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Comparing the emotional impact of the UK COVID-19 lockdown in very preterm and full-term born children

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Author contribution statement

ZS, LH, CN, LV have substantial contributions to the conception or design of the work as well as the acquisition, analysis, or interpretation of data for the work. All authors contributed to drafting the work or revising it critically for important intellectual content as well as the final approval of the version to be published. ZS, CN, LV agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Keywords

COVID-19, child mental health, Very preterm children, Internalizing symptoms, LockDown, Crisis

Abstract

Word count: 299

Introduction: The COVID-19 pandemic has caused a global mental health crisis, especially for those individuals who are vulnerable to stress and anxiety due to pre-existing mental health problems. This study aimed to understand the emotional impact of the COVID-19 lockdown on children who were born very preterm (VPT, <32 weeks' gestation), as they are vulnerable to mental health difficulties and are at increased risk of developing psychiatric problems during childhood compared to their full-term-born counterparts.

Methods: The parents of 32 VPT children (mean age=8.7) and 29 term-born controls (mean age=8.8) who had previously taken part in a study of brain development and psychopathology following VPT birth completed an online modified version of the Coronavirus Health and Impact Survey (CRISIS). The emotional impact of the COVID-19 lockdown on the child and the parent, measured by the CRISIS, was studied in relation to pre-existing mental health difficulties, assessed with the parent-rated Strengths and Difficulties Questionnaire (SDQ) evaluated before the CRISIS completion (mean time gap 15 months). T-tests, likelihood ratio F-tests, linear regression models and simple slope analyses were conducted to study the effects of COVID-19-related stressors on children's and parents' behavior, relationships and mental health.

Results: There were no significant group differences in pre-existing SDQ internalizing/externalizing symptoms, child's emotions or parent's emotions during the COVID-19 lockdown. However, higher pre-existing internalizing symptoms in VPT children were associated with greater lockdown-related emotional problems and worries (simple slope=1.95, $p<0.001$), whereas this was not observed in term-born children.

Conclusion: Our results suggest that VPT children with pre-existing internalizing problems may be more vulnerable to the negative impact of certain societal and familial stressors, such as social restrictions during the national COVID-19 lockdown periods.

Effective intervention strategies are therefore needed to support this particularly vulnerable group in the context of potentially stressful life changes and adjustments.

Contribution to the field

Being born prematurely is associated with an increased risk for developmental psychiatric disorders and cognitive deficits. It is also well-reported that restrictions to daily life during the COVID-19 pandemic had profound effects on children's mental health. However, the effects of COVID-19-related stressors on preterm children's as well as their parents' relationships and mental health remains unclear. In order to address this question, we recruited 32 participants from a longitudinal study of children who were born very preterm (VPT) and matched them with 29 term-born peers. We tested associations between pre-existing mental issues with COVID-19 related child emotions in VPT and term-born children, while controlling for the impact on their parents' emotions. We found that the emotional impact of the COVID-19 lockdown did not differ between VPT children and their term-born peers as a whole; they also show comparable effects of lockdown-related stressors on emotions and worries of the parents of VPT and full-term children. However, results of this study indicate that specifically among VPT children, higher pre-existing internalising symptoms were associated with more COVID-19 related emotional problems and concerns during the lockdown. These findings not only show that pre-existing internalising symptoms were selectively associated with lockdown-related emotional problems in VPT children but suggest that VPT children with pre-existing internalising problems may be more vulnerable to the negative impact of societal and familial stressors in general. Our results highlight that very preterm children may be in need of more attention and care to reduce emotional impact when exposed to environmental change.

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Ethics statements

Studies involving animal subjects

Generated Statement: No animal studies are presented in this manuscript.

Studies involving human subjects

Generated Statement: The studies involving human participants were reviewed and approved by King's College London Ethics Committee

Hammersmith and Queen Charlotte's Research Ethics Committee

South East Research Ethics Committee

Stanmore Research Ethics Committee. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Inclusion of identifiable human data

Generated Statement: No potentially identifiable human images or data is presented in this study.

