

Impact of lack of face-to-face schooling during COVID-19 confinement on family quality of life of children with disabilities and typical development

Rocío Palomo-Carrión¹, Rita-Pilar Romero-Galisteo, Helena Romay-Barrero², María-Dolores Cortés-Vega, María-Jesús Casuso-Holgado and Elena Pinero-Pinto

Abstract

Objective: The aim of this study was to analyze the impact of the lack of face-to-face schooling during the COVID-19 confinement on the family quality of life of children aged 3–6 years with hemiplegia, obstetrical brachial palsy, and typical development.

Materials and Methods: An observational and cross-sectional study, using an online survey hosted in Google Forms from October to December 2020, was performed in families with children with infantile hemiplegia, obstetrical brachial palsy, and typical development aged 3–6 years living in Spain. The quality of life and family impact (measured through Pediatric Quality of Life Questionnaires, PedsQL™) were evaluated, as well as the affected upper limb side, the presence of other associated problems, the parents' job, lack of use of the affected upper limb, and the type of online intervention using different channels: phone calls, emails, and video calls. Family expectations on the treatment and on their acquired capacity to solve problems related to their children were also measured.

Results: A total of 93 families participated in the study and the children's quality of life and family impact obtained a strong correlation in three populations: infantile hemiplegia ($r = 0.844$), obstetrical brachial palsy ($r = 0.513$), and typical development ($r = 0.904$). There was no association between quality of life and online intervention (phone calls and emails were selected), $p > 0.05$.

Conclusion: The deprivation of schooling coupled with home confinement due to the COVID-19 pandemic had a greater impact on the quality of life of children with disabilities: infantile hemiplegia and obstetrical brachial palsy than on typically developing children and on their families. However, the online intervention did not produce improvements in quality of life, which could be a consequence of using emails or phone calls instead of video calls to interact with the families.

Keywords: disability children, family impact, home confinement, quality of life, typical development

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The study's graphical abstract is shown in figure 1 of Supplemental material.

Introduction

The pandemic caused by COVID-19 has posed a major change in the lives of all people. In addition

to the economic losses and the thousands of victims, the fear of the virus caused a serious psychological impact on a large part of the population, as suggested by different studies in this regard.^{1,2} The measures imposed by different governments in different parts of the world reduced interaction and participation in the community. This social

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Correspondence to:
**Rita-Pilar Romero-
Galisteo**

Department of
Physiotherapy, Faculty
of Health Sciences,
University of Málaga,
Arquitecto Francisco
Peñalosa St., 3 (Campus
Teatinos), 29014 Málaga,
Spain.

Institute of Biomedicine of
Málaga (IBIMA), Málaga,
Spain

rpromero@uma.es

Rocío Palomo-Carrión
Department of Nursing,
Physiotherapy and
Occupational Therapy,
Faculty of Physiotherapy
and Nursing, University
of Castilla-La Mancha,
Toledo, Spain

Pediatric Unit, Hemi-
Child-Research [Group of
Research in Physiotherapy
of Toledo (GIFTO)], Toledo,
Spain

Helena Romay-Barrero
Department of Nursing,
Physiotherapy and
Occupational Therapy,
Faculty of Physiotherapy
and Nursing, University
of Castilla-La Mancha,
Toledo, Spain

**María-Dolores Cortés-
Vega**

**María-Jesús Casuso-
Holgado**
Department of
Physiotherapy, University
of Seville, Seville, Spain

Elena Pinero-Pinto
Department of
Physiotherapy, Faculty of
Nursing, Physiotherapy
and Podiatry, University of
Seville, Seville, Spain

deprivation also affected millions of schoolchildren around the world,³ interfering with children and adolescents not only in academic tasks but also in daily routines, sleep, and emotional aspects, among others.⁴⁻⁶

School is the children's social environment par excellence; while lockdown protected children and families from the virus, the negative effects of the pandemic have possibly been exacerbated during lockdown,⁷ when regular contact with friends was not necessarily reduced through the use of telephones or other forms of communication.⁸

School closures alone have been associated with higher rates of caregiver stress.⁹ Families have been overwhelmed by the situation, having to combine multiple tasks that are necessary to cover childcare and cope with the stress of the situation itself.¹⁰ They have been forced to seek strategies to optimize the functioning of their children, sometimes generating frustration and/or anguish. Children and their families have to share a restricted space at home, with limited resources, and have to change their daily life and routines to cope with numerous new challenges.¹¹ Children are supposed to get home schooling and home therapies, supervised by their parents.

