



Repercussions of the pandemic on child development and the actions of visitors to the Happy Kids Program^a

Repercussões da pandemia no desenvolvimento infantil e nas ações dos visitantes do Programa Criança Feliz

Repercusiones de la pandemia en el desarrollo infantil y en la actuación de los visitantes del Programa Niño Feliz

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ABSTRACT

Objective: to apprehend the repercussions of the COVID-19 pandemic on child development and on the actions of the Happy Child Program visitors. **Method:** qualitative research, anchored in Bronfenbrenner's Bioecological Theory of Human Development, with eight visitors from the aforementioned program, in a city in Paraíba. Data were collected from January to June 2021, using a semi-structured script, with interviews recorded and processed by IRAMUTEQ, which were later analyzed according to the Descending Hierarchical Classification (Reinert's method), and the Bardin's Content Analysis framework. **Results:** the repercussions of the pandemic limit the actions to promote child development by visitors, by hindering interaction with families surrounded by the fear of contracting the disease, incurring a break in the connection between visitors and family, a delay or absence of return of activities by families, feelings such as fear, discouragement, frustration, aggressiveness and attachment to screens as barriers to the continuity of child monitoring. **Final considerations and implications for practice:** learning about the repercussions of the COVID-19 pandemic on the development of children assisted by the Happy Child Program, provided an opportunity to reflect upon the strategies necessary to enhance Nursing practice in development surveillance and stimulation actions for comprehensive child health care.

Keywords: COVID-19; Child; Child development; Pandemics; Home visit.

RESUMO

Objetivo: apreender as repercussões da pandemia da COVID-19 no desenvolvimento infantil e nas ações de visitantes do Programa Criança Feliz. **Método:** pesquisa qualitativa, ancorada na Teoria Bioecológica do Desenvolvimento Humano de Bronfenbrenner, com oito visitadoras do referido programa, em uma cidade paraibana. Os dados foram coletados no período de janeiro a junho de 2021, por meio de um roteiro semiestruturado, com entrevistas gravadas e processadas pelo IRAMUTEQ, que posteriormente foram analisadas conforme a Classificação Hierárquica Descendente (método de Reinert), e referencial da Análise de Conteúdo de Bardin. **Resultados:** as repercussões da pandemia limitam as ações de promoção do desenvolvimento infantil pelos visitantes, ao dificultar a interação com as famílias cercadas pelo medo de contrair a doença, incorrendo em quebra de vínculo, demora ou ausência de retorno das atividades pelas mesmas, sentimentos como medo, desânimo, frustração, agressividade e apego às telas como barreiras para a continuidade do acompanhamento infantil. **Considerações finais e implicações para a prática:** apreender sobre a realidade das repercussões da pandemia da COVID-19 no desenvolvimento de crianças assistidas pelo Programa Criança Feliz, oportunizou refletir sobre as estratégias necessárias para potencializar a prática da Enfermagem nas ações de vigilância e estimulação do desenvolvimento para uma atenção integral à saúde da criança.

Palavras-chave: COVID-19; Criança; Desenvolvimento Infantil; Pandemias; Visita domiciliar.

RESUMEN

Objetivo: apreender las repercusiones de la pandemia de COVID-19 en el desarrollo infantil y en las acciones de los visitantes del Programa Niño Feliz. **Método:** investigación cualitativa, anclada en la Teoría Bioecológica del Desarrollo Humano de Bronfenbrenner, con ocho visitantes del mencionado programa, en una ciudad de Paraíba. Los datos fueron recolectados de enero a junio de 2021, a través de un guion semiestructurado, con entrevistas grabadas y procesadas por IRAMUTEQ, que posteriormente fueron analizadas según la Clasificación Jerárquica Descendente (método de Reinert), y el marco de Análisis de Contenido de Bardin. **Resultados:** las repercusiones de la pandemia limitan las acciones de promoción del desarrollo infantil por parte de los visitantes, al dificultar la interacción con las familias rodeadas por el temor de contraer la enfermedad, incurriendo en ruptura del vínculo, retraso o ausencia de retorno a las actividades por parte de los mismos, sentimientos como el miedo, el desánimo, la frustración, la agresividad y el apego a las pantallas como barreras para la continuidad del cuidado infantil. **Consideraciones finales e implicaciones para la práctica:** apreender la realidad de las repercusiones de la pandemia de COVID-19 en el desarrollo de los niños asistidos por el Programa Niño Feliz, brindó la oportunidad de reflexionar sobre las estrategias necesarias para potenciar la práctica de Enfermería en las acciones de vigilancia y estimulación del desarrollo para la atención integral de la salud infantil.