Data availability statement

Generated Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

In review

1 **Comparing the emotional impact of the UK COVID-19**
2 **lockdown in very preterm and full-term born children: a**
3 **longitudinal study**

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18 **Key words: COVID-19, child mental health, very preterm children, internalizing**
19 **symptoms, lockdown.**

20 **Abstract**

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22 especially for those individuals who are vulnerable to stress and anxiety due to pre-
23 existing mental health problems. This study aimed to understand the emotional impact
24 of the COVID-19 lockdown on children who were born very preterm (VPT, <32
25 weeks' gestation), as they are vulnerable to mental health difficulties and are at
26 increased risk of developing psychiatric problems during childhood compared to their
27 full-term-born counterparts.

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30 psychopathology following VPT birth completed an online modified version of the
31 Coronavirus Health and Impact Survey (CRISIS). The emotional impact of the
32 COVID-19 lockdown on the child and the parent, measured by the CRISIS, was
33 studied in relation to pre-existing mental health difficulties, assessed with the parent-

34 rated Strengths and Difficulties Questionnaire (SDQ) evaluated before the CRISIS
35 completion (mean time gap 15 months). T-tests, likelihood ratio F-tests, linear
36 regression models and simple slope analyses were conducted to study the effects of
37 COVID-19-related stressors on children's and parents' behavior, relationships and
38 mental health.

39 **Results:** There were no significant group differences in pre-existing SDQ
40 internalizing/externalizing symptoms, child's emotions or parent's emotions during
41 the COVID-19 lockdown. However, higher pre-existing internalizing symptoms in
42 VPT children were associated with greater lockdown-related emotional problems and
43 worries (simple slope=1.95, $p<0.001$), whereas this was not observed in term-born
44 children.

45 **Conclusion:** Our results suggest that VPT children with pre-existing internalizing
46 problems may be more vulnerable to the negative impact of certain societal and
47 familial stressors, such as social restrictions during the national COVID-19 lockdown
48 periods. Further rigorous studies are therefore needed to assess the severity of
49 increased risks for this particularly vulnerable group in the context of potentially
50 stressful life changes and adjustments.

In review

51 **1 Introduction**

52 Restrictions to daily life during the COVID-19 pandemic had profound effects on
53 children's well-being, friendships and mental abilities. Closure and reduction of
54 access to academic settings and routine medical care resulted in decreased social
55 support to children and young people, with likely adverse consequences for their
56 mental health (Meherali et al., 2021, Panchal et al., 2021, Singh et al., 2020). In
57 addition, the COVID-19 pandemic was associated with socioeconomic challenges for
58 some families, due to increasing financial pressure, income decline and job loss
59 (Fegert et al., 2020, Newlove-Delgado et al., 2021). Taken together, such factors
60 contributed to changes in family dynamics during these uncertain times, in some
61 instances exacerbating psychological stress for all family members (Ehrler et al.,
62 2021).

63 Whilst it is now established that the COVID-19 pandemic has caused a global
64 secondary mental health crisis (O'Connor et al., 2021, Kola et al., 2021), this appears
65 to be especially true for those individuals who are vulnerable to stress and anxiety due
66 to pre-existing mental health conditions (Stinson et al., 2021, Viner et al., 2022). In
67 uncertain times and when facing stressful events, such individuals may be particularly
68 worried about what is happening, become socially isolated and, at the extreme end,
69 experience mental health problems (Griffiths et al., 2019, Garcini et al., 2017).

