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DEVELOPMENT OF PRESCHOOL CHILDREN IN THE RETURN TO SCHOOL AFTER THE COVID-19 CONFINEMENT IN BRAZIL

DESENVOLVIMENTO DE CRIANÇAS PRÉ-ESCOLARES NA VOLTA ÀS AULAS APÓS O CONFINAMENTO DA COVID-19 NO BRASIL

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ABSTRACT: **Aim**: This cross-sectional study aimed to analyze determinants related to the development of preschool children in the return to school after the COVID-19 confinement in Brazil. **Methodology**: Children's development indicators (overall development, abilities, difficulties and special health needs) were expressed in scores and their means were analyzed according to biological factors, health conditions, maternal care, quality of life and repercussions of the COVID-19 pandemic, using the student's t-test. **Results**: Children with the pentavalent vaccine, better quality of life and mothers with facility in terms of caring for were favorable to child development, while health problems and rejection of school represented negative factors. Health care, adaptation to remote learning, social support and financial stability during the pandemic also favored child development. **Conclusions**: Thus, the promotion of child development must permeate health care, quality of life and the child's social context.

KEYWORDS: COVID-19. Child. Child Development. Health-Related Behaviors. Health Level. Quality of Life. Social Conditions.

RESUMO: **Objetivo**: Estudo transversal, que objetivou analisar determinantes relacionados com o desenvolvimento de crianças pré-escolares na volta às aulas após o confinamento da COVID-19 no Brasil. **Metodologia**: Indicadores do desenvolvimento das crianças (desenvolvimento geral, capacidades, dificuldades e necessidades especiais de saúde) foram expressos em escores e suas médias analisadas segundo fatores biológicos, condições de saúde, cuidado materno, qualidade de vida e repercussões da pandemia da COVID-19, por meio do teste *t-student*. **Resultados**: Crianças com a vacina pentavalente, melhor qualidade de vida e de mães com facilidade para prestar cuidados mostraram-se favoráveis ao desenvolvimento infantil, enquanto problemas de saúde e rejeição à escola representaram fatores negativos. Os cuidados de saúde, a adaptação ao ensino remoto, o apoio social e a estabilidade financeira durante a pandemia também favoreceram o desenvolvimento infantil. **Conclusões**: Assim, a promoção do desenvolvimento infantil deve perpassar pelos cuidados de saúde, a qualidade de vida e o contexto social da criança.

PALAVRAS-CHAVE: Comportamentos Relacionados com a Saúde. Condições Sociais. COVID-19. Criança. Desenvolvimento Infantil.

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INTRODUCTION

The first five years of life are recognized as a crucial period for children's development, with an impact on health, well-being, learning, education and productivity in the short and long terms[1-5]. Nonetheless, at least 250 million children under the age of five in low- and middle-income countries (43%) are exposed to poverty or stunting, and therefore at risk of not reaching their developmental potential[1,2]. Globally, it was estimated that 52.9 million children under the age of five were developmentally delayed in 2016, mainly concentrated in developing countries[4]. Despite the fact that these countries are basically vulnerable, children around the world are exposed to adverse factors that impair their optimal development, intensified by the marked susceptibility to environmental influences, characteristic of childhood[1,2]. Conversely, the development process is stimulated by access to quality early childhood education services[6].

Child development can be affected by a combination of environmental, socioeconomic, nutritional and social factors, during pregnancy and the first years of life, such as poverty, lack of public security, low maternal education, insufficient birth weight, suboptimal breastfeeding, inadequate nutrition, child growth deficit, lack of responsive and loving care, absence of positive stimuli and learning opportunities, mental health problems, adverse experiences and exposure to toxic stress[1,2,5-7]. Nonetheless, most research on parenting practices and child development has been conducted in North America and Europe, with empirical evidence from Latin American countries being scarce[4].

Toxic stress occurs in highly stressful and frequent situations that involve the intense and prolonged reactivity of the body, without the presence of protective mechanisms from stressful events, threatening the ability to adapt and generating exhaustion. This state has several deleterious consequences for development and health[8].

Wars, natural disasters and pandemics are considered adverse events that can also contribute to potential damage to child development, since they can affect the environmental and social context, as well as family relationships[9]. These circumstances represent adverse psychosocial experiences, particularly harmful in developing children, and can trigger stress in both caregivers and children. In cases of high and continuous exposure, stress can become toxic, causing significant psychological and emotional distress, anxiety, depression and panic[10-12]. This scenario also predisposes to changes in physical activity and sleep that are essential for development[11]. The risk of developmental delays increases with the degree of exposure to toxic stress and adverse experiences, resulting in potential impairments to brain and cognitive development, physical and mental health, as well as in the onset of chronic diseases and illicit drug use[10].

