the family, considering the child in their totality and within their contextualized reality. By conceiving the child as a whole, their family and sociocultural background are included.

The daycare, as a context for the child's learning, operationalizes this practice by sharing educational and care actions with the family. Therefore, dialogue and engagement with families and the community are fundamental assumptions highly valued by the interviewed teachers, as expressed in the following statements: "We're always trying to encourage parents to understand the work in the daycare because they do not have much awareness. They think we are there only for care, without connecting care with education. So, they do not see the daycare from an educational perspective" (Teacher V.M.).

For another teacher, the lack of partnership with parents in the learning process also hampers the necessary research: "It becomes difficult when we do not have the partnership of parents, of the family, especially. Without that feedback from the family, and if the family does not truly help you, it's over. There's nothing you can do because, no matter how much you teach the child, there's a void" (Teacher N.).

When families and teachers share knowledge and ideas regarding what is most significant for the children, they promote experiences that have an impact on learning: "If we fail to reach the heart of that family, as I'm telling you, development will not happen because it's not enough for us to work solely at school. They do not live with us; they are with us; they pass through us" (Teacher N.).

In addition to the family, another important factor addressed by the teachers was teamwork with other professionals in the daycare:

pedagogical coordinators, educational counselors, and other teachers who work with the child. “The school team is also fundamental in this process; they need to do their part. It’s complicated, it’s not easy, but it’s the role of coordination and guidance to refer and follow up on the case. It’s a collective effort. Classmates need to be in consensus about that child, and the partnership with the family is essential, just as I emphasized education and health, I would emphasize school and family” (Teacher T.).

However, the biggest challenge pointed out by the teachers was regarding the coordination with professionals external to the school, especially healthcare professionals who are responsible for diagnosing, conducting in-depth assessments of development, and providing therapeutic interventions. The participants reported difficulties in coordinating between the education and health sectors, hindering the research process, and delaying the necessary referrals for diagnosis and the definition of joint interventions. For the teachers, this coordination between health and education addresses the demands of school inclusion for children with special needs: “Health and education, and I believe they should go hand in hand, each in their own area, but both working for the benefit of that child. That’s how it should work, in my opinion! Education and health together would enhance the child’s development” (Teacher T.).

One of the factors mentioned by a teacher relates to the devaluation of teachers in the early detection of signs of developmental alterations, hindering dialogue and the child’s proper development: “I think teachers are heavily criticized when they try to participate in this detection process. (...) There is no articulation between education and health in monitoring; it’s as if, from the moment the teacher signals something, it becomes a fork in the road. Education goes one way, and health goes the other” (Teacher L.).

Another teacher highlights the importance of healthcare professionals being closer to the school routine: “Education and health are linked, not only in terms of diagnosis but in everything. If we had the participation of healthcare within schools, it would be great for dealing with all issues, not only cognitive matters but also health-related issues, knowing how to handle them, like taking care of a flu or managing an allergy. I believe they should be together there, you know?” (Teacher N.).

In their statements, the need for teachers to seek a diagnosis emerges, considering that having a diagnosis allows the child to access appropriate treatment. In a way, we can assess that this need does not translate into the need to work collaboratively and interdisciplinarily, as advocated by policies for early childhood. Perspectives from different angles, yet complementary and not divergent, would reduce the duplication of actions that mostly focus solely on preventing harm.

The accounts show how different perspectives can hinder the work with teachers if there is no collaborative effort among all professionals who interact with the child. “The psychologist comes, the counselor comes and says it has to be this way, but in daily life, things aren’t like that. It does not work that way, with a classroom full of screaming children, it destabilizes him” (Teacher L.).

The feedback on referrals to health services and specialists reflects a fragmented view that goes against the need to understand the child’s development as a whole: “It is assumed that when a child is referred to the doctor with a complaint about hearing from the school, the doctor already understands what we are suggesting between the lines, but that’s not what happens” (Teacher N.).

Discussion

This research aimed to investigate the experiences of day care center teachers with children who show signs of risk for ASD as developmental surveillance agents, and who should be aware of possible early signs of alterations in the development of children from 0 to 3 years. The results made it possible to verify the protagonism that the teachers have in their care practices as intervention strategies in their actions. It was also possible to highlight gaps in terms of communication between education professionals and health and indicated the need for consistent intersectoral actions that favor the monitoring of the development of children who show early signs of ASD and value the role of the teacher in this process.