Palabras clave: COVID-19; Niño; Desarrollo Infantil; Pandemias; Visita Domiciliaria.

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INTRODUCTION

Early childhood, considered the first six full years of life, represents a neuro-psycho-social window of opportunity for healthy growth and Child Development (CD). Therefore, it is essential to structure and guarantee holistic care, based on the guidelines of the National Policy for Comprehensive Child Health Care (NPCCHC).¹

In this sense, the Happy Child Program (HCP) was created in 2016, updated by Decree No. 9,579/2018, with the purpose of promoting adequate, integral, and quality child development in that phase of susceptibility to the influence of external actions and stimuli, such as poverty and violence.²

However, despite the positive impact of this program within the Health Care Network (HCN), with the COVID-19 pandemic situation since 2020, social isolation has affected the population of children due to the discontinuity of daily activities, including monitoring by social programs, such as the HCP itself. This brought to light among the risk factors for CD, the absence of stimulation, domestic violence, neglect, abusive and coercive parenting, food insecurity, low schooling, unemployment or financial instability, and parental mental health problems.^{3,4}

Home visits carried out by HCP visitors began to be carried out remotely or in a semi-presential format during the pandemic situation. In cases where this format was not possible, the visit took place at the family's home following all precautions and measures to prevent the transmission of COVID-19 and to ensure care for the child.⁵

Experiencing social distancing in the face of a highly transmissible disease, such as COVID-19, can have lifelong negative consequences.^{6,7} As for CD, the pandemic situation can affect five domains of care and attention to this process: health, nutrition, responsive care, safety/protection, and timely learning, essential for children's socio-effective growth.^{7,8}

A study conducted in Shaanxi Province, China, found the repercussions of the pandemic on children and adolescents aged three to 18, related to emotional problems such as distraction, irritability, agitation, and fear of knowing about the pandemic, while in children aged three to six, excessive attachment to parents, fear of relatives getting sick and inattention prevailed.⁹

Although it is a theme widely studied in recent years, due to its global complexity in the different dimensions of humanity, investigations that directly address the repercussions of the COVID-19 pandemic on child development, specifically on HCP's actions, remain incipient in the scientific literature. In view of this, this research question is: What are the repercussions of the COVID-19 pandemic on CD and the actions of HCP visitors?

Given the inevitable repercussions for CD and the limitations of publications on this topic with the HCP audience, this study is justifiable in order to understand how children in social vulnerability face the reality, in order to qualify HCP professionals and strengthen the proposal to promote early childhood development.¹⁰

Therefore, the purpose was to understand the repercussions of the COVID-19 pandemic on child development and the actions of HCP visitors.

METHOD

This is a qualitative, exploratory-descriptive research, anchored in Bronfenbrenner's Bioecological Theory of Human Development (BTHD). It was designed in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ), in order to meet the research's methodological rigor.¹¹

Bronfenbrenner's Theory is explained by the PPCT model, where Process is the relationship between the individual and the context, contemplating their interactions and conditions with some implication for the individual's development; Person, the global, biological, cognitive, emotional, and behavioral characteristics; Context, the environments that make it possible to influence the development of the being; and Time, the temporality issues, establishing the chronosystem that dominates changes throughout life.¹²

Bronfenbrenner established four bioecological levels of interaction between the person and their context, which are: Microsystem, where the first interpersonal relationships are present; Mesosystem, which is the relationship between microsystems; Exosystem, which refers to the environment that the individual does not live directly and the Macrosystem, which influences the values and culture present in the child's daily life.¹²

The research was conducted with eight of the 12 HCP visitors from a municipality in *Curimataú Paraibano* (area of semi-arid climate in the state of Paraíba corresponding to 29 municipalities, in particular, Araruna and Cuité), selected systematically from a list provided by the HCP Management. Professionals with at least six months of experience in the Program were included, while four were excluded from the study due to not attending the interview after three appointments. It should also be noted that the data saturation criteria were not considered during the data collection.