During the lockdown, children with disabilities received substantially less pediatric healthcare because outpatient centers were closed, resulting in some children's diseases remaining untreated.¹² Thus, the role of families of children with disabilities not only looked after them but also provided adequate rehabilitation at home to maintain their function, which may have had an impact on the family. Children diagnosed with hemiplegia or obstetrical brachial palsy (OBP) have daily life difficulties due to a reduced use of the affected upper limb, and thus, they need specific treatments to keep their functionality; the school enables the interaction with others and improves their participation.¹³⁻¹⁵ The activity and participation are altered due to the nonuse of the affected upper limb, as well as their quality of life (QoL). Therefore, the confinement may have adversely affected their functionality, mental health, and psychological status, which affected not only children but also the general and mental health of their families.^{16,17}

Knowing the aspects that affected the quality of family life of children with disabilities will help us

to plan better family interactions and enrich the home environment, in order for the functioning of the child and his or her family to develop successfully. For this reason, the situation of the family environment must be known during the suspension phase of face-to-face schooling,¹⁸ analyzing how social, educational, and environmental deprivation, among other factors, has influenced children aged 3-6 years. Despite the fact that there are multiple publications on the effects of confinement on children with disabilities and their families,^{19,20} no studies were found that combine a population with typical development and with some type of disability to observe the children's QoL and family impact (FI) on both populations.

The objective of the study was to analyze the influence of the lack of face-to-face schooling during the COVID-19 confinement influenced on the QoL of 3- to 6-year-old children with hemiplegia, OBP, and typical development and on their families.

Methods

Design

This is an observational and cross-sectional study.

Participants

Participants were families living in Spain whose children had been diagnosed with infantile hemiparesis, OBP, and typical development. The initial contact with the families of children with OBP, infantile hemiparesis, and typical development was conducted telematically, sending them the questionnaire via email. They received information about the objectives set regarding the completion of the questionnaire. If they did not have primary education, the informative sheet was read by another person and would be completed according to what the family said. Then, they signed an informed consent in which they approved the use of their data with research purposes and the dissemination of results.

The study complies with the principles of the Declaration of Helsinki, as well as with the Spanish Law on Personal Data Protection and Guarantee of Digital Rights, of December 2018. The study has also been approved by the Ethics and Experimentation Committee of the University of Málaga (Ref No. 75-2020 -H).

Inclusion/exclusion criteria

To complete the questionnaire and be included in the dataset, the participants were required to have resided in Spain for a minimum of 6 years before completing the questionnaire and have a child diagnosed with infantile hemiparesis, OBP, or/and typical development, aged between 3 and 6 years during the confinement due to the COVID-19 pandemic, corresponding to the lack of child schooling (from March to June 2020).

The study excluded the parents whose children had been diagnosed with a different type of cerebral palsy and other pathologies not described in the inclusion criteria and children who do not attend school.

Outcome measures and instrument

A simple questionnaire was created *ad hoc* for parents of children diagnosed with infantile hemiparesis, OBP, and typical development aged between 3 and 6 years. The questions were designed with the aim of gathering information about the situation regarding the influence of lack of child schooling due to the COVID-19 pandemic lockdown on the QoL and FI from the families' perspectives (infantile hemiparesis, OBP, and typical development).

QoL. The Pediatric Quality of Life Inventory™ (PedsQL™) General Core Scales were designed to provide a modular approach to measuring health-related QoL in healthy children, as well as in those with acute and chronic health conditions, across the broadest, empirically feasible, age groups (2–18 years).²¹ The PedsQL™ includes child self-reports for ages 5–18 years and parent-proxy report scales from 2 to 18 years. The QoL in children of this study was assessed using the Pediatric Quality of Life Inventory (PedsQL™ v. 3.0), whose internal reliability coefficient is between 0.7 and 0.9. Internal consistency reliability for the Total Scale Score (alpha = 0.88 child, 0.90 parent report), Physical Health Summary Score (alpha = 0.80 child, 0.88 parent), and Psychosocial Health Summary Score (alpha = 0.83 child, 0.86 parent) was acceptable for group comparisons. Validity was demonstrated using the known-groups method, correlations with indicators of morbidity and illness burden, and factor analysis. The PedsQL distinguishes

between healthy children and pediatric patients with acute or chronic health conditions, it is related to indicators of morbidity and illness burden, and it presents a factor-derived solution that is largely consistent with the a priori conceptually derived scales. It comprises 35 items assessing seven dimensions: daily activities (9 items), school activities (4 items), movement and balance (5 items), pain (4 items), fatigue (4 items), eating activities (5 items), and speech and communication (4 items). A 5-point response scale is utilized across child self-report for ages 8–18 years and parent proxy-report (0 = never a problem; 1 = almost never a problem; 2 = sometimes a problem; 3 = often a problem; 4 = almost always a problem). The items are reverse-scored and linearly transformed into a 0–100 scale (0 = 100, 1 = 75, 2 = 50, 3 = 25, 4 = 0); thus, higher scores indicate better QoL.