Teachers’ observation regarding the development and detection of early signs of ASD

For daycare teachers, the care of children from 0 to 3 years old becomes complex when neuroscience emphasizes the importance of this period for human development. Research shows that the early childhood period is full of opportunities for life’s fullness, emphasizing the experiences lived in the first 1,000 days of life, forming the basis for socio-emotional, cognitive, and physical learning. The early patterns of learning and behavior in the developmental process that are established in the early years of life are decisive experiences for expanding possibilities. This fact establishes a scientific argument for early intervention (Franco, 2015; Shonkoff, 2016).

The role of the environment during this period is extremely important, and it is the responsibility of caregivers, family members, and teachers to provide an environment rich in experiences, nurturing, and caring for the child to learn and develop. According to Pletsch et al. (2021), early childhood education from a bioecological perspective represents a microsystem that has a great influence on human development, creating opportunities for identification and effective response to the developmental issues presented by the child.

The amount of time and frequency in which the child stays in daycare favors interactions and proximal processes, making them intense and extensive and reflecting in development and articulation with other contexts. McWilliam (2012) emphasizes the importance of considering the teacher’s perception of the child in each routine and what actually happens, because discrepancies between the educator’s expectations and the child’s behavior may indicate the need for intervention.

From the perspective of early childhood intervention (ECI), early childhood education is one of its main pillars, and intervention processes are directly related and articulated with the quality of educational services provided for children with developmental delays. For them, in addition to an involved family, consistent, modern, and solid educational work is completely beneficial and necessary in this approach (Franco, 2015).

The delays caused by transient alterations or resulting from established disabilities complicate this distinction. To understand the quality of each child’s individual development, it is necessary to consider the indivisibility of developmental contexts since there is an organic confluence between risk and protective factors and the individual and particular conditions of each child (Franco et al., 2017).

In the field of intervention and research, intervening early means being attentive to multiple factors that potentially can generate alterations in development. It means paying attention to warning signs, to the changes that occur in daily life. In the interviews conducted, the teachers demonstrated that observing the child in their everyday activities is the main resource that a daycare teacher should have. Bronfenbrenner (2005) already emphasized that daycares with defined educational objectives become an important element of the microsystem of young children in interdependence and articulation with other developmental contexts.

Regarding the risk of ASD, recent research suggests that between 18 and 24 months, impairment in affective development would be a specific marker of autism, as well as the deficit affecting the development of shared attention. Symbolic play is also one of the markers of autism risk in the second year of life according to the literature in this area (Garcia and Lampreia, 2011). Failures in the ability to respond to one's own name, as well as peculiarities in play behavior, less frequent exploration and flexibility with toys, and deficits in social responsiveness and communication have also been reported as early markers associated with ASD outcomes (Ozonoff et al., 2010).

In a recent integrative review, among the main benefits of early intervention in children with ASD, the increase in learning capacity and cognitive functions, linguistic competences, reduction in the severity of autism symptoms, improved adaptive and socialization response, and reduction in stereotyped behaviors are highlighted (Silva et al., 2020).

The signs pointed out by the teachers when observing developmental alterations that resemble early signs of ASD align with what is currently being studied and disseminated about the disorder. According to the latest version of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2023), ASD is characterized by a dyad of qualitative deficits, specifically in the areas of social communication and restricted and repetitive patterns of behavior, interests, or activities.

Strategies of teachers regarding children with early signs of ASD

The participating teachers demonstrated an understanding of the importance of the daycare context for the child's development. They emphasized in their statements that learning is strongly influenced by interactions and experiences within their environment since the child actively learns through the interactions established in their environment, which, in turn, affect other aspects of their development (Biglan et al., 2012). Therefore, the child's learning opportunities that provide daily experiences and possibilities through activities in natural contexts of their routine are essential to encourage development and the practice of skills adjusted to their everyday interactions (Dunst et al., 2012).