As a data collection instrument, a semi-structured interview script was used, containing the participants' profile data (age group; marital status, education, family income, previous training to work in the HCP, and length of time working in the Program), and the respective guiding questions: Tell me what you understand by child development; Report on your monitoring of child development in the COVID-19 pandemic; Please describe your experiences as an HCP visitor during the pandemic.

Data collection took place from January to June 2021, after the pilot test, in two moments, due to the COVID-19 pandemic and the need to follow the health standards of social isolation. In the first one, participants were recruited remotely, by telephone and smartphone messaging apps, with three attempts being made at a 15-day interval for each visitor. At the time, the Free and Informed Consent Term (FICT) was presented or read and consent to participate was requested, followed by the interview schedule.

In the second moment, the interview was carried out remotely, via a message application, except for two, which took place in person at home, with privacy, following biosafety standards: a minimum social distance of 1.5m between the participant and the researcher, and the use of Personal Protective Equipment (PPE). Each participant was identified by the letter "V" for visitor, followed by the order number of the interview (Ex. V1, V2, V3 ...).

The interviews were recorded on digital media, with an average duration of 25 minutes, and later transcribed in full. The data were processed by the software *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (IRAMUTEQ), version 0.7 Alpha 2, a free open source program that allows statistical analysis of entirely qualitative data, organizing the distribution of words in an easily understandable and visually clear way. It should be noted that the data were peer-reviewed before and during processing.

The textual analysis was performed by means of the Descending Hierarchical Classification (DHC) proposed by Reinert's method, in which the text segments are classified according to their respective vocabularies, distributed in dendrograms and thematic classes, through their proximities and ramifications, being significant the words with a frequency equal to or greater than five, chi-square (χ^2) > 3.84 and p-value < 0.05; and, following the methodological framework of Bardin's Content Analysis,¹³ contemplating pre-analysis, categorization, and interpretation of the data with the literature. Its discussion was carried out in the light of BTHD, as previously mentioned.

This work is a by-product of the research entitled: "Early Childhood and COVID-19 Pandemic: Factors Associated with Possible Changes in Child Development and the Perception of Parents/Caregivers and Visitors of the Happy Child Program", approved by the Ethics Committee of the Alcides Carneiro University Hospital (CEP/HUAC) under opinion No. 4,487,671.

RESULTS

Eight female health visitors participated in the study, ranging in age from 23 to 43 years, predominantly single, with a high school education and a family income of up to one minimum wage. Regarding the abilities to work in the PCF, all reported having completed training before starting the program, with duration of 18 to 36 months.

In the Descending Hierarchical Classification analysis, a general corpus consisting of eight texts was obtained, separated into 183 Text Segments (TS), with 147 TSs (80.33%), for which 5,923 occurrences (words, forms, or words) emerged. In the dendrogram, the corpus was divided into two sub-corpora: the first, Class 6 was obtained with 28 TS (15.7%), and a second subdivision, which encompassed Classes 2, with 28 TS (19.1%), and 4, with 21 TS (14.3%); the second, Class 3 was obtained with 21 TS (14.3%), with a subdivision consisting of Classes 5 with 31 TS (21.1%), and 1 with 23 TS (15.7%), as shown in Figure 1.