PedsQL™ FI. The PedsQL™ FI Module measures parent self-reported functioning: (1) Physical Functioning (6 items), (2) Emotional Functioning (5 items), (3) Social Functioning (4 items), (4) Cognitive Functioning (5 items), (5) Communication (3 items), and (6) Worry (5 items); and two scales measuring parent-reported family functioning: (7) Daily Activities (3 items) and (8) Family Relationships (5 items).²² A 5-point response scale is utilized (0 = never a problem; 4 = always a problem). The items are reverse-scored and linearly transformed into a 0–100 scale (0 = 100, 1 = 75, 2 = 50, 3 = 25, 4 = 0); thus, higher scores indicate better functioning, whereas lower scores indicate negative impact.

Internal consistency reliability was demonstrated for the PedsQL™ FI Module Total Scale Score ($\alpha = 0.97$), Parent QoL Summary Score ($\alpha = 0.96$), Family Functioning Summary Score ($\alpha = 0.90$), and Module Scales (average $\alpha = 0.90$, range = 0.82–0.97). The PedsQL™ FI Module distinguishes between families with children in a long-term care facility and families whose children resided at home.²²

All internal consistency reliabilities exceeded the recommended minimum alpha coefficient standard of 0.70 for group comparisons, with most scales approaching or exceeding an alpha of 0.90, recommended for individual patient analysis.

Questionnaire instrument. In this questionnaire, the QoL and IF variables were collected using the Spanish versions of both *PedsQL*TM scales (<https://eprovide.mapi-trust.org/instruments/pediatric-quality-of-life-inventory>) (Supplemental material). In addition, general aspects were collected: the birth date, the affected upper limb side, the presence of other associated problems, the parents' job, and lack of use of the affected upper limb (currently, it is not used in four bimanual activities for which it used to be employed: take a glass/bottle with both hands, wash your face, put your socks on, and pull up your pants). It was also recorded whether children with disabilities received online intervention. During the period of confinement at home, the therapists had to design different strategies to provide care for the children and their families, through which they would know their needs and concerns, as well as what approaches to use to maintain the child's condition using daily routines and empowering the family. The communication strategies between the families-children and the therapist were diverse, using different channels of online intervention for their care and follow-up: phone calls, emails, and video calls. Family expectations on the treatment and on their acquired capacity to solve problems related to their children were also measured.

The questionnaire was developed by a research team with more than 10 years of experience in pediatrics, selecting, by consensus with members of the team, the questions that could be considered essential for the objectives of the study, using a simple and nontechnical language. The study was disseminated through social networks, different pediatric hospitals, early intervention centers, and associations or foundations of children with developmental alterations.

Sample size

The calculation of the sample size was carried out using the G.Power v.3.1 program, with an α error = 0.05, a power ($1 - \beta$ error) = 0.95, effect size of 0.70, number of groups = 3, and number of covariates = 2, obtaining that a total of 60 individuals is required, with 20 individuals in each group.

Data collection

This cross-sectional correlational study was carried out using an online survey hosted in Google

Forms from October to December 2020. Participants were recruited by means of convenience snowball sampling, with an invitation to complete the survey being sent out to various institutions, such as pediatric hospitals, early intervention centers and associations or foundations of children with developmental alterations, universities, and associations and organizations with links to the area of typical development. After completing the survey, which comprised all the aforementioned instruments, the respondents were asked to indicate their family's situation during lockdown. It was made clear to all potential respondents that their participation was voluntary and that all data would remain anonymous throughout the study. The participants were explicitly asked for their consent regarding the use of the information they provided. Once the questionnaire was completed by the families, the data were electronically loaded. Only the researchers of the study had access to identifiable data.

Once coded, the data were stored, ensuring the safety of the identity of the participants. To preserve the anonymity of the participants and comply with the precepts of the Law on Personal Data Protection currently in force in Spain, the principal investigator of this project was the only person with access to the dataset, from computers protected by secure login with password, which automatically closed after 5 min of inactivity. The information is not disseminated through specific or recognizable personal details. A nonidentifiable dataset is shared to enable comparisons with research purposes at national and international levels.