The COVID-19 pandemic resulted in the adoption of non-pharmacological measures to cope with it. In order to control the spread and contain the disease, social distancing and isolation, namely the closure of educational establishments and the restriction of leisure areas, have had consequences on education, language development, nutrition, access to essential health care, childhood vaccination rates, family life, social relationships, behaviors and daily routines[2,3,12-16].

With the closure of schools, children had their routine compromised, namely leaving home, going to school, participating in activities outside the classroom, carrying out outdoor activities, playing with other children and even meeting friends. In addition, the quantity and quality of sleep underwent changes[2,10,13-15].

The pandemic also had repercussions on the family care routine of children (e.g., cognitive, affective and physical stimuli)[2,14,15,17]. In addition, the experiences of the pandemic generated mental and emotional consequences among parents, such as fear, stress, anxiety, and depression, which can

generate adverse experiences and the risk of toxic stress in children[10]. Therefore, the pandemic has had repercussions on children's lives, with implications for their physical and mental health, as well as their intellectual, physical and emotional development[2,10,11,13,15-17].

Containing the disease also required a high ability for resilience from caregivers to include in their routine, while distancing themselves from people, sanitary measures to prevent contagion, such as hand hygiene, use of antiseptics and wearing masks[10,12,16]. Particularly in children, these habits are not always understandable to them[12]. Thus, managing children's activities and behaviors was even more challenging during confinement than usual, especially in the presence of additional family stressors and when parents had to work[18].

Current evidence suggests negative impacts of the COVID-19 pandemic and its containment measures on child development, mainly on vulnerable children, who even before the pandemic were at higher risk of compromised development[3,16]. Specifically, it is estimated that school closures have resulted in 10.75 million children having their developmental potential impaired[6]. However, so far, the repercussions of the COVID-19 pandemic on the development of children in vulnerable situations, namely preschoolers, are not yet fully understood, revealing a lack of empirical studies on the topic[3,10]. In addition, face-to-face studies with young children and analyses of long-term effects are still scarce[3,10,12].

Given the relevance of knowing the impact of the COVID-19 pandemic on child development, especially for vulnerable groups[3,10,12,16], the current study aims to analyze determinants related to the development of preschool children returning to school after the COVID-19 confinement in Brazil. Understanding the repercussions of the COVID-19 pandemic on child development can help us to plan and implement strategies to support families to cope with the adversities caused by the disease, recover themselves and promote the healthy development of their children.

METHODOLOGY

Study design

This is a cross-sectional study nested in a cohort of live births designed to prospectively investigate determinants of child growth and development19. The children in the cohort were born in 2018 at the Mamanguape General Hospital and lived in the municipality of Mamanguape, Paraíba, headquarters of the aforementioned hospital, about 60 km from the state capital. Of the total of 335 children eligible for the study, 95 were excluded (mother under 18 years of age, congenital malformation, twins, referred to the Neonatal Intensive Care Unit, neonatal death, birth before the 37th week of pregnancy, birth weight less than 2,500g) and 35 mothers did not accept to participate in the research. Of the total number of children who started the study (n = 205), 61 were lost to follow-up and 144 were evaluated in the sixth month of life. Initially, the cohort intended evaluations at birth, in the 1st, 2nd and 6th month and at the thousand days of life of the children. However, the follow-up at two years of age of the children had to be interrupted as a consequence of the onset of the COVID-19 pandemic.

In order to continue the cohort[19], the previous reference design was reformulated for the purpose of examining implications of the COVID-19 pandemic on children's growth and development. The data were collected in the five municipal schools in the municipality of Mamanguape with pre-school education, where, in general, children born in the municipality start their studies between four and six years of age. The children were recruited at the age of four on their return to school after prolonged confinement at home during the COVID-19 pandemic, with data collection in August 2022.

Data collection

For data collection, a structured questionnaire with information regarding the children was used, applied to the mothers and children. The children's development was evaluated using questionnaires validated in Brazil[20-25].

Sociodemographic factors include gender and race and were self-reported by the mothers. Health conditions included any health problems at birth, hospitalization since birth for a minimum of 24 hours and immunization for the pentavalent vaccine. Information related to the child's vaccination was obtained from the child's health booklet. The child's maternal care was evaluated by the facility (or difficulty) of caring for the child and guiding the child about health aspects, as well as the routine of doing activities and playing with the child. The answers to these questions included "Yes" and "No" as alternative answers. The questions related to the children's quality of life were elaborated by the researchers. The children were asked if they like the things they do at home and the school activities, as well as if they feel loved by their families. In addition, along with these questions, the mothers were asked if their children had already presented any rejection to the school with three alternative answers ("Yes, often", "Yes, sometimes" and "Never"), grouping for analysis "Yes, often" and "Yes, sometimes".