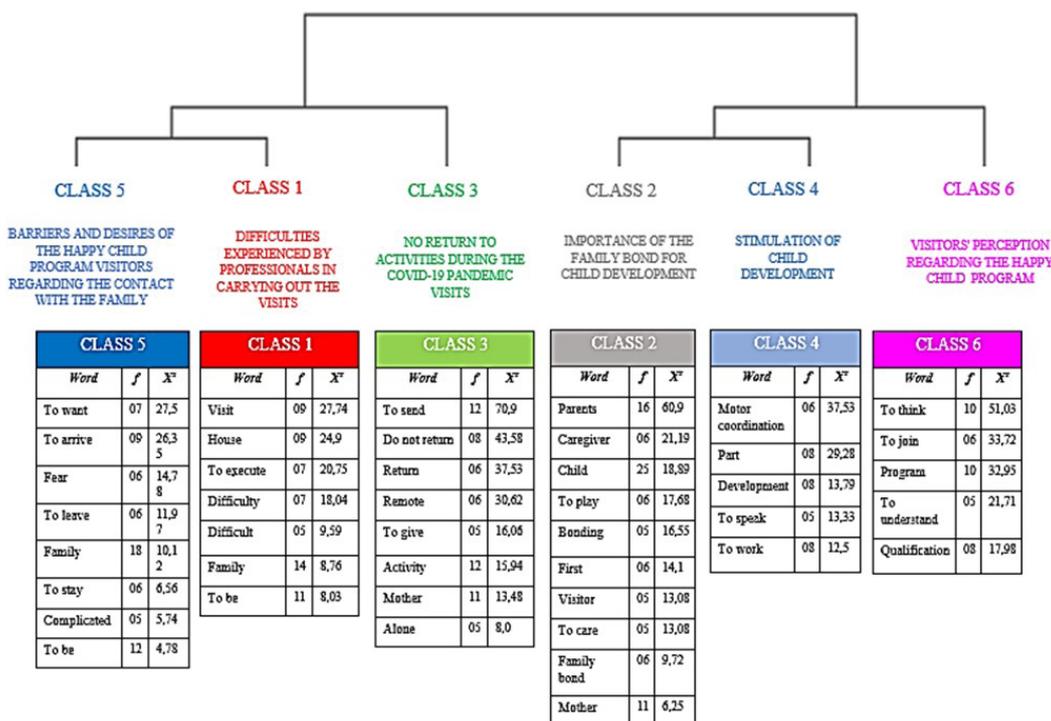


Figure 1. Dendrogram of class distribution according to the Descending Hierarchical Classification. Cuité, Paraíba, Brazil, 2020-2021. *f= frequency; X²= chi-square
Source: Survey data (2021).

Based on the analysis and understanding of the classes, it was possible to name them as follows: Class 1: difficulties experienced by professionals to carry out home visits; Class 2: the importance of the family bond for child development; Class 3: no return of activities during the COVID-19 pandemic; Class 4: stimulation of child development; Class 5: barriers and desires of the Happy Child Program visitors regarding the contact with the family; Class 6: visitors' perception regarding the Happy Child Program (Figure 1).

Then, based on Bardin's Content Analysis,¹³ two thematic categories were constituted. The first one, called "HCP visitors' actions to promote CD", comprised 49.1% (f = 72ST) of the total corpus analyzed, included classes 2, 4, and 6, and raised questions related to HCP visitors' perception of child development and how they see this process in home visits, considering the pandemic context. The second, entitled "Difficulties in carrying out the actions to promote CD during the COVID-19 pandemic", corresponded to the remaining 51.1% (f = 75ST) of the total corpus, and was composed of classes 1, 3, and 5, which questions were related to the difficulties faced by visitors in carrying out development promotion actions, at home or virtual, given the COVID-19 pandemic.

Category 1 - Performance of the HCP visitors for the promotion of CD.

According to the HCP visitors, CD is the result of the interference of aspects that make up the extrinsic process factors, and the family bond is the focus of CD. One of its actions consists of guiding caregivers regarding developmental stimulation and the importance of care with affection and attention since children who are welcomed and loved are more likely to develop fully.