Data analysis

The collected data were coded, tabulated, and statistically analyzed using SPSS v.24.0 (SPSS Inc., IBM, Chicago, IL, USA). The Shapiro-Wilk test was employed to study the normality of the sample. Continuous data were presented as mean and standard deviation (SD), while categorical data were presented as number (percentage). A repeated measures analysis of variance (ANOVA) test was conducted. The Bonferroni correction was employed for pairwise post hoc comparisons to further analyze significant interactions. Correlations between QoL and FI were performed using Person's correlation coefficient (r). Independent sample t test was used to evaluate whether there were statistically significant

relationships between QoL and online treatment, between FI and online treatment, between capacity to solve problems related to the child and online treatment, and nonuse of the affected upper limb. Significance was considered at $p < 0.05$.

Results

The questionnaire was completed voluntarily by 93 Spanish families.

The entire questionnaire (100%) was completed by the mothers of children diagnosed with OBP ($n = 21$), infantile hemiparesis ($n = 32$), and typical development ($n = 40$) included in this study. The most frequent age range of the mothers was 35–45 years (90%). In the OBP group, 60% of mothers worked during the confinement, of whom 58% did telework and 2% worked face-to-face, and 100% of them were in charge of the child care. In the infantile hemiplegia group, 65% of mothers worked during the confinement (50% did telework and 15% worked face-to-face) and 90% of them were in charge of the child care. Finally, in the typical development group, 75% of mothers worked (70% did telework and 5% worked face-to-face) and 80% of them were in charge of the child care. The right side was more affected than the left side in children with OBP and infantile hemiparesis, and infantile hemiparesis families felt less use of the affected upper limb (87.5%) than OBP families (67.18%). Children with OBP (57.14%) and infantile hemiparesis (65.62%) received online intervention through phone calls and emails, and, in both populations, 100% were unsatisfied with the treatment. More than 80% of OBP and infantile hemiparesis families did not acquire the capacity to solve problems in their children's daily life (Table 1).

There were significant intergroup differences in the mean for both QoL and FI ($p < 0.01$) (Table 1). According to Bonferroni post hoc test (Table 2), there were significant differences between the means of QoL for OBP and typical development, and between infantile hemiparesis and typical development ($p < 0.01$). In the FI, differences were obtained between OBP and typical development, and between infantile hemiparesis and typical development ($p < 0.01$). No significant differences were found between the two disability groups ($p = 1.00$) (Table 2).

There was a high correlation between QoL and FI for all study groups: OBP ($r = 0.513$, $p < 0.01$), infantile hemiparesis ($r = 0.844$, $p < 0.001$), and typical development ($r = 0.904$, $p < 0.001$) (Table 3).

No association was found for online intervention (phone calls and emails) with QoL or FI in neither OBP nor infantile hemiparesis $p > 0.3$ (Table 4). Similarly, there was no association for the family's capacity to solve problems with QoL (OBP: $p = 0.43$, infantile hemiparesis: $p = 0.14$) or FI (OBP: $p = 0.26$, infantile hemiparesis: $p = 0.32$), or in the relationship between nonuse of the affected upper limb and online intervention for both populations (OBP: $p = 0.20$, infantile hemiparesis: $p = 0.64$).

Discussion

The objective of the study was to analyze the influence of the lack of face-to-face schooling during the COVID-19 confinement on the QoL of 3- to 6-year-old children with hemiplegia, OBP, and typical development and on their families. It was observed that children with OBP and hemiplegia obtained lower values in their QoL than the children with typical development during confinement. This may be due to the fact that children with disabilities need more care in their day-to-day life to optimize their functioning,²³ which can be affected by the lack of interaction with the environment, such as school and social deprivation.^{8,24} The QoL encompasses various dimensions of their well-being, including daily activities that could have been affected by the lack of physical activity, schooling, good habits, and medical and therapeutic care, producing a deterioration in the same respect in typical development children.⁸

Mothers oversaw the care of their children during confinement in the three groups. Considering 100% of the mothers of children with OBP, most of them also teleworked, which could be mitigated with conciliation policies between work and family, parental guidance, and community support.²⁵ According to different cultures, it is the mothers' responsibility to take care of the children and do all the housework in general. Having a child with special needs might add an extra daily workload, reducing the mother's quality life and increasing the FI.²⁶

Table 1. Demographic characteristics and study variables.