The participants seek to review strategies, adapt activities, and change routines so that children can participate and interact with their peers, objects, and adults. However, despite their efforts, the training in this area is still incipient. Although continuing teacher education contributes to significant learning in educational settings for children with signs of developmental alterations, inclusive practices need to be articulated with other institutions serving this population, and

above all, in constant communication and interaction with families. This training needs to be part of the reality of teachers and students immersed in this context (Brites and Brites, 2019; Silva, 2021).

In Brazil, the Law of Guidelines and Bases of National Education (Law 9.394/1996), by promoting Early Childhood Education as the first stage of basic education, dignified the Early Childhood Education teacher and their training, giving them a new professional identity. Undeniably, it brought advances, including access to funding through the Fund for the Maintenance and Development of Basic Education and Valorization of Education Professionals (FUNDEB), but training remains a challenge (Peroza and Martins, 2016).

Teachers in training contexts point out the discrepancy between the content of the curricula and teacher training programs and the real formative needs for the exercise of the profession. Similarly, the interviewed teachers reported this gap between theoretical training and what happens in the classroom. In addition, none of the participating teachers in the research had training courses in early intervention, failing to fulfill one of the 10 principles advocated by the European Commission regarding well-qualified and trained teachers, with working conditions that include time for observation, reflection, and planning, teamwork, and collaboration with families (Balcells et al., 2019).

According to Marini and Della Barba (2021), these factors seem to indicate deficiencies in the training processes of professionals and may constitute one of the causes for the difficulty in implementing evidence-based practices in the context of Early Intervention Programs (IPI) in Brazil.

Articulation between the health and education sectors and with the family

In the process of articulation and action by teachers, the family has been one of the key interlocutors considered essential to better understand the child and the causes of developmental alteration signs. However, even though teachers are concerned about families, they report situations where the family appears as a secondary player in this process, being questioned, informed, and/or referred to seek services to assist their children. In most accounts, teachers mentioned the difficulty parents/caregivers face in accessing health services, seeking diagnoses, and searching for specialized treatments. However, a family-centered approach prompts us to consider the family's role in this process. For family-centered practice, a relationship of trust between parents and professionals is necessary, one that is less hierarchical and more collaborative. In this sense, considering the difficulties and vulnerabilities of families regarding their child should be a function of early intervention professionals. Inclusive school environments need to involve families and the community as support networks for the school and teachers (Simón et al., 2016). Likewise, analyzing how the daycare center has built communication and integration with the family, studies demonstrate that the contributions for improvement indicated by the work show that the results value family participation since only this partnership can promote a humanized, integrated, and unique process (Romeu and Rossit, 2022).

The Law of Guidelines and Bases of National Education (LDBEN) 9394/96 and the National Curriculum Parameters (PCN) also address health as a cross-cutting theme to be addressed in schools under the dimensions of promotion, assistance, and prevention of harm and

diseases, thus expanding the responsibility for school health beyond the health sector, enhancing the capacity for health promotion throughout the community and designating schools as allies in the multiplication of health education.

Similarly, there are currently some Brazilian public policies that indicate the importance of intersectoral actions, such as the Health in School Program (Brasil Ministério da Saúde, 2007) and the National Policy for Comprehensive Child Health Care (Brasil Ministério da Saúde, 2015). Such propositions have contributed to services and professionals rethinking their practices and seeking to build paths for less fragmented interventions, promoting collaborative and interdisciplinary practices.

The European Agency for Development in Special Needs Education (EADSNE), in its latest and important report on Early Intervention [European Agency for Special Needs and Inclusive Education (EASNIE), 2014], emphasizes four key elements for the implementation of recommended practices: legislative and policy measures that ensure a commitment to Early Intervention; professional training for teamwork and collaboration with other professionals and families; management coordination that ensures collaboration among services, professionals, and families; and finally, coordination between different sectors involved (Health, Education, and Social Assistance), with the family at the center of the actions. As examples, countries such as the United States of America and Portugal regulated and organized early childhood care services based on intersectoral, community-based and integration between services (Pereira and Serrano, 2010).

However, there is no specific legislation for Early Intervention in Brazil; instead, there are still emerging research and public policies that seek to indicate intersectoral work focused on early childhood but are still not sufficient to guarantee the elements described above. Silva et al. (2022) confirms this when pointing out that studies on intersectorality between health and education professionals reveal the difficulty in establishing a common plan.