[...] the aspect of the family bond, [...] the warmth of the family [...] that is the caregiver who listens to the child, who sits to play, who sits to educate, so the child has a good development [...]. (V1)

[...] so, our visits have always focused on the formation of the socio-affective bond, the family bond, so that we can help the child. If the child has difficulty walking, we can stimulate them with some activities, or if the child has not succeeded with this stimulus, we can guide the mother so that she can seek the health network. [...]. (V4)

[...] as visitors, we strongly encourage parents [...] to show the importance of the family bond, whether it is the child's father or mother, or the caregiver [...], it is very important for the child to feel welcomed and loved. [...]. (V8)

Category 2 - Difficulties in carrying out CD promotion actions during the COVID-19 pandemic

The COVID-19 pandemic has had repercussions on all people, regardless of the life cycle, however, with regard to the families of children who are accompanied by the HCP, in addition to the difficulties related to the child's family and social context, some families refused to receive the visitors in the program, for fear of catching the disease, a situation that limited the visitors' actions, according to the reports below:

The difficulty of being able to go to the family's home to make a face-to-face visit, [...] because sometimes the family is afraid to receive us, this is the most difficult issue we face [...]. (V4)

Difficulty in accessing homes, keeping in touch, it's all very difficult. Sometimes we have activities to deliver, and the mother doesn't want to receive them or calls saying she has COVID-19, others say they have the flu [...]. (V7)

Regarding the virtual assistance necessary for the visitors' performance during the pandemic, it was possible to observe the difficulty of contacting and interacting with families, the delay or absence of return of activities by families, in addition to not responding to app messages.

[...] now it is remote, we still have little time to talk to the family [...] to know how the child is doing, and to send the activity (CD stimulation) of the week by photo, video, or video call. It is up to the family when they are going to do it, to take a picture and send it to us. Many families do not respond [...]. (V5)

[...] we do not have direct contact with the child [...]. Mothers are absent from activities with their children. Sometimes, many say: - No! I prefer to do the daycare activities. [...] This is the biggest obstacle, the lack of mothers' participation. [...]. (V6)

So, sometimes I assign the activity on Tuesday, the week goes by, and only on Monday will the mother answer me [...] the remote environment is not good, it makes interaction with the family difficult [...]. (V8)

On the other hand, the participants highlighted that the COVID-19 pandemic caused feelings such as fear, discouragement, frustration, and aggressiveness, among others, in families and children. Attachment to screens was also a break in the bond with the professional, as well as barriers to adherence and continuity of child monitoring in the program.

Before the pandemic, the service was face-to-face, once a week, we were well received, many children were more involved in the activities, and the family did not report as much of the situation as they do today, regarding financial and health issues [...]. (V1)

Children today are more withdrawn, more frustrated [...] they are more connected to virtual media, [...] they have a fearful gaze [...]. [...] many families need psychological counseling, [...] they are afraid. I know that there is the aggressiveness part in words, [...] the child experiences it more. (V3)

[...]now it is very complicated because the children get stressed as they are at home for a long time [...]. (V6)

[...] we used to come and play [...] nowadays when we go back, the children cry, they think we're strangers. So we already had that bond with the visitor, when we go back everything starts from scratch, it's like the first time. Everything is slower, and more difficult! [...]. (V7)

DISCUSSION

Child development consists of a sequence of progressive transformations, which can be influenced by external factors experienced in daily life, whether social, cultural, or biological. In this scenario, the pandemic situation can be considered a potential trigger for changes in the child's life and health conditions, whether due to the stress caused by the confinement period, the constant fear of contamination, or the social distancing itself, which have affected these families' relationships, sense of competence to act, and autonomy to make decisions, thus resulting in maladaptive outcomes in the medium and long term.⁴

According to Bronfenbrenner's Bioecological Theory, context strongly influences care for child development.¹² This is evidenced in this study, when visitors recognized the repercussions of the COVID-19 pandemic on child development, such as weak family ties and the way the family deals with the child.

It is possible to reflect upon the significant misalignment in the ecological levels proposed in BTHD, resulting from the repercussions of COVID-19 on child development. One of the main implications for the children's exosystem was unemployment, which occurred en masse during the pandemic and caused families who were already in social vulnerability to live in poverty or extreme poverty. For one participant in this study, this caused her a feeling of powerlessness, becoming a barrier to her actions at work.