| Variables | Groups | | | Intergroup <i>p</i> value |
|--|---|--|--|------------------------------|
| | Obstetrical brachial palsy, <i>n</i> = 21 | Infantile hemiparesis, <i>n</i> = 32 | Typical development, <i>n</i> = 40 | |
| Age, median (SD) | 4.53 (1.77) | 4.35 (1.61) | 4.62 (1.83) | 2.67 |
| Sex, <i>n</i> (%) | | | | |
| Male | 12 (57.14%) | 18 (56.25%) | 24 (60%) | - |
| Female | 9 (42.86%) | 14 (43.75%) | 16 (40%) | |
| Affected UP, <i>n</i> (%) | | | | |
| Right | 15 (71.43%) | 24 (75%) | | |
| Left | 6 (28.57%) | 8 (25%) | - | - |
| Associated problems, <i>n</i> (%) | | | | |
| Epilepsy | | 6 (18.75%) | | |
| Cognitive | | 5 (15.63%) | | |
| Speech | | 6 (18.75%) | | - |
| None | 100% | 15 (46.87%) | 100% | |
| Online intervention, <i>n</i> (%) | 12 (57.14%) | 21 (65.62%) | | |
| Phone calls | 3 (14.28%) | 5 (15.62%) | | |
| Emails | 9 (42.86%) | 16 (50%) | | |
| None | 9 (42.86%) | 11 (34.38%) | - | - |
| Family expectations on the treatment, <i>n</i> (%) | | | | |
| Satisfied | 0% | 0% | | |
| unsatisfied | 12 (100%) | 21 (100%) | - | - |
| Family capacity to solve problems related their children, <i>n</i> (%) | | | | |
| Yes | 3 (14.28%) | 5 (15.62%) | | |
| No | 18 (85.72%) | 27 (84.32%) | - | - |
| Reduced affected upper limb use, <i>n</i> (%) | | | | |
| Yes | 15 (68.18%) | 28 (87.5%) | | |
| No | 6 (31.82%) | 4 (12.5%) | - | - |
| Quality of life, median (SD) | 64.96 (14.06) | 65.31 (17.92) | 77.82 (14.95) | <0.01 |
| Family impact, median (SD) | 49.29 (22.67) | 47.81 (19.96) | 64.83 (14.40) | <0.01 |
| n, number; UP, upper limb. Online intervention (phone calls or emails), quality of life (0–100), and family impact (0–100). | | | | |

Table 2. Post hoc Bonferroni quality of life and family impact in all groups.

| Study variables groups | Mean difference | Significance | (95% CI) |
|---|-----------------|--------------|--------------------|
| Quality of life | | | |
| OBP | | | |
| IH | -0.35 | 1.000 | (-11.21 to 10.41) |
| TD | -12.87* | 0.010* | (-23.29 to -2.45) |
| IH | | | |
| OBP | 0.35 | 1.000 | (-10.51 to -11.21) |
| TD | -12.52* | 0.004* | (-21.69 to -3.35) |
| TD | | | |
| OBP | 12.87* | 0.010* | (2.45 to 23.29) |
| IH | 12.52* | 0.004* | (3.35 to 21.69) |
| Family impact | | | |
| OBP | | | |
| IH | 1.48 | 1.000 | (-11.16 to 14.14) |
| TD | -15.54* | 0.007* | (-27.68 to -3.39) |
| IH | | | |
| OBP | -1.48 | 1.000 | (-14.14 to 11.18) |
| TD | -17.02* | 0.001* | (-27.71 to -6.33) |
| TD | | | |
| OBP | 15.54* | 0.007* | (3.39 to 27.68) |
| TD | 17.02* | 0.001* | (6.33 to 27.71) |
| CI, confidence interval at 95%; IH, infantile hemiparesis; OBP, obstetrical brachial palsy; TD, typical development. *Statistically significant difference ($p < 0.05$). | | | |

In our study, the level of disability in OBP and infantile hemiplegia was similar, based on the reduced use of the affected upper limb due to movement restrictions, which limits the execution of activities of daily living, such as personal hygiene, eating, and so on, producing more worries and stressful situations about the children's future (treatment, pain, relationships, problems to communicate with others, and to explain the child's condition).²⁷ These factors may have influenced the family situation due to the confinement, as suggested by the results of Rajkumar.²⁸

The FI was lower in children with disabilities than in those with typical development. There was a great correlation between children's QoL and FI, which suggests that the situation experienced by families due to a stressful condition such as confinement during COVID-19 affects their emotional state,^{11,28} especially mothers, as is shown in this study, because they are mostly responsible for the care of their children and the execution of school activities, in addition to having to reconcile telework with the needs of the child in the same environment. All this can be a stress factor that prevents addressing the family

Table 3. Correlations between quality of life and family impact in obstetrical brachial palsy, infantile hemiparesis, and typical development groups.