The repercussions of the COVID-19 pandemic included questions about the routine of wearing masks and washing hands, the difficulty of adapting to remote teaching during the isolation period and the social support received from family and friends. The questions were elaborated with three answer alternatives ("Very Little", "Little" and "Very Much"), grouping "Very Little" and "Little" for analysis. In addition, we asked about the mother-child coexistence during the isolation period, with alternatives of "Good" and "Regular/Bad" answers, and if any family member lost his/her job or there was a reduction in income in the family, with alternatives of "Yes" and "No" answers.

In order to evaluate the children's development, four indicators were considered: I. Overall development, II. Abilities, III. Difficulties and IV. Special health needs. The instruments used were the Questionnaire for the Evaluation of Child Development (QAD-PIPAS)[20], the Questionnaire of Abilities and Difficulties (SDQ)[21-23] and the Questionnaire for the Screening of Children with Special Health Needs (CSHCN Screener)[24,25] for overall development, abilities and difficulties, and special health needs, respectively.

The Questionnaire for the Evaluation of Child Development is an instrument based on measures of children's behavior consisted of four domains of child development: motor, cognitive, language and socio-affective. The number of questions depends on the age of the child (25-30 months: 19 questions, 31-36 months: 21 questions, 37-48 months: 17 questions, 49-59 months: 24 questions). The questions are answered with a value of 0 (not adequate) or 1 (adequate), enabling each child to obtain a score corresponding to the total sum of the points obtained. Accordingly, the minimum and maximum possible scores were 0 and 24, respectively, being higher scores indicative of better development[20].

The Questionnaire of Abilities and Difficulties is an instrument of free use (https://youthinmind.com/products-and-services/sdq/) to measure the psychological well-being of children and adolescents. In this study, the two- to four-year-old version on psychological attributes for parents was used (https://sdqinfo.org/py/sdqinfo/b3.py?language=Portugueseqz(Brazil)). The questionnaire comprises five subscales (emotional symptoms, behavioral problems, hyperactivity, peer relationship problems and pro-social behavior), which result in two domains: abilities (pro-social behavior) and difficulties. Each subscale is made up of five items, totaling 25 questions, of which five correspond to abilities and 20 to difficulties. The questions are answered with the value 0 (false), 1 (more or less true) or 2 (true), with the items "usually obedient and does normally what adults ask of him/her",

"has at least one good friend" and "in general, is liked by other children" inverted. For each child, scores of abilities and difficulties were obtained, corresponding to the total sum of the points obtained in their items. Accordingly, the minimum and maximum possible scores were 0 and 10 for abilities and 0 and 40 for difficulties, respectively. The higher the score, the more pronounced abilities and difficulties. For categorization, scores ≥ 5 and ≥ 16 were considered as high levels of abilities and difficulties, respectively (https://sdqinfo.org/py/sdqinfo/c0.py) [21-23].

The Screening of Children with Special Health Needs is an instrument for screening children with health needs due to chronic, physical, developmental, behavioral or emotional conditions that require special health care in three domains: dependence on medications prescribed for a certain clinical condition, use of health services above what is considered normal or routine and presence of functional limitations. It consists of 14 questions with alternative answers "no" and "yes" (special need), five of which are main and nine are conditional (four of the main questions include two conditional questions; the other main question includes a conditional one). A value of 0 was assigned to the questions answered as "no" and 1 to the "yes" answers, enabling each child to obtain a score corresponding to the total sum of the points obtained. Accordingly, the minimum and maximum possible scores were 0 and 14, respectively, with higher scores indicating greater special health needs. For categorization, when at least one main question and its conditional (s) was (were) answered positively, it was classified as special health need (special health need in at least one of the domains).

Data analysis

The independent variables characterizing the children used in the analyses were: gender (male, female), race (white, brown/black/yellow/indigenous), health problems at birth (no, yes), hospitalization for a minimum period of 24 hours since birth (no, yes), immunization for the pentavalent vaccine (complete schedule, incomplete schedule), mother's facility in terms of caring for the child and guiding him/her in health aspects (yes, no), mother's routine for doing activities and playing with the child (yes, no), likes the things she does at home (yes, no), feels loved by the family (yes, no), likes school activities (yes, no), rejection of school (no, yes), routine of wearing masks during the COVID-19 pandemic (much, little/very little), routine of washing hands during the COVID-19 pandemic (much, a little/very little), difficulty in terms of adapting to remote learning during the isolation period (little/very little, much), mother-child coexistence during the isolation period (good, regular/bad), social support received from family members during the COVID-19 pandemic (much, little/very little), social support received from friends during the COVID-19 pandemic (much, little/very little), a family member lost his/her job or there was a reduction in family income during the COVID-19 pandemic (no, yes).