The importance of intersectorality and interdisciplinarity in the care of young children with developmental alterations presupposes avoiding pathologizing discourses that reduce the child and their family to a diagnosis. The coordination of multiple actors, including teachers and families, brings about new forms of care, support, and possibilities for learning and development for these children.

Conclusion

The conclusions of the research questions that this study sought to understand are, first, that teachers observe children in detail in their daily lives at the daycare center and are attentive to early signs of autism. Despite the majority not having specific training in special education, even less in Early Intervention, they demonstrate experience with children whose development requires more attention and intervention. Secondly, professionals seek to establish intervention strategies in the daycare context, looking for activities that make sense and foster the development of children with early signs of Autism Spectrum Disorder (ASD).

Third and lastly, teachers reported difficulties in establishing coordinated actions both with families and between the education and health sectors. These difficulties include the impact of parents facing the particularities of their children and the challenges of referral and

service provision in other sectors, such as health and social assistance. The aforementioned issues can be affected by the absence of key elements for the implementation of recommended Early Intervention practices, such as legislation and policies that guarantee such practices, professional training, and service coordination for intersectoral actions.

Strengths and limitations of the study

In Brazil, studies on IP and education have been underdeveloped, since attention and care for children with disabilities has been delimited in the field of health and rehabilitation. The importance of the early childhood education teacher in monitoring child development and in building an environment rich in experiences in the school context needs to be further explored and grounded in research on EI. In this sense, this is a relevant study to identify how Brazilian daycare teacher's work with children with early signs of ASD and to reveal the important role that these professionals play in the Early Intervention process in the school context and in the interaction with families, as well as in referrals and coordination with other sectors and professionals involved. The study also revealed insufficient attention to teacher training in Early Intervention, lack of resources to work with families and professionals from other sectors, and a lack of awareness among school communities about recommended Early Intervention practices.

Limitations

As a limitation, it is understood that the study limited to a certain region can make it difficult to understand and deepen the phenomenon under study. Another limitation refers to the fact that the participants were only professionals and did not include the perspective of families.

Perspectives

Expected to contribute to the improvement of IP practices, with possible implications for the organization and functioning of IP services in this region. The results reinforce the importance of implementing policies that envisage the articulation of services between the health, education and social security sectors in order to create greater accessibility for families and children to these services, as well as to optimize the resources of the various sectors in identifying of children with TES and their referral to support services.

Therefore, future studies should delve into the information using other qualitative or quantitative research instruments to obtain a broader picture of the current situation. It would also be important to have a larger sample size to confirm the validity of the results presented in this study.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found at: <https://repositorio.unifesp.br/handle/11600/61202>.

Ethics statement

The studies involving humans were approved by Ethics Committee of the Federal University of São Paulo. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

AP and CB were responsible for the article's conception, writing, data analysis, and final revision. DF was responsible for conceiving the article, organizing the data and writing it. All authors contributed to the article and approved the submitted version.