| Groups | | Quality of life | Family impact | Significance |
|--|---------------------|-----------------|---------------|--------------|
| OBP | | | | |
| Quality of life | Pearson correlation | 1 | 0.513* | 0.017* |
| Family impact | Pearson correlation | 0.513* | 1 | 0.017* |
| IH | | | | |
| Quality of life | Pearson correlation | 1 | 0.844** | <0.001* |
| Family impact | Pearson correlation | 0.844** | 1 | <0.001* |
| TD | | | | |
| Quality of life | Pearson correlation | 1 | 0.904** | <0.001* |
| Family impact | Pearson correlation | 0.904** | 1 | <0.001* |
| IH, infantile hemiparesis; OBP, obstetrical brachial palsy; TD, typical development. * p_r statistically significant correlation ($p < 0.05$). **Value of Pearson correlation coefficient very high. | | | | |

Table 4. Association between online assistance and quality of life and family impact in obstetrical brachial palsy and infantile hemiparesis groups.

| Groups: OBP and IH | Mean (SD) | p value |
|---|---------------|-----------|
| OBP | | |
| QoL | | |
| None | 65.21 (14.77) | 0.95 |
| Online intervention | 64.78 (14.17) | |
| IH | | |
| QoL | | |
| None | 62.64 (20.41) | 0.54 |
| Online intervention | 66.70 (16.83) | |
| OBP | | |
| FI | | |
| None | 54.24 (26.28) | 0.40 |
| Online intervention | 45.58 (19.92) | |
| IH | | |
| FI | | |
| None | 42.75 (26.55) | 0.39 |
| Online intervention | 50.46 (15.60) | |
| FI, family impact; IH, infantile hemiparesis; OBP, obstetrical brachial palsy; QoL, quality of life. p : statistically significant correlation ($p < 0.05$). | | |

situation and influences the QoL of children for both families of children with disabilities and typical development.²⁷ Thus, the deprivation of contact with other family members, the anguish of not being able to communicate, together with the inability to concentrate and stay motivated, could alter the physical and mental functioning of the caregivers.²⁹

Moreover, the FI was similar in OBP and infantile hemiplegia families. This suggests that families with children with special needs lived a complicated situation regarding child care due to the home confinement. They had worries related to the future treatment of their children, and they usually felt headaches every day.²⁷ They could not concentrate on daily activities and they did not feel motivated to do enjoyable activities because they had their full attention in the care of their children; furthermore, they could not communicate their concerns to other friends, they felt unprotected, and their concern about the condition of their children and the lack of treatment during lockdown increased.³⁰

In this study, 57.14% of OBP did online intervention (42.86% via email and 14.28% via phone call) and children with hemiplegia received 65.62% online intervention (50% email and 15.62% phone call). Although more than 50% of children with disabilities obtained online intervention, there was no association between doing online intervention and the use of the affected upper limb. The families observed that the affected upper limb use was reduced in eating and personal hygiene despite doing online intervention, and 100% of families felt unsatisfied with the online intervention received and were not capable of solving problems related to their children, which may have affected the children's QoL. However, there was no association between QoL and receiving online intervention. These data may be surprising, as other studies have reached opposite conclusions, perhaps due to the fact that the interventions were conducted through video calls.^{31,32}

This is an important aspect because QoL should improve when a child receives a specific treatment and follow-up, but it is necessary to highlight that the type of intervention that the families received was very distant (i.e. phone calls or emails), which would not offer them stable family support to be able to detect and redirect the needs

of the child and of the family unit. Therefore, there were no differences between receiving and not receiving intervention, which could be due to the intervention characteristics. These families could have benefited from using video calls, potentially obtaining a less stressful family situation and thereby a lower FI, thus improving the care of their children and, consequently, their QoL.³³

Telerehabilitation and telemedicine services should aim to prevent the negative effects of future pandemic periods that require social isolation in these children who need medical service and rehabilitation throughout their lives. They should be applied through video calls or different online meeting platforms such as Microsoft Teams ©, where families and professionals can meet, and families can receive help strategies and support to improve the anxiety and stress in these periods, acquiring more self-confidence and reducing the FI.^{34,35} This can help to maintain children's QoL, as families will have a specific online support through video calls and follow-up targeted to the families' and children's needs.

Regarding limitations, there were a small number of families with OBP, but in comparison with the infantile hemiplegia, there is less population with this affection (OBP).³²⁻³⁵ Moreover, this study disregarded the measurement of the affected upper limb through validated questionnaires to study where there was a reduction of spontaneous use, as well as the socioeconomic characteristics of families with children with disabilities and typical development. These factors could influence the FI and modify the children's QoL.

