Characterization of children with Autism Spectrum Disorder attended in a Pediatric Emergency Department

Caracterização de crianças com Transtorno do Espectro Autista atendidas em Pronto-Socorro Pediátrico

Caracterización de niños con Trastorno del Espectro Autista atendidos en una sala de emergencia pediátrica

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Abstract

Objective: To characterize children with Autism Spectrum Disorder (ASD) attended in a Pediatric Emergency Department regarding sociodemographic, clinical, and birth-related variables.
Method: Quantitative, cross-sectional, and descriptive study conducted in the Pediatric Emergency Department (PED) of a University Hospital in southern Brazil. Participants included children with ASD hospitalized between 2019 and 2023. Data collection occurred from March to April 2024 through electronic medical record searches, and analysis was performed using descriptive statistics, employing absolute and relative frequencies.
Results: A total of 51 medical records of children with autism attended during the period were included, with a prevalence of males, with 37 (72.5%), aged between 6 and 12 years old (54.9%), with the mother as companion in 43 of the cases (91.5%), 39.2% of the children were born by cesarean section. Among the 51 children with ASD admitted to PED, some were hospitalized more than once, totaling 76 hospitalizations in the period analyzed. The main symptoms associated with hospitalization at PED were: fever, convulsion, respiratory discomfort and cough.
Conclusion: The study characterized children with ASD treated at a PED, highlighting the prevalence of males, born by C-section, with clinical symptoms such as fever, respiratory discomfort and seizures. The findings indicate the need to prepare the team for comprehensive and humanized care for this population, given their prevalence in emergency services, considering their clinical and behavioral specificities.

Resumo

Objetivo: Caracterizar crianças com Transtorno do Espectro Autista atendidas (TEA) em um Pronto-Socorro Pediátrico quanto a variáveis sociodemográficas, clínicas e de nascimento.
Métodos: Estudo quantitativo, transversal e descritivo que teve como cenário o Pronto-Socorro Pediátrico (PS Ped) de um Hospital Universitário do Sul do Brasil. Os participantes incluídos foram crianças com TEA internadas do período de 2019 a 2023. A coleta de dados ocorreu de março a abril de 2024 por meio de buscas em prontuários eletrônicos e a análise foi feita por meio da estatística descritiva, utilizando-se frequência absoluta e relativa.
Resultados: Incluiu-se 51 prontuários de crianças com autismo atendidas no período, identificou-se prevalência do sexo masculino, com 37 (72,5%), faixa etária entre 6 e 12 anos incompletos (54,9%), tendo como acompanhante a mãe em 43 dos casos (91,5%), 39,2% das crianças nasceram de parto cesárea. Dentre as 51 crianças com TEA internadas no PS Ped algumas internaram mais de uma vez, totalizando 76 internações no período analisado. Os principais sintomas associados à internação no PS Ped foram: febre, convulsão, desconforto respiratório e tosse.
Conclusão: As crianças com TEA atendidas em um PS Ped, caracterizaram-se como sendo, em sua maioria, do sexo masculino, nascidos por parto cesáreo, com clínica relacionada a sintomas como febre, desconforto respiratório e convulsão. Os achados indicam a necessidade do preparo da equipe para um cuidado integral e humanizado a este público, dada a sua prevalência em serviços de emergência, considerando as suas especificidades clínicas e comportamentais.

Resumen

Objetivo: Caracterizar a los niños con Trastorno del Espectro Autista (TEA) atendidos en un Servicio de Urgencias Pediátricas en cuanto a variables sociodemográficas, clínicas y de nacimiento. Urgencias Pediátricas en cuanto a variables sociodemográficas, clínicas y de nacimiento.
Métodos: Se trató de un estudio cuantitativo, transversal y descriptivo realizado en el Servicio de Urgencias Pediátricas (SUP) de un hospital universitario del sur de Brasil. Los participantes incluidos fueron niños con TEA hospitalizados entre 2019 a 2023. La recogida de datos se realizó entre marzo y abril de 2024 mediante búsquedas en registros médicos electrónicos y se analizó mediante estadística descriptiva, utilizando frecuencias absolutas y relativas.