References

- American Psychiatric Association (2023). *Diagnostic and Statistical Manual of Mental Disorders: DSM-5-TR*. 5 Edn. Porto Alegre: Artmed.
- American Psychiatry Association (2014). *Diagnostic and Statistical Manual of Mental Disorders—DSM-5*. 5th Washington: American Psychiatric Association.
- Balcells, A., Mas, J., Basqués, N., and Giné, C. (2019). "Atención temprana y educación inclusiva" in *Prácticas de Atención Temprana Centradas en la Familia y Entornos Naturales*. eds. C. T. E. Mora and L. R. García (Espanha: Uned), 319–337.
- Bardin, L. (2011). *Análise de Conteúdo*. Edições, São Paulo. 70.
- Biglan, A., Flay, B. R., Embry, D. D., and Sandler, I. N. (2012). The critical role of nurturing environments for promoting human well-being. *Am. Psychol.* 67, 257–271. doi: 10.1037/a0026796
- Bogdan, R., and Biklen, S. (2010). *Investigação qualitativa em educação: Uma introdução à teoria e aos métodos*. Porto Editora.
- Brasil Ministério da Saúde (2007) Decreto no. 6286, de 5 de dezembro. Dispõe sobre o Programa de Saúde na Escola—PSE, 2007. Available at: http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=1726-saudenaescola-decreto6286-pdf&category_slug=documentos-pdf&Itemid=30192 (Accessed March 16, 2020).
- Brasil Ministério da Saúde (2015). Portaria n° 1.130, de 5 de agosto. Institui a Política Nacional de Atenção Integral à Saúde da Criança (PNAISC) no âmbito do Sistema Único de Saúde (SUS). Available at: https://bvsms.saude.gov.br/bvs/saudelegis/gm/2015/prt1130_05_08_2015.html (Accessed March 27, 2023).
- Brites, L., and Brites, C. (2019). Mentes únicas: Aprenda como descobrir, entender e estimular uma pessoa com autismo e desenvolva suas habilidades impulsionando seu potencial. Editora Gente Livre Editora Ltda.
- Bronfenbrenner, U. (2005). "The bioecological theory of human development" in *Making Human Beings Human: Bioecological Perspectives on Human Development*. ed. U. Bronfenbrenner (Thousand Oaks, CA: Sage Publications).
- Conte, L., Lupo, R., Mazzarella, C., Calabrò, A., Vaglio, L., Chirizzi, S., et al. (2022). Autism Spectrum disorders and inclusion attitudes in the Italian school environments: teachers' knowledge, attitudes, perceptions and their necessity to consult a healthcare multidisciplinary team. *Acta Biomed* 93:e2022284. doi: 10.23750/abm.v93i4.12938
- Coutinho, C. P. (2011). *Metodologia de Investigação em Ciências Sociais e Humanas: teoria e prática* Aoloandro.
- da Silva, C. O., Oliveira, S. A., da Silva, W. C., Mendes, R. C., Miranda, L. S. C., Melo, K. C., et al. (2020). Benefits in using early intervention in children with autistic spectrum disorder (ASD): an integrative review. *Res. Soc. Dev.* 9:e256972474. doi: 10.33448/rsd-v9i7.2474
- de Souza Freire, J. M., and Nogueira, G. S. (2023). Considerações sobre a prevalência do autismo no Brasil: uma reflexão sobre inclusão e políticas públicas. *Rev. Foco* 16:e1225 doi: 10.54751/revistafoco.v16n3-009
- Dunst, C. J., Raab, M., Trivette, C. M., and Swanson, J. (2012). "Oportunidades de aprendizagem para a criança no quotidiano da comunidade" in *Trabalhar com as Famílias de Crianças com Necessidades Especiais*. ed. R. A. McWilliam (Porto: Porto Editora), 73–106.
- European Agency for Special Needs and Inclusive Education (EASNIE) (2014). Five key message for inclusive education. Putting theory into practice. EASNIE, Odense.
- Franco, V. (2015). *Introdução a Intervenção Precoce no desenvolvimento da criança: com a família, na comunidade, em equipe*. Évora: Aoloandro.
- Franco, V., Melo, M., Santos, G., Apolónio, A., and Amaral, L. (2017). A national early intervention system as a strategy to promote inclusion and academic achievement in Portugal. *Front. Psychol.* 8, 1–7. doi: 10.3389/fpsyg.2017.01137
- Garcia, M. L., and Lampreia, C. (2011). Limites e possibilidades da identificação de risco de autismo no primeiro ano de vida. *Psicologia* 24, 300–308. doi: 10.1590/S0102-79722011000200011