Regarding strengths, to the best of our knowledge, this is the first study to compare the possible influence of the FI on the QoL of children with disabilities and typical development and how both variables are correlated in both populations. This suggests that home confinement was a stressful situation for all families, which reduced their chances of coping with daily routines, highlighting the care of their children. In addition, any online intervention directed at the home and the care of the family and children would not be adequate to provide greater use of the affected upper limb, and online intervention, using video calls and family follow-up, may be a factor to consider.

Conclusion

The deprivation of schooling coupled with home confinement due to the COVID-19 pandemic had a greater impact on the QoL of children with infantile hemiplegia and OBP than in typically developing children, as well as on their families. This study established a correlation between both variables. However, the online intervention did not produce improvements in QoL, which could be a consequence of the lack of using video calls instead of emails or phone calls to interact with the families.

Author contributions

Rocío Palomo-Carrión: Investigation; Supervision; Writing – original draft; Writing – review & editing.

Rita-Pilar Romero-Galisteo: Formal analysis; Methodology; Software; Writing – original draft; Writing – review & editing.

Helena Romay-Barrero: Conceptualization; Investigation; Resources; Writing – original draft; Writing – review & editing.

María-Dolores Cortés-Vega: Formal analysis; Visualization; Writing – original draft; Writing – review & editing.

María-Jesús Casuso-Holgado: Conceptualization; Methodology; Writing – original draft; Writing – review & editing.

Elena Pinero-Pinto: Investigation; Project administration; Writing – original draft; Writing – review & editing.

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ORCID iDs

Rocío Palomo-Carrión  <https://orcid.org/0000-0003-4034-2585>

Helena Romay-Barrero  <https://orcid.org/0000-0003-2388-2213>

Supplemental material

Supplemental material for this article is available online.

References

1. Moccia L, Janiri D, Pepe M, *et al.* Affective temperament, attachment style, and the psychological impact of the COVID-19 outbreak: an early report on the Italian general population. *Brain Behav Immun* 2020; 87: 75–79.
2. Forte G, Favieri F, Tambelli R, *et al.* COVID-19 pandemic in the Italian population: validation of a post-traumatic stress disorder questionnaire and prevalence of PTSD symptomatology. *Int J Environ Res Public Health* 2020; 17: 1–16.
3. Viner RM, Russell SJ, Croker H, *et al.* School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review. *Lancet Child Adolesc Health* 2020; 4: 397–404.
4. Sprang G and Silman M. Posttraumatic stress disorder in parents and youth after health-related disasters. *Disaster Med Public Health Prep* 2013; 7: 105–110.
5. Berasategi Sancho N, Idoiaga Mondragón N, Dosil Santamaría M, *et al.* *Las Voces de Los Niños y de Las Niñas En Situación de Confinamiento Por El COVID-19* (ed. A Zerbitzua). Universidad del País Vasco, País Vasco, España, 2020.
6. Nearchou F, Hennessy E, Flinn C, *et al.* Exploring the impact of covid-19 on mental health outcomes in children and adolescents: a systematic review. *Int J Environ Res Public Health* 2020; 17: 8479.
7. Wang G, Zhang Y, Zhao J, *et al.* Mitigate the effects of home confinement on children during the COVID-19 outbreak. *Lancet* 2020; 395: 945–947.
8. Ellis WE, Dumas TM and Forbes LM. Physically isolated but socially connected: psychological adjustment and stress among adolescents during the initial COVID-19 crisis. *Can J Behav Sci* 2020; 52: 177–187.
9. Brooks SK, Webster RK, Smith LE, *et al.* The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 2020; 395: 912–920.
10. Kowal M, Coll-Martín T, Ikizer G, *et al.* Who is the most stressed during the COVID-19 pandemic? Data from 26 countries and areas. *Appl Psychol Health Well Being* 2020; 12: 946–966.
11. Clemens V, Deschamps P, Fegert JM, *et al.* Potential effects of ‘social’ distancing measures and school lockdown on child and adolescent mental health. *Eur Child Adolesc Psychiatry* 2020; 29: 739–742.