The means of the overall development, abilities, difficulties and special health needs scores were analyzed according to the children's characterization variables. The mean scores of the development indicators were also analyzed among themselves: overall development, abilities and difficulties, according to the screening of special health needs (no, yes); overall development, according to the level of abilities (high, low) and difficulties (low, high) and abilities, according to the level of difficulties (low, high). The means were compared using the Student's t-test. The statistical significance criterion was set at $p < 0.05$. The analyses were conducted using the Stata statistical package, version 11.0.

Ethical aspects

The study was conducted under the guidelines of Resolution 466/2012 of the Brazilian National Health Council. The children's mothers signed the Free and Informed Consent Form as a precondition for participating in the study after being informed about the goals, procedures and advantages of their participation. The research projects were approved by the Research Ethics Committee of the State University of Paraíba (CAAE 81216417.0.0000.5187, Opinion 2.447.509, and CAAE 53281421.8.0000.5187, Opinion 5.137.768).

RESULTS

A total of 126 preschool children participated in the study, whose distribution according to the characteristics of the children is displayed in Table 1. As observed, the most prevalent negative health condition was hospitalization since birth for a minimum period of 24 hours (38.9%). Regarding maternal care, 19.0% of the mothers answered that they did not find it easy to take care of the child and guide him/her in terms of health aspects. Regarding quality of life, 29.9% and 27.8% of the children answered that they did not like the things they do at home and did not like the school activities, respectively, while not feeling wanted was reported by 17.5% of them. Moreover, 38.1% of the children experienced rejection of school. During the COVID-19 pandemic, 82.5% of the children wore masks in their routine and 78.6% washed their hands regularly. The difficulty in terms of adapting to remote teaching was manifested by 44.4% of the mothers, while the problems of living with the child were identified in 38.1% of the mothers. Only 52.4% of mothers said they had received sufficient support from friends during the pandemic; and, in 53.2% of the families, a member lost his/her job or there was a reduction in income.

The analysis of the children's development indicators showed that females ($p = 0.024$) represented significantly greater overall development, while males ($p = 0.015$) had greater special health needs. Overall development was significantly higher among children with a complete pentavalent vaccine immunization schedule ($p = 0.003$). They represented higher means of difficulties, health problems at birth ($p = 0.047$) and hospitalization for a minimum period of 24 hours from birth ($p = 0.026$). Children with health problems at birth ($p = 0.004$), hospitalization for 24 hours or more since birth ($p = 0.001$) and incomplete immunization schedule for the pentavalent vaccine ($p < 0.001$) had greater special health needs. The mother's facility in terms of caring for the child was positively associated with all indicators, while stimulation (the mother's routine to do activities and play with the child) favored the levels of abilities ($p = 0.013$) and difficulties ($p = 0.003$). All variables on quality of life indicated significant differences in overall development and abilities; and, additionally, rejection of school represented higher means of difficulties and special health needs (Table 1).

Regarding the repercussions of the COVID-19 pandemic (Table 1), the routine of wearing masks ($p = 0.042$, $p = 0.015$), the routine of washing hands ($p = 0.041$, $p = 0.045$), the social support received from family members ($p = 0.035$, $p = 0.002$) and the social support received from friends ($p = 0.001$, $p = 0.048$) obtained significantly higher means of overall development and abilities; the absence of routine health care and the lack of social support determined greater difficulties and special health needs. When there was difficulty in terms of adapting to remote teaching, the mean of abilities was significantly lower ($p = 0.041$), while the mean related to special health needs was higher ($p = 0.043$). In families in which a family member lost his/her job or there was a reduction in income, the means of difficulties ($p = 0.007$) and special health needs ($p = 0.018$) were higher and the mean of abilities ($p = 0.013$) was lower.

Concerning the analysis of the children's development indicators (Table 2), the means of overall development ($p < 0.001$) and abilities ($p < 0.001$) were higher in the case of children not identified with special health needs, while the mean number of difficulties ($p < 0.001$) was higher in children with positive screening for special health needs. Similar results were found for the means of the other indicators, with the overall development of children with a high level of abilities ($p < 0.001$) and a low level of difficulties ($p < 0.001$) being better.