- Girianelli, V. R., Tomazelli, J., Silva, C. M. F. P., and Fernandes, C. S. (2023). Early diagnosis of autism and other developmental disorders, Brazil, 2013–2019. *Rev. Saude Publica* 57:21. doi: 10.11606/s1518-8787.2023057004710
- Gómez-Marí, I., Sanz-Cervera, P., and Tárraga-Mínguez, R. (2021). Teachers' knowledge regarding autism Spectrum disorder (ASD): a systematic review. *Sustain. For.* 13:5097. doi: 10.3390/su13095097
- Homecher, B. M., Peres, L. S., Arruda, L. F. S., and Smeha, L. N. (2020). Observação Materna: primeiros sinais do transtorno do Espectro Autista Maternal. *Estud. Pesquisas Psicol.* 20, 540–558. doi: 10.12957/ep.2020.52585
- Marini, B. P. R., and Della Barba, P. C. D. S. (2021). Intervenção precoce, formação profissional e os desafios para a implementação de práticas baseadas em evidência. *Da Investig. Pratic. Estudos Nat. Educ.* 11, 4–24. doi: 10.25757/invep.v11i1.241
- McCarty, P., and Frye, R. E. (2020). Early detection and diagnosis of autism spectrum disorder: why is it so difficult? *Semin. Pediatr. Neurol.* 35:100831. doi: 10.1016/j.spen.2020.100831
- McWilliam, R. (2012). *Trabalhar com as Famílias de Crianças com Necessidades Especiais*, Porto: Porto Editora
- Minayo, M. C. (2014). *O desafio do Conhecimento: Pesquisa Qualitativa em Saúde*. 11a Edn. São Paulo: Hucitec
- Nunes, D. R., and Rodrigues Araújo, E. (2014). Autismo: a educação infantil como cenário de intervenção. *Educ. Policy Analy.* 22, 1–14. doi: 10.14507/epaa.v22n84.2014
- Ozonoff, S., Iosif, A. M., Baguio, F., Cook, I. C., Hill, M. M., Hutman, T., et al. (2010). A prospective study of the emergence of early behavioral signs of autism. *J. Am. Acad. Child Adolesc. Psychiatry* 49, 256–66.e662.
- Pereira, A. P. S., and Serrano, A. M. (2010). Abordagem centrada na família em intervenção precoce: perspectiva histórica, conceptual e empírica. *Rev. Diversid.* 27, 4–11.
- Peroza, M. A. R., and Martins, P. L. O. (2016). A formação de professores para a educação infantil no limiar dos vinte anos da Lei de Diretrizes e Bases da Educação Nacional 9.394/96. *Diálogo Educ.* 16, 809–829. doi: 10.7213/1981-416X.16.050.DS01
- Pletsch, M., Calheiros de Sá, M., and Lunardi Mendes, G. (2021). A favor da escola pública: a intersetorialidade como premissa para a educação inclusiva. *Rev. Teias* 22, 11–26. doi: 10.12957/teias.2021.58619
- Romeu, C., and Rossit, R. A. S. (2022). Trabalho em equipe interprofissional no atendimento à criança com transtorno do espectro do autismo. *Rev. Bras. Ed. Esp.* 28, 639–641. doi: 10.1590/1980-54702022v28e0114
- Sampedro-Tobón, M. E., González-González, M., Vélez-Vieira, S., and Lemos-Hoyos, M. (2013). Detección temprana en trastornos del espectro autista: una decisión responsable para un mejor pronóstico. *Bol. Med. Hosp. Infant. Mex.* 70, 456–466.
- Shonkoff, J. P. (2016). Investindo em Ciência para Fortalecer as Bases da Aprendizagem, do Comportamento e da Saúde ao longo da Vida. Avanços do Marco Legal da Primeira Infância. 2016. Available at: <https://www2.camara.leg.br/a-camara/estruturaadm/altosestudios/pdf/obra-avancos-do-marco-legal-da-primeira-infancia> (Accessed December 10, 2021).
- Silva, R. M. A. (2021). Contributions of continued teacher education in the face of autism spectrum disorder. *Rev. Diálogo. Perspect. Educ. Especial* 8, 71–82. doi: 10.36311/2358-8845.2021.v8n1.p71-82
- Silva, L. N., Dias, F. S., Lenzi, M. F., and Costa, I. S. (2022). Desafios à intersetorialidade no cuidado das crianças com deficiência na perspectiva de profissionais da educação. *Cad. Saude Publ.* 38:e00256021. doi: 10.1590/0102-311xpt256021
- Simón, C., Giné, C., and Echeita, G. (2016). Escuela, Familia y Comunidad: Construyendo Alianzas para Promover la Inclusión. *Rev. Latinoam. Educ. Inclus.* 10, 25–42. doi: 10.4067/S0718-73782016000100003
- Zwaigenbaum, L., Brian, J. A., and Ip, A. (2019). Early detection for autism spectrum disorder in young children. *Pediatr. Child Health* 24, 424–432. doi: 10.1093/pch/pxz119

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.