Resultados: Se incluyeron 51 historias clínicas de niños con autismo atendidos durante el periodo. 37 (72,5%) eran varones, con edades comprendidas entre 6 y 12 años incompletos (54,9%), acompañados de su madre en 43 de los casos (91,9%) madre en 43 de los casos (91,5%), el 39,2% de los niños nacieron por cesárea. De los 51 niños con TEA ingresados en Urgencias Pediátricas, algunos ingresaron más de una vez, con un total de 76 ingresos en el periodo analizado. Los principales síntomas asociados al ingreso en Urgencias Pediátricas fueron fiebre, convulsiones, molestias respiratorias y tos.
Conclusión: La mayoría de los niños con TEA atendidos en un servicio de pediatría eran varones, nacidos por cesárea varón, nacido por cesárea, con síntomas clínicos relacionados con fiebre, molestias respiratorias y convulsiones. Los resultados indican la necesidad de preparar al equipo para una atención integral y humana.

Introduction

According to the 5th revised edition of the Diagnostic and Statistical Manual of Mental Disorders, Autism Spectrum Disorder (ASD) is characterized by core symptoms (social communication deficits and restricted, repetitive behaviors) and related comorbidities, including sensory conditions, feeding problems, and challenging behaviors.[1]

Regarding autism epidemiology, the *Centers for Disease Control and Prevention* (CDC), a U.S. government agency, identified a prevalence of 1 child with autism for every 36 children aged 8 years.[2] In the Brazilian context, the lack of epidemiological studies limits knowledge about the actual prevalence of this condition, making it possible only to estimate figures based on the aforementioned study. Based on this, Brazil is estimated to have approximately 6 million individuals with autism. In Rio Grande do Sul, as of May 2022, 4,074 individuals with ASD had requested the Autism Spectrum Disorder Identification Card.[3]

In non-systematized literature review, publications available in the National Library of Medicine (PubMed) and Web of Science (WoS) databases were analyzed and the lack of Brazilian studies on the topic of this study was observed. At the international level, the main reasons for seeking emergency care for children with ASD were identified as neurological issues, such as epilepsy, psychological concerns, including medication intoxication and self-injurious behaviors. Studies also indicate that children with autism are more likely to seek emergency care for these reasons compared to their peers.[4-6] Despite advances in international description, the literature is centered on developed countries, making progress in the characterization of these patients in national settings vital.

It is known that the emergency department environment is often detrimental to children with ASD due to their specific sensitivities, including photophobia, phonophobia, disruptions to routine, and social impairments. This underscores the urgency for professionals working in this setting to be attentive to these particularities. By understanding the characteristics of this patient group, healthcare teams can organize care to ensure it is swift and respectful of their limitations and special needs. [7]

Given the lack of national studies addressing the profile of children with ASD in urgent and emergency care settings, the following research question was posed: "What is the profile of children with autism attended in a Pediatric Emergency Department?". Thus, the objective of this study was to characterize children with ASD hospitalized in a PED regarding sociodemographic, clinical, and birth-related variables.

It is expected that the knowledge gained from answering these research questions will contribute to improving care quality, enabling comprehensive care for children with autism in the study setting and other healthcare services. Additionally, this study seeks to bring visibility to these children in various care contexts, aligning with public policies specific to children and adolescents with ASD.

Method

It is a quantitative, cross-sectional and descriptive study. The study was conducted in the PED) of a medium-sized, high-complexity university hospital that serves as a reference in southern Brazil.

The study included children up to 12 years of age, as defined by the Brazilian Child and Adolescent Statute (ECA)[8], who were hospitalized in the PED between 2019 and 2023. These children were selected through the Hospital Management Application for University Hospitals (AGHU).

Data collection was carried out using electronic medical records of children with ASD via AGHU from

March to April 2024, in the city of Santa Maria, Brazil. Medical records were included in the study based on the presence of an ASD diagnosis and hospitalization in the PED within the last five years, i.e., from 2019 to 2023. The temporal scope was defined to ensure the data's relevance.

To obtain the medical records for this population, the researcher contacted the Hospital's Project Support Office (GAP) in person and requested the medical record numbers of all children hospitalized in the PED during the specified period.