DISCUSSION

The findings of this study revealed that the child's health conditions (absence of health problems at birth, absence of hospitalization for a minimum period of 24 hours from birth, complete immunization schedule for the pentavalent vaccine), maternal care and the child's quality of life enhanced the development of children at four years of age, after the prolonged confinement at home during the COVID-19 pandemic and return to school. Conversely, the routine of wearing masks and washing hands, social support, facility of adaptation to remote learning and maintaining the family's employment/income during the pandemic represented favorable conditions for child development. These results highlight the importance of meeting children's needs in terms of health, care and well-being, while valuing the social and economic support of caregivers, in order to promote healthy child development[1,17,26].

The current study provides an analysis of the children's development that resulted in mean scores of 16.309 ± 3.511 for overall development; 7.683 ± 2.07 for abilities; 14,000 ± 7,794 for difficulties and 2,103 ± 3,883 for special health needs, which represents 67.9%, 76,8%, 65.0% and 85.0% of the maximum development potential according to the indicators of interest, respectively. The impaired development of Brazilian children was also highlighted in the state of Ceará[4], in the city of Matinhos (PR)[7] and in the municipality of Itupeva (SP)[27]. Globally, 52.9 million children under the age of five had developmental delays in 2016, allowing us to identify that the improvement since 1990 has been minimal[28]. It is possible that the COVID-19 pandemic may have hindered potential advances in child development[3,6,16].

A study carried out with Italian children showed that development during pandemic social distancing suffered negative repercussions and that they were intensified with the imposition of more severe restrictions[9]. This study does not allow us to establish the consequences of the pandemic on children's development, but it signals the need to foster their potential, in correspondence with others in which the pandemic is highlighted by possible negative impacts in this regard[29,30]. Thus, it is evident the relevance of better understanding the factors related to child development[27], particularly the understanding of the impact of restrictive measures, in order to contribute to decisions about the strategies that should be prioritized to mitigate the repercussions of the pandemic and ensure the healthy development of children[2,10].

Child health is associated with early development, with repercussions on the child's behaviors, quality of life and well-being[31]. When children are afflicted with illness and when hospitalization is necessary, it is possible that developmental opportunities associated with disruption in communication, social environment and daily activities may be missed due to the demand for continuous medical consultations, procedures and treatments, which are still possible sources of stress[26,27,31]. The findings of this study highlighted developmental impairments among children with special health problems and needs. These results support the poorer development associated with hospitalization and frequent and

long-term hospitalizations observed in Australian children who participated in a longitudinal cohort study[27]. They also corroborate the association of prolonged hospitalization and infectious processes after birth with lower developmental scores found in a population-based study with children aged 0 to 66 months living in the State of Ceará, Brazil[5].

Thus, interventions to support the development and well-being of children with health problems are necessary, including the role of health professionals in the identification, prevention and treatment of diseases[31,32]. This recommendation should be especially considered in the context of the COVID-19 pandemic that has worsened access to health services, medical care and psychological support, as well as restricted school reception, while changing maternal and child life[2,3,10,11,15,16]. Children with additional health needs and/or special needs have been impacted more severely by the COVID-19 pandemic[16].

Research on parenting behaviors has shown better results in child development when there is greater parental involvement, playful interactions, playfulness and positive practices in terms of child care[4,26,33,34]. Additionally, a systematic review and meta-analysis found that parenting interventions improve parent-child interactions and children's development[35]. The findings of the current study are in addition to the previous ones, as the mothers who answered that they found it easy to stimulate the child (care, guide and play), as well as the children who said they liked the things they do at home and reported that they felt loved by the family, reached higher levels of overall development and/or abilities and fewer difficulties and/or special health needs.

An interpretation similar to the previous one can be emphasized for the characteristics related to the COVID-19 pandemic, since conditions that express the parents' ability to take care of the children and to adapt to difficult or stress-generating situations imposed by the pandemic discriminated better development indicators in the children in this study: I. The good coexistence of the mother with the child represented a higher overall development score and a decrease in special needs; II. The child's routine to use protective measures, such as masks and hand washing, determined better development in all indicators of interest; III. The difficulty in terms of adapting to remote teaching was significantly associated directly with the level of abilities and indirectly with the level of difficulties.

Caregivers play a fundamental role in the child's environment, which needs support, affection, positive influences, responsive care and stimulus to outline the structuring of relationships, bonding, connection and security necessary for healthy development. The involvement of parents with their children in terms of stimulating activities, such as reading, singing and storytelling, as well as exposure to diverse experiences and games that facilitate interaction between them, brings benefits to child development[4,26,33,34,36].