12. Fegert JM, Vitiello B, Plener PL, *et al.* Challenges and burden of the Coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: a narrative review to highlight clinical and research needs in the acute phase and the long return to normality. *Child Adolesc Psychiatry Ment Health* 2020; 14: 20.
13. Palomo-Carrión R, Romero-Galisteo RP, Romay-Barrero H, *et al.* How does the cause of infantile hemiparesis influence other conditioning factors? A preliminary study in a Spanish population. *Children* 2021; 8: 323.
14. Yeves-Lite A, Zuñil-Escobar JC, Martínez-Cepa C, *et al.* Conventional and virtual reality mirror therapies in upper obstetric brachial palsy: a randomized pilot study. *J Clin Med* 2020; 9: 3021.
15. Akel BS, Öksüz Ç, Oskay D, *et al.* Health-related quality of life in children with obstetrical brachial plexus palsy. *Qual Life Res* 2013; 22: 2617–2624.
16. Ping W, Zheng J, Niu X, *et al.* Evaluation of health-related quality of life using EQ-5D in China during the COVID-19 pandemic. *PLoS ONE* 2020; 15: e0234850.
17. Bertamino M, Cornaglia S, Zanetti A, *et al.* Impact on rehabilitation programs during COVID-19 containment for children with pediatric and perinatal stroke. *Eur J Phys Rehabil Med* 2020; 56: 692–694.
18. Anaby D, Hand C, Bradley L, *et al.* The effect of the environment on participation of children and youth with disabilities: a scoping review. *Disabil Rehabil* 2013; 35: 1589–1598.
19. Bova SM, Basso M, Bianchi MF, *et al.* Impact of COVID-19 lockdown in children with neurological disorders in Italy. *Disabil Health J* 2021; 14: 101053.
20. Cardenal-Muñoz E, Nabbout R, Boronat S, *et al.* Impact of COVID-19 on Spanish patients with Dravet syndrome and their caregivers: consequences of lockdown. *Rev Neurol* 2021; 73: 57–65.
21. Varni JW, Seid M and Rode CA. The PedsQL: measurement model for the pediatric quality of life inventory. *Med Care* 1999; 37: 126–139.
22. Rosenbaum P. To enhance function, promote children's development. *Dev Med Child Neurol* 2021; 63: 628.
23. Gloster AT, Lamnisos D, Lubenko J, *et al.* Impact of COVID-19 pandemic on mental health: an international study. *PLoS ONE* 2020; 15: e0244809.
24. López-Bueno R, López-Sánchez GF, Casajús JA, *et al.* Health-related behaviors among school-aged children and adolescents during the Spanish covid-19 confinement. *Front Pediatr* 2020; 8: 573.
25. Oskay D, Öksüz C, Akel S, *et al.* Quality of life in mothers of children with obstetrical brachial plexus palsy. *Pediatr Int* 2012; 54: 117–122.
26. Bray N, Noyes J, Harris N, *et al.* Measuring the health-related quality of life of children with impaired mobility: examining correlation and agreement between children and parent proxies. *BMC Res Notes* 2017; 10(1): 377.
27. Bernedo I, Oliver J, Urbano-Contreras A, *et al.* Perceived stress, resources and adaptation in relation to the COVID-19 lockdown in Spanish foster and non-foster families. *Child Fam Soc Work*. Epub ahead of print August 2021. DOI: 10.1111/cfs.12871.
28. Rajkumar RP. COVID-19 and mental health: a review of the existing literature. *Asian J Psychiatr* 2020; 52: 102066.
29. Dhiman S, Sahu PK, Reed WR, *et al.* Impact of COVID-19 outbreak on mental health and perceived strain among caregivers tending children with special needs. *Res Dev Disabil* 2020; 107: 103790.
30. Fazzi E and Galli J. New clinical needs and strategies for care in children with neurodisability during COVID-19. *Dev Med Child Neurol* 2020; 62: 879–880.
31. Turolla A, Rossetini G, Viceconti A, *et al.* Musculoskeletal physical therapy during the COVID-19 pandemic: is telerehabilitation the answer? *Phys Ther* 2020; 100: 1260–1264.
32. Camden C and Silva M. Pediatric telehealth: opportunities created by the COVID-19 and suggestions to sustain its use to support families of children with disabilities. *Phys Occup Ther Pediatr* 2021; 41: 1–17.
33. Meireles ALF and de Meireles LCF. Impact of social isolation due to the covid-19 pandemic in patients with pediatric disorders: rehabilitation perspectives from a developing country. *Phys Ther* 2020; 100: 1910–1912.
34. Cankurtaran D, Tezel N, Yildiz SY, *et al.* Evaluation of the effects of the COVID-19 pandemic on children with cerebral palsy, caregivers' quality of life, and caregivers' fear of COVID-19 with telemedicine. *Ir J Med Sci* 2021; 190: 1473–1480.
35. Vaquero G, Ramos A, Martínez JC, *et al.* Obstetric brachial plexus palsy: incidence, monitoring of progress and prognostic factors. *Rev Neurol* 2017; 65: 19–25.