Recognizing that children with autism seek emergency services for various reasons, the primary ICD code for their hospitalization referred to the condition prompting care rather than the ASD diagnosis itself. For this reason, the medical record numbers of all hospitalized children during the period were requested.

To identify children with autism among all hospitalizations, it was necessary to review all medical records from this period and verify whether an ASD diagnosis was listed under "Previous Diagnoses" in the History/Anamnesis section of the records. A total of 3,830 medical records were analyzed.

The data collection instrument was adapted for Google Forms and included three dimensions of information: sociodemographic data (sex, age, race/ethnicity, city of residence, and accompanying caregiver during hospitalization), birth data (date of birth, gestational age at birth, birth weight, and delivery method), and clinical data (medical history, number of hospitalizations between 2019 and 2023, reasons for hospitalizations, and average length of stay).

Data collection was conducted by the academic researcher in a designated room at the University Hospital reserved for research purposes, scheduled in advance with GAP for all data collection days.

Data analysis was performed using descriptive statistics, employing the mean as a measure of central tendency, along with absolute and relative frequencies. By integrating these descriptive statistical techniques, a comprehensive understanding of the distribution, centrality, and occurrence of the collected data was achieved, aiding in effective interpretation and communication of the results.

This research posed minimal risks related to participant identity breaches; however, data were securely stored to ensure confidentiality. The findings from this research will be made available as a database for future studies related to this topic. The study's benefits are indirect, as it aims to enhance understanding of the profile of children with ASD attended in emergency services, enabling the planning of health promotion, prevention, and recovery interventions.

The study adhered to all legal guidelines and prerogatives established by Resolutions No. 466/2012[9] and 510/2016[10] of the National Health Council. A waiver for the Free and Informed Consent Form was requested from the Research Ethics Committee (CEP), given that data collection occurred through electronic medical records without direct contact with participants. The study protocol was approved by the institution's Ethical Committee under number 6.512.409.

Results

During the quantitative data collection, 3,830 medical records of children attended in the PED from 2019 to 2023 were analyzed, of which 51 were selected as pertaining to children with ASD. Based on the information obtained from the medical records, sociodemographic, birth, and clinical data were organized into tables. The sociodemographic characterization of children with ASD participating in the study is presented in Table 1.

Based on the data described, a predominance of male children was identified, accounting for 37 (72.5%) of the 51 children. The predominant age group was 6 years to <12 years (54.9%), with ages ranging from 3 to 11 years and an approximate mean of 6 years. Regarding ethnicity, there was a predominance of white ethnicity with 47 cases (92.2%), followed by black ethnicity with 3 cases (5.9%).

Concerning the family member or caregiver accompanying the child during hospitalization, in 43 cases (91.5%), this person was the mother. The participants came from 17 municipalities in the state of Rio Grande do Sul, predominantly from the Central-West macroregion of the state, with the city of Santa Maria accounting for 31 children.

Table 2 contains birth and clinical data of the children with ASD participating in the study.

Gestational age at birth was categorized as preterm (<37 weeks), term (37 to 42 completed weeks),

Table 1. Sociodemographic characterization of children with ASD participating in the study

Variables	Absolute frequency
Gender	
Female	14(27.5)
Male	37(72.5)
Age group	
1 year old	0(0)
≥ 1 year - 6 years (incomplete)	23(45.1)
≥ 6 years (complete) and ≤ 12 years (incomplete)	28(57.9)
Ethnicity	
White	47(92.2)
Black	3(5.9)
Brown	1(2)
Asian	0(0)
Indigenous	0(0)
Not identified	0(0)
Origin by Health Macroregions of Rio Grande do Sul	
North	0(0)
South	0(0)
Midwest	44(86.3)
Missionary	3(5.9)
Metropolitan	1(1.9)
Vales	3(5.9)
Accompanying caregiver during hospitalization	
Mother	43(91.5)
Father	2(4.3)
Grandfather	1(2.1)
Grandmother	1(2.1)
Other	0(0)

Table 2. Clinical and birth variables of children with ASD participating in the study.