During the pandemic, confinement measures led to marked deprivation of social relationships, family ties and stimuli, with negative repercussions on children's development. For mothers, the pandemic may have caused social (irregularity of social assistance and estrangement from family members), financial, emotional, psychological and health limitations, as well as in terms of access to essential services, concomitant with greater concerns and demands for domestic work, school responsibilities and child care, with possible negative repercussions on child care[2,9,10,17,31]. Specifically, mothers with mental health problems may compromise their child's care as a result of changes in mother-child interactions, decreased attachment, lack of stimulation to pay attention to the child and less involvement in responsive stimulation[17].

Thus, measures to support the needs of families were important during the pandemic, such as the inclusion of benefits to help with child care while early childhood education schools were closed in high-income countries[37]. Parents may need additional support, whether due to stress, motivational issues, their skills and available resources[36].

However, in Brazil, support measures for child care[2] have not been implemented. Accordingly, parents weakened by the pandemic had to look for new arrangements to take care of their children with the support of family members[30]. Thus, the relationship between social support and all the children's development indicators in this study is justified. Therefore, It is evident that facing the consequences of social distancing involves valuing the family's interaction with the child based on affection, interaction and stimulating play[2,13]. Young children depend on the care of their parents or other adults, and therefore they experience the repercussions of restrictive measures through their caregivers' ability to provide responsive care[17]. Especially, boys seem to be more susceptible than girls to the influences of the environment, demanding greater attention from the family context as a tool to promote development, as suggested by this research by highlighting more favorable overall development and special health needs scores for females[33].

Thus, the importance of health promotion for the study population should be highlighted. In this sense, it is necessary to consider opportunities that drive good health, responsive care, good opportunities for early learning, adequate nutrition, as well as security and protection, which represent the essential components of the child's development[1]. Parenting interventions aimed at improving caregivers' knowledge, attitudes, practices and abilities related to child development have consistently shown positive results[35].

In the factors related to the quality of life of the children in the current study, satisfaction with school (liking school activities and rejection of school) was another condition that also showed its relevance in the developmental potential. This result reinforces the literature by highlighting the influence of early childhood education on the development of early competencies and on the physical, psychological, behavioral and educational outcomes of children[36,38].

This evidence may reflect the importance of the school environment in the socialization process, for playing and relating, in the acquisition of knowledge, for physical fitness, emotional well-being and mental health, whose relevance for full development in all aspects of life is unquestionable[9,13,36]. Schools with positive and responsive climates support students' social and emotional development[36]. Educators are important for students' motivation, involvement, development of supportive and culturally responsive relationships, learning, self-regulation, self-esteem, self-confidence, positive behavior, emotional balance and psychological support[36,39]. During the socialization of children with their peers, significant learning for development occurs, such as cooperation, involvement, emotional and intellectual security, living with differences, dealing with expectations and frustrations, facing challenges, negotiating conflicts, waiting for their turn, impulse control, sharing decisions; among other abilities that promote self-esteem, satisfaction and school involvement[8,13,36]. In turn, social isolation can raise levels of childhood stress hormones, such as cortisol and adrenaline, and consequently interfere with child development[13], while rejection of school can deregulate stress responses and have significant effects on physical and mental health[36].

The relevance of the school is also visible through a survey carried out in China at the beginning of the pandemic, where psychological and behavioral problems were found in children, such as physical discomfort, lethargy, agitation, worry, fear, anxiety, stress, sleep disorders and excessive dependence on parents[40]. Behavioral and emotional disturbances in children during the COVID-19 epidemic were also present among Brazilian children[13,29,30]. One study estimated that 10.75 million children worldwide could lose their direction in their early development as a result of early childhood education school closures in the first 11 months of the pandemic, mostly in low- and lower-middle-income countries, exacerbating global inequalities.

In this sense, it is considered that early childhood education centers can play a more important role in the protection and promotion of child development during the pandemic[6], strengthening the meaning of the findings of the current study related to the importance of the school context (liking for school activities, rejection of school and difficulty in terms of adapting to remote teaching during the isolation period) in the child's development, as well as in relation to the socio-emotional abilities and difficulties on the part of children as explanatory conditions of their overall development.

Children and their development have been more impacted by the pandemic if they come from economically disadvantaged classes and lower-income countries[16,28]. The pandemic has widened social inequalities that reduce the opportunities of disadvantaged populations and their children to achieve their full development[2,16]. This evidence may justify the negative effect on the development of children in the current study from families in which some member lost his/her job or had a reduction in income, corroborating the findings in other locations that show a more marked developmental delay in children from less favored economic groups[7,27]. Conversely, results of a study developed in São Paulo pointed out that the pandemic did not affect child development, possibly due to the participating families being of upper middle income and without social vulnerability, whose profile promotes better child development[41]. Socioeconomic vulnerability, in addition to limiting access to essential services, influences both physical conditions and resource attainment, child care practices, and mental health, which are necessary to adequately promote child protection and stimulation[7,17,31,34,36,38].