It is clear that, due to the pandemic, there was an increase in hunger, food insecurity, exposure to screens, a reduction in children's outdoor recreation and school activities, and thus, contact with the various social environments, such as school, daycare centers, parks and friends' and family's homes, were restricted to the virtual.¹⁴

Based on the premise that the family context interferes with development, the more risk factors in the child's microsystem, the greater the likelihood of this interference, which may lead to a delay or absence of developmental milestones. A Brazilian study with the public assisted by the HCP identified that, among other aspects, low schooling, maternal depression, lack of access to drinking water, basic sanitation, inadequate nutrition, and anemia in childhood, were associated with lower development scores in children in early childhood.¹⁵

All these risk factors are associated with low family income and, therefore, the lower this income, the lower the children's cognitive and socio-emotional skills,¹⁶ since a family's experiences are influenced by the scenario in which they find themselves, thus causing affective/family/social fragility linked to vulnerability.¹⁷

It is noteworthy that as family income decreases, investments in the child and the chances of the child reaching a level of development within the expected parameters are also reduced. This situation may have worsened during the COVID-19 pandemic, with the increase in parents' and guardians' unemployment, and thus, the decrease in their income, leading to restrictions on food, medicines, and services, in addition to aggravating the conflicts that already occurred in their homes.¹⁶

In addition, the change in family routine caused by unemployment and/or the shift from face-to-face work to home office may have had a direct impact on children's development. It should be noted that not only the systems that are directly linked to that one individual but also the indirect ones, such as those related to the exosystem, that is, those in which the child does not actively participate, can influence their development, such as the parents' work.

Therefore, increased contact with parents may not necessarily have brought children positive experiences, since this study's findings showed an increase in family stress, which may therefore increase the overload of negative feelings experienced and turn into toxic stress.¹⁸

Toxic stress is a strong level of stress that exceeds tolerable levels, with frequent occurrence and prolonged activation in the individual, being able to trigger hypervigilance and exhaustion. This can have an impact not only on children's socio-affective environment, but also on their brain and mental architecture, as the increase in cortisol levels leads to changes in the immune and nervous systems, altering emotion, memory, and learning, and the high risk of physical and mental illnesses that are related to stress, with effects that last for months or even years.^{4,14}

Therefore, with home office work, there was a change in the child's interaction with the family, causing changes in their proximal processes. For Bronfenbrenner, proximal processes are characterized by the mutual interaction between the child and the people or objects present in the immediate environment and are considered "engines of development", as they exert a strong influence on the stimulation of child development.¹⁸

Therefore, with the misalignment of social and family levels, there was a rupture in the dynamic contact between the child and the proximal processes.

It is clear from the visitors' statements the importance of children's interaction with proximal processes for their development, as seen in BTHD. It is worth noting that in contexts where these processes are impaired, children tend not to develop effectively and possibly have a delay in some developmental milestones.

Another barrier reported by the HCP visitors, due to the repercussions of the COVID-19 pandemic, was the non-participation of mothers and the absence of feedback on the activities proposed by the program, thus making it difficult to monitor children's development. A study carried out with a program similar to the HCP, the Family Support and Parental Monitoring Center (FSPMC), which works with families of children and adolescents at risk, obtained similar data, showing the same challenges of family monitoring.¹⁹

The non-cooperation of family members, reported by the visitors in this study and by professionals from other Brazilian studies, may be related to the emergence of COVID-19, which brought fear of contamination, causing the performance of visits to be affected.²⁰

The fear of contamination became a barrier to the work of health visitors, as the children's mothers/caregivers refused to receive face-to-face visits, even with the Ministry of Health protocols being implemented. At the same time, digital visits did not have the expected positive effects on the experience of the study participants. These results corroborate a study carried out with caregivers in the interior of the Northeastern region, which showed that they recognized the importance of monitoring in health services, however, due to the high rate of SARS-Cov-2 transmissibility, they avoided attending physiotherapy sessions, for fear of infecting the child.²⁰

Virtual visits have emerged as a safe alternative for ongoing HCP monitoring and various other health services. However, according to the study participants, virtual interactions caused a break in the bond, difficulty in contacting and interacting with families, lack of return to activities, and non-interaction of messages sent by the WhatsApp messaging application.