Variables	n(%)
Gestational age	
Preterm	10 (19.6)
Full-term	15(29.4)
Post-term	0(0)
No information	26(51)
Birth weight	
Extremely low birth weight	3(5.9)
Very low	0(0)
Low	3(5.9)
Sufficient	5(9.8)
Adequate	10(19.6)
Macrosomia	0(0)
No information	30(58.8)
Delivery method	
C-section	20(39.2)
Vaginal	3(5.9)
No information	28(54.9)
Clinical history	
Respiratory system diseases	18(21.18)
Nervous system disorders	15(17.65)
Diseases of the circulatory and cardiovascular system	6(7.06)
Diseases of the gastrointestinal system	3(3.53)
Diseases of the genitourinary system	3(3.53)
Hematologic-oncologic and immunological diseases	5(5.88)
Systemic diseases	1(1.18)
Metabolic diseases	4(4.70)
Diseases of the endocrine system	6(7.06)
Congenital malformations, deformities and chromosomal anomalies	19(22.35)
Surgery	5(5.88)
Reasons for hospitalization	
Respiratory system	30(25)
Nervous system	22(18.34)
Circulatory and cardiovascular system	1(0.84)
Gastrointestinal system	24(20)
Genitourinary system	2(1.67)
Hematologic-oncologic and immunological conditions	5(4.17)
Systemic conditions	20(16.67)
Endocrine system	2(1.67)
Injuries, poisoning, and other conditions related to external causes	10(8.34)
Surgery	3(2.5)
Others	1(0.84)

and post-term (42 completed weeks or more). Of the total number of children included, 25 of them had this information described in their medical records and 15 (29.4%) were born at term.

Birth weight was also categorized as follows: extremely low birth weight (<1000g), very low birth weight (<1500g), low birth weight (<2500g), sufficient weight (2500 to 2999g), adequate weight (3000 to 3800g), and macrosomia (>3800g). Of the 51 children included, only 21 had birth weight information in their records, with the majority, 10 (19.6%), being born with adequate weight.

Regarding delivery method, this information was available in 23 medical records, which showed that 20 (39.2%) children were delivered via cesarean section, while 3 (5.9%) were delivered vaginally.The number of hospitalizations per year is shown in Figure 1 below.

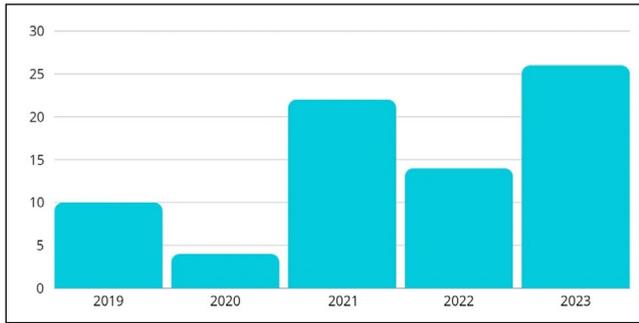From 2019 to 2023, 51 children with ASD were hospitalized in the PED, with some children being hospitalized more than once, with the total number of hospitalizations 76. The year with the highest number of hospitalizations was 2023, with 26 cases.

Among the study participants, 19 had congenital malformations, deformities, or chromosomal anomalies in their medical history, with West Syndrome, Trisomy 21, and clubfoot being the most common, each with 2 cases.

Additionally, 18 children had chronic respiratory system diseases, with asthma being the most preva-

Figure 1. Distribution of the number of hospitalizations of children with ASD participating in the study by year.

Figure 2. Main conditions in the clinical history of children with ASD participating in the study.