This study is one of the first evaluations on the development of preschool children in the return to school after the COVID-19 confinement in Brazil, allowing the planning and implementation of strategies to deal with the characteristics of the family, its life context and adversities caused by the pandemic, with the intention of promoting the child's development. Nonetheless, the results should be interpreted with caution, as the design does not allow the analysis of child development trajectories over time or establish a cause-effect relationship. The small number of schools evaluated, and coming from only one municipality, is also a limitation of the study, which may have contributed to the low variability of the data, although it was sufficient to guarantee the statistical power of the results. In addition, the findings may not be generalizable to children in other contexts. There is also the possibility that the grouping of races has masked significant differences between different groups, such as blacks and browns, for example. Therefore, future research with longitudinal data and population samples is essential to better understand the factors that influence children's development over time, in order to evaluate the repercussions of the pandemic and to verify, eventually, the benefits of re-entering school.

CONCLUSION

The analysis of factors related to the development of preschool children returning to school after the COVID-19 confinement in Brazil showed that better child health conditions, greater maternal ability for child care and child satisfaction in relation to family and school life enhanced positive results. In addition, health care (wearing masks and washing hands), social support, facility of adaptation to remote learning and maintaining employment and family income during the COVID-19 pandemic confinement were associated with greater development of children. These results suggest the need for strategies aimed at promoting maternal care and well-being of children in vulnerable situations, particularly for cases in fragile situations, such as the presence of health problems, while valuing the social and economic support of caregivers, in order to promote healthy child development. Further studies should include the promotion of child development, especially at early ages.

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Table 1. Development of preschool children according to characteristics of children related to biological factors, health conditions, maternal care, quality of life and repercussions of the COVID-19 pandemic. Mamanguape, PB, 2022.

Variables	n	%	Overall Development (16.309 ± 3.511)			Abilities (7.683 ± 2.077)			Difficulties (14.000 ± 7.794)			Special Health Needs (2.103 ± 3.883)		
			Mean	Standard Deviation	p-value	Mean	Standard Deviation	p-value	Mean	Standard Deviation	p-value	Mean	Standard Deviation	p-value
Sociodemographic factors														
Gender					**0.024**			0.356			0.284			**0.015**
Female	66	52.4	16.893	2.898		7.716	2.036		13.621	7.524		1.394	2.914	
Male	60	47.6	15.666	4.007		7.542	2.284		14.417	8.125		2.883	4.629	
Race					0.418			0.357			0.244			0.400
White	38	30.2	16.210	3.587		7.579	2.213		13.395	8.487		2.237	3.914	
Brown/Black/Yellow/ Indigenous	88	69.8	16.352	3.497		7.727	2.027		14.261	7.512		2.045	3.892	
Health conditions														
Health problem at birth					0.364			0.096			**0.047**			**0.004**
No	112	88.9	16.348	3.373		7.768	2.049		13.589	7.635		1.786	3.489	
Yes	14	11.1	16.000	4.607		7.000	2.253		17.286	8.561		4.643	5.773	
Hospitalization for a minimum of 24 hours from birth					0.462			0.286			**0.026**			**0.001**
No	77	61.1	16.285	3.335		7.766	1.959		12.143	7.650		1.312	3.151	
Yes	49	38.9	16.346	3.805		7.551	2.264		16.347	7.907		3.347	4.581	
Immunization for pentavalent vaccine					**0.003**			0.247			0.130			**0.000**
Complete schedule	113	89.7	16.592	3.086		7.726	2.019		13.735	7.771		1.735	3.402	
Incomplete schedule	13	10.3	13.846	5.669		7.308	2.594		16.308	7.920		5.308	6.060	
Maternal care														
Facility of the mother to take care of the child and guide him/her in health aspects					**0.047**			**0.002**			**0.008**			**0.037**
Yes	102	81.0	16.549	3.271		8.167	1.706		13.196	7.494		1.804	3.543	
No	24	19.0	15.191	4.318		7.150	2.320		17.417	8.277		3.375	4.977	