These results align with a national study that evaluated the HCP in more than 30 municipalities and showed that there was a transition from home visits to remote visits, with the implementation of internet calls, messages, videos, and phone calls by visitors to access families.²¹ In addition, a study conducted in Los Angeles showed that most of the professionals surveyed rated the transition from face-to-face to remote visits as moderately difficult and that only a small portion was engaged with remote visits.²²

Unlike these findings, a study conducted in Bahia with users of Primary Health Care services showed that the bond, reception, and communication with individuals assisted during the pandemic were strengthened. It can be explained by the way the service was organized, which structured a task division flow among the team, maintaining contact from Monday to Friday with users.²³

Another aspect that deserves to be highlighted as a repercussion of the COVID-19 pandemic in CD was the significant increase in children's exposure to screens such as TV, cell phones, and computers, among others. Therefore, it is necessary to consider this exposure, which, despite having been the means of communication available to bring people together outside the home, has negatively influenced children's physical and mental well-being.²⁴⁻²⁷ For HCP visitors, during the pandemic scenario, children were prone to develop negative feelings, which may have been due to the excessive use of screens, which had repercussions as a barrier in the work of the HCP.

There is a consensus in the literature that screen use among children is detrimental to child development. Therefore, the younger the child, the greater the harm. Thus, children under two years of age are the most affected. This exposure may be related to delayed psychological and motor development, increased cases of obesity, depression, anxiety, and sleep disorders. Babies who are overexposed to screens may have delayed speech and language development.²⁴⁻²⁷

In addition, the negative feelings presented by children may also be the result of harmful maternal feelings, such as fear, discouragement, withdrawal, frustration, and aggression, which are present in maternal daily life, according to the participants of this research. This finding is in line with a study that showed that caregivers have faced these same feelings, and are distressed by feeling powerless in the face of the pandemic and its repercussions.²⁰

Although there are inherent risks to the pandemic, the paths to resilience are paramount. Therefore, it is necessary to discuss the need for a different approach to families during this phase, since these negative feelings may trigger some type of illness in the medium or long term if no intervention or referral of the family member is carried out within the Health Care Network (HCN).²⁸

CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

COVID-19 pandemic repercussions on the development of children assisted by the HCP in the municipality under study permeate the actions carried out by visitors, due to the interaction barriers with families, surrounded by the fear of catching the disease, resulting in a broken bond and delay or absence in the return to children's activities by families. In addition, the experience of feelings such as fear, discouragement, frustration, aggressiveness, and attachment to the screens by the child and the family represented barriers to the continuity of child monitoring.

Thus, based on Bronfenbrenner's BTHD and the link between visitor/child/family/ pandemic, it is considered that the results can contribute to sensitizing managers and services on continuing education for HCP visitors, in order to qualify them to develop strategies that can enhance child development surveillance actions, as well as the role of parents/caregivers/family in adhering to activities to stimulate and develop the child's potential, regardless of the pandemic context.

Despite the results obtained, the study's limitation is the use of remote means for the interviews, since, due to the HCP visitors' daily duties, the speaking time was impaired; as well as the fact that it was carried out in only one municipality. Thus, it is suggested that other broader studies be carried out, which can lead to learning about how to reorganize the monitoring flow by the program.

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^aCourse Conclusion Work: "Repercussions of the COVID-19 pandemic on child development and the actions of visitors to the 'Happy Child Program'", authored by Layla Caroline Lino da Silva. Bachelor's Degree in Nursing. Center for Education and Health. Federal University of Campina Grande. Advisor: Prof. Dr. Nathanielly Cristina Carvalho de Brito Santos. Year 2022.