Figure 3. Main symptoms presented by children with ASD participating in the study.

lent, accounting for 10 cases. Moreover, nervous system diseases were present in 15 participants, with epilepsy being the most common, reported in 8 cases. This prevalence is illustrated in Figure 2 below.
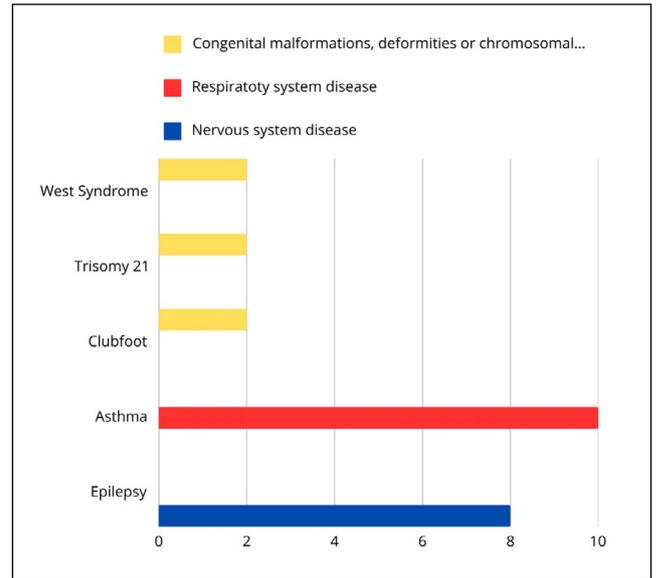
Regarding reasons for hospitalization, respiratory system-related symptoms were predominant, such as cough (11 cases) and respiratory distress (8 cases). Furthermore, fever was highlighted as a systemic condition, being one of the symptoms that led children with ASD to seek the PED in 17 instances. Finally, seizures were noted as a nervous system-related symptom, being the reason for hospitalization in 9 instances. This description is schematically presented in Figure 3 below.
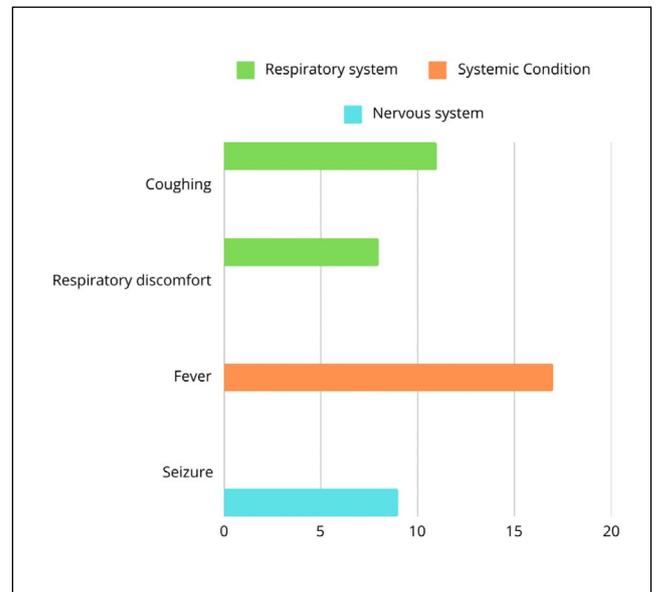
Discussion

Concerning the profile of the children participating in the research and the gender variable, a predominance of males (84%) was observed. These findings align with data from the Centers for Disease Control and Prevention, which indicate that boys are four times more likely to be diagnosed with ASD than girls.[2] However, it is important to note the masking of diagnoses in girls, as evidenced by a study suggesting that ASD may go undiagnosed in females with less severe symptoms.[10,11]

White ethnicity was the most common among participants. Evidence suggests that Black children are diagnosed at a later age, a fact that may be related to significant disparities in access to healthcare services and, consequently, in early diagnosis and its implications for individual health outcomes.[12]

From the analysis of the medical records of children with ASD participating in the study, it became evident that, in most cases, the family member accompanying the child during hospitalization was the mother. Historically, mothers have been seen as the primary caregivers for children with complex needs, given the lack of support networks, as evidenced by the stress and burden faced by single mothers.[13,14]

Regarding perinatal characteristics, the data obtained in this study differ from most research describ-

ing the birth weight and gestational age of children with ASD, as this study found a predominance of term births and adequate birth weight. International studies have observed the prevalence of preterm births and low or very low birth weight associated with ASD diagnoses.[15-17]

It is known that elective cesarean sections performed at 37 or 38 weeks of gestation contribute to risks related to incomplete maturation and weight gain that could be achieved at 39 weeks or more of intrauterine life.[18] Based on data from the participants' medical records, a prevalence of cesarean births was observed.