Mother's routine to do activities and play with the child					0.163			**0.013**			**0.003**			0.251
Yes	118	93.7	16.389	3.434		7.788	2.062		13.602	7.506		2.042	3.830	
No	8	6.3	15.125	4.611		6.125	1.727		19.875	9.049		3.000	4.811	
Quality of life														
She likes the things she does at home					**0.002**			**0.048**			0.291			0.377
Yes	68	70.1	17.323	2.836		7.926	1.957		13.191	7.193		1.853	3.266	
No	29	29.9	14.448	2.983		7.130	2.173		14.103	8.112		1.620	3.560	
She feels loved by her family					**0.012**			**0.006**			0.166			0.458
Yes	80	82.5	17.075	2.915		7.975	1.955		13.125	7.560		1.800	3.289	
No	17	17.5	15.294	2.995		6.647	2.090		15.059	6.887		1.706	3.670	
She likes school activities					**0.002**			**0.009**			0.128			0.477
Yes	70	72.2	17.285	2.909		8.043	1.876		12.929	6.800		1.771	3.240	
No	27	27.8	15.407	2.818		6.963	2.244		14.852	8.909		1.815	3.648	
Rejection of school					**0.000**			**0.000**			**0.000**			**0.012**
No	78	61.9	17.166	2.540		8.128	1.768		12.205	6.723		1.500	2.944	
Yes	48	38.1	14.916	4.360		6.958	2.343		16.917	8.572		3.083	4.933	
Repercussions of the COVID-19 pandemic														
Routine of wearing masks					**0.042**			**0.015**			**0.037**			**0.000**
Much	104	82.5	16.557	3.332		7.865	2.034		13.229	7.720		1.558	3.329	
Little/very little	22	17.5	15.136	4.143		6.818	2.108		16.527	7.940		4.682	5.195	
Routine of washing hands					**0.041**			**0.045**			**0.046**			**0.018**
Much	99	78.6	16.575	3.398		7.938	1.988		13.405	7.672		1.727	3.599	
Little/very little	27	21.4	15.033	3.802		7.011	2.326		15.914	8.115		3.481	4.602	
Difficulty in terms of adapting to remote teaching during the isolation period					0.285			**0.041**			**0.043**			0.379
Little/very little	60	55.6	16.683	3.143		8.067	2.049		12.367	7.344		1.917	3.941	
Much	48	44.4	16.312	3.632		7.354	2.178		14.946	8.001		2.146	3.713	
Mother-child coexistence during the isolation period					**0.047**			0.438			0.151			**0.011**

Good	78	61.9	16.666	3.325		7.705	1.948		13.436	7.486		1.487	3.086	
Regular/bad	48	38.1	15.297	3.757		7.646	2.292		14.917	8.269		3.104	4.781	
Social support received from family members					**0.035**			**0.002**			**0.003**			**0.002**
Much	94	74.6	16.638	3.036		7.989	1.852		12.926	6.647		1.543	3.127	
Little/very little	32	25.4	15.343	4.555		6.781	2.446		17.156	9.932		3.750	5.267	
Social support received from friends					**0.001**			**0.048**			**0.015**			**0.002**
Much	66	52.4	17.182	2.625		7.924	1.884		12.576	6.995		1.167	2.658	
Little/very little	60	47.6	15.350	4.091		7.147	2.257		15.567	8.369		3.133	4.703	
She has a family member who has lost his/her job or there has been a reduction in income in the family					0.171			**0.013**			**0.007**			**0.018**
No	56	46.8	16.627	2.722		8.119	1.801		12.220	7.142		1.339	2.850	
Yes	67	53.2	16.029	4.082		7.299	2.236		15.567	8.057		2.776	4.522	

Table 2. Means of the scores of the indicators of the development of preschool children analyzed among themselves (overall development, abilities and difficulties, according to screening of special health needs; overall development, according to level of abilities and difficulties; abilities, according to the level of difficulties). Mamanguape, PB, 2022.

Indicators	**n**	**%**	**Overall Development** (16.309 ± 3.511)			**Abilities** (7.683 ± 2.077)			**Difficulties** (14.000 ± 7.794)		
			Mean	**Standard Deviation**	**p-value**	**Mean**	**Standard Deviation**	**p-value**	**Mean**	**Standard Deviation**	**p-value**
Abilities					**0.000**	-	-	-	-	-	-
High	114	90.5	16.798	2.939		-	-	-	-	-	-
Low	12	9.5	11.667	5.033		-	-	-	-	-	-
Difficulties					**0.000**			**0.000**	-	-	-
Low	76	60.3	17.789	2.168		8.500	1.509		-	-	-
High	50	39.7	14.060	3.961		6.440	2.215		-	-	-
Special health needs					**0.000**			**0,000**			**0.000**
No	93	73.8	17.172	2.676		8.065	1.846		11.613	6.347	
Yes	33	26.2	13.878	4.392		6.606	2.331		20.727	7.633	