A Brazilian study linked emergency cesarean sections to an increased likelihood of developing ASD[19], a finding corroborated by another study that also associated elective cesarean deliveries with a higher risk of developing ASD.[19]

Health conditions related to autism frequently cited in various studies include respiratory and nervous system diseases and genetic disorders.[4,20,21] These findings align with this research, asthma and epilepsy were the most common diagnoses found in participants' medical histories, along with various syndromes.

The main reasons for hospitalization included symptoms such as respiratory distress, cough, seizures, and fever. These results are consistent with other studies reporting seizures and respiratory symptoms as some of the observable symptoms in children with ASD hospitalized in emergency departments.[21,22]

The study's limitations include incomplete information in medical records, which sometimes raised doubts about inclusion due to unclear documentation of ASD diagnoses. Some cases that could have been included were excluded for this reason.

Conclusion

This study allowed the characterization of children with ASD treated at a PED in terms of sociodemographic, clinical and birth variables. There was a prevalence of males and white ethnicity, in addition to the predominance of hospitalizations in the age group of 6 to 12 years of age. Most children were accompanied by their mother during hospitalization.

Regarding clinical aspects, the main symptoms that led to hospitalization were fever, cough, respiratory discomfort and seizure. Furthermore, it was found that a significant number of children had a history of respiratory and neurological diseases, especially asthma and epilepsy.

Regarding birth data, a high rate of cesarean deliveries, adequate birth weight and full-term births were identified, although a large part of hospitalizations regarding mode of delivery, birth weight and gestational time at birth were not recorded in the medical records.

In view of these findings, the importance of knowing such information for the adequate preparation of professionals and qualification of urgent and emergency pediatric care for children with ASD, considering their clinical and behavioral particularities. Team training can contribute to humanized and efficient care, reducing potential negative impacts of hospitalization in this population group. Furthermore, it is suggested to improve the recording of information in medical records, ensuring more detailed monitoring based on complete data.

Contributions

Figueiredo CL, Ribeiro AC, Buboltz FL, Souza NS, Santos HTQ and Neves ET declare that they contributed to the design of the study, collection, analysis and interpretation of data, writing of the article, relevant critical review of the intellectual content and approval of the final version to be published.

References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5a. ed. Text revision; 2022.

2. Maenner MJ. Prevalence and characteristics of autism spectrum disorder among children aged 8 years–autism and developmental disabilities monitoring network, 11 sites, United States, 2018. MMWR Surveill Summ. 2021;70(No. SS-11):1-16.

3. Faders. Estado do Rio Grande do Sul. Secretaria da Igualdade, Cidadania, Direitos Humanos e Assitência Social. CARACTERÍSTICAS DA POPULAÇÃO COM CARTEIRA DE IDENTIFICAÇÃO DO TRANSTORNO DO ESPECTRO AUTISTA NO RIO GRANDE DO SUL. Maio de 2022; [acesso em 18 Jul 2024]. Disponível em: https://faders.rs.gov.br/upload/arquivos/202205/23162953-pesquisa-ciptea-2021-2022.pdf

4. Beverly J, Giannouchos T, Callaghan T. Examining frequent emergency department use among children and adolescents with autism spectrum disorder. Autism. 2021;25(5):1382-94.

5. Mannenbach MS, Passe RL, Lovik KK, Larson EM, Laudon SM, Naeve A, et al. Caring for children with autism in an emergency department setting. Pediatr Emerg Care. 2021;37(12):e977-e980.

6. Schott W, Tao S, Shea L. Emergency visits for autistic children and children with ADHD. Pediatrics. 2022; 149(Suppl 4):e2020049437V.

7. Wood EB, Halverson A, Harrison G, Rosenkranz A. Creating a sensory-friendly pediatric emergency department. J Emerg Nurs. 2019;45(4):415-24.

8. Brasil. Lei n.8.069 de 13 de julho de 1990. Dispõe sobre o Estatuto da Criança e do Adolescente, e dá outras providências. Diário Oficial da República Federativa do Brasil, Brasília (DF); 2021 [acesso 01 Set. 2023]. Disponível em: https://www.chegadetrabalhoinfantil.org.br/wp-content/uploads/2017/06/LivroECA_2017_v05_INTERNET.pdf

9. Brasil. Ministério da Saúde. Resolução n. 466, de 12 de dezembro de 2012. Aprova diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. Brasília, Diário Oficial da União, 12 dez. 2012 [acesso em 01 Set 2023]. Disponível em: https://bvsms.saude.gov.br/bvs/saudelegis/cns/2013/res0466_12_12_2012.html

10. Brasil. Ministério da Saúde. Resolução n. 510, de 7 de abril de 2016. Dispõe sobre as normas aplicáveis a pesquisas em Ciências Humanas e Sociais cujos procedimentos metodológicos envolvam a utilização de dados diretamente obtidos com os participantes ou de informações identificáveis. Brasília, Diário Oficial da União, 7 abr. 2016 [acesso em 01 Set 2023]. Disponível em: https://bvsms.saude.gov.br/bvs/saudelegis/cns/2016/res0510_07_04_2016.html

11. Freire M, Cardoso HS. Diagnóstico do autismo em meninas: revisão sistemática. Rev Psicopedag. 2022;39(120):435–44.

12. Fombonne E, Zuckerman KE. Clinical profiles of Black and White children referred for autism diagnosis. Journal of autism and developmental disorders. 2022 ;52(3):1120-30.

13. Faro KC, Santos RB, Bosa CA, Wagner A, Silva SS. Autismo e mães com e sem estresse: análise da sobrecarga materna e do suportefamiliar. Psico. 2019;50(2):e30080.

14. Silveira A, Neves ET. "Enfrentei tudo sozinha" cuidado de adolescentes com necessidades especiais. Rev Cient Enferm. 2021;11(36):102-11.

15. Guo BQ, Li HB, Zhai DS, Yang LQ. Prevalence of autism spectrum disorder diagnosis by birth weight, gestational age, and size for gestational age: a systematic review, meta-analysis, and meta-regression. Eur Child Adolesc Psychiatry. 2024;33(7):2035-49.

16. Saroukhani S, Samms-Vaughan M, Lee M, Bach MA, Bressler J, Hessabi M, et al. Perinatal factors associated with autism spectrum disorder in Jamaican children. J Autism Dev Disord. 2020;50(9):3341-57.

17. Tâmega IE, Antila CC, Gasperini F, Shin C, Sampaio AF, Antila AG. Prevalência dos fatores de risco associados ao transtorno do espectro autista. Rev Fac Ciênc Méd Sorocaba. 2018;20(Suppl).

18. Brasil. Ministério da Saúde. Política Nacional de Atenção Integral à Saúde da Criança: orientações para implementação. Departamento de Ações Programáticas Estratégicas. – Brasília, 2018 [acesso em 23 Set 2023]. Disponível em: https://portaldeboaspraticas.iff.fiocruz.br/wp-content/uploads/2018/07/Pol%C3%ADtica-Nacional-de-Aten%C3%A7%C3%A3o-Integral-%C3%A0-Sa%C3%BAde-da-Crian%C3%A7a-PNAISC-Vers%C3%A3o-Eletr%C3%B4nica.pdf

19. Silva VB, Maia FA, Oliveira AJ, Cezar IA, Bandeira LV, Oliveira SL, et al. Association between autism spectrum disorder and peripartum events: a case–control study. Rev Paul Pediatr. 2023;41:e2021220.

20. Liu KY, Teitler JO, Rajananda S, Chegwin V, Bearman PS, Hegyi T, et al. Elective deliveries and the risk of autism. American journal of preventive medicine. 2022;63(1):68-76.

21. Garrick A, Lee ML, Scarffe C, Attwood T, Furley K, Bellgrove MA, et al. An Australian cross-sectional survey of parents' experiences of emergency department visits among children with autism spectrum disorder. J Autism Dev Disord. 2022;52(5):2046-60.

22. Deavenport-Saman A, Lu Y, Smith K, Yin L. Do children with autism overutilize the emergency department? Examining visit urgency and subsequent hospital admissions. Matern Child Health J. 2016;20(2):306-14.