70 Here we studied the emotional impact of the COVID-19 lockdown on children who
71 were born very preterm (VPT, <32 weeks' gestation) as they are vulnerable to stress
72 and anxiety (Brummelte et al., 2012). Furthermore, VPT adolescents have also been
73 found to show a more than twofold incidence of anxiety symptoms in the clinical
74 range compared to their full-term born peers (Treyvaud et al., 2013, Johnson et al.,
75 2010), including increased emotional and behavioral symptoms (Johnson et al., 2019)
76 and attention-deficit/hyperactivity disorder (ADHD) (Rommel et al., 2017). They also
77 have a doubled risk of developing clinically significant anxiety compared to full-term-
78 born children (Somhovd et al., 2012).

79 Given the pre-existing vulnerability of VPT children to mental health difficulties, we
80 investigated the effects of COVID-19-related stressors on children's and parents'
81 behavior, relationships and mental health. We hypothesized that VPT children would
82 be more negatively impacted than their term-born peers by lockdown-related stressors
83 and that their pre-existing mental health would be associated with COVID-19 related
84 emotional problems. Understanding the impact of COVID-19 on VPT children will
85 help us understand what type of mental health support is needed, now and in the
86 future.

87 **2 Methods**

88 This longitudinal study recruited parents of very preterm and full-term born children
89 who had previously taken part in the ongoing Brain, Immunity and Psychopathology
90 following very Preterm birth (BIPP) study.

91 **2.1 Participants**

92 This study recruited parents of very preterm and full-term children who had taken part
93 in the Brain, Immunity and Psychopathology following very Preterm birth (BIPP)
94 study. The BIPP study is currently ongoing, inviting consenting participants who
95 previously took part in the ‘Evaluation of MR imaging to predict neurodevelopmental
96 impairment in the preterm infant’ study (ePrime; EudraCT 2009-011602-42 (Edwards
97 et al., 2018)) to complete a follow-up assessment between the ages of 8 and 10 years.
98 Eligible participants were those who had previously taken part in a behavioral follow-
99 up assessment at the age of 4-7 (Vanes et al., 2021, Kanel et al., 2021). Infants
100 recruited into ePrime had the following inclusion criteria: birth before 33 weeks of
101 gestation, maternal age above 16 years, and mothers not being hospital inpatients.
102 Exclusion criteria were major congenital malformations, contraindications to
103 magnetic resonance imaging, parents not being able to speak English, or being subject
104 to child protection proceedings. 511 very preterm infants delivered at 14 hospitals in
105 the North and South-West London Perinatal Network were recruited at birth between
106 April 2010 and July 2013 (Edwards et al., 2018).

107 Full-term (FT) born controls matched for sex and age are also currently being studied
108 as part of the BIPP study. Controls were recruited via three strategies: asking parents
109 of preterm children to invite a child of the same sex and similar in age within the
110 same academic year to participate in the study, through recruitment letters to local
111 schools and via internal advertisements to college staff and students. Inclusion criteria
112 are full-term birth (38-42 weeks) and birth weight >2500 grams, the exclusion criteria
113 are a history of neurological conditions (meningitis, head injury and cerebral
114 infections) and contraindication for MRI. The BIPP study aims to recruit 240 VPT
115 and 120 term-born participants by August 2024.

116 The parents of 134 BIPP participants (83 VPT children and 51 FT) who had already
117 been assessed in person between October 2018 and July 2021 were contacted via
118 email in September 2021 and asked to complete an online modified version of the
119 Coronavirus Health and Impact Survey (Nikolaidis et al., 2021). The current study
120 included 32 questionnaires completed by a parent of a VPT child and 29
121 questionnaires completed by a parent of a term-born child (Figure 1).

122 This study was conducted in accordance with the ethical standards of the 1964
123 Helsinki Declaration. The study was approved by the King’s College London Ethics
124 Committee (REC: LRS/DP-20/21-21931); ePrime by the Hammersmith and Queen
125 Charlotte’s Research Ethics Committee (REC: 09/H0707/98); BIPP by the South East
126 Research Ethics Committee (REC: 19/LO/1940) and the Stanmore Research Ethics
127 Committee (REC: 18/LO/0048).

128 **2.2 Assessments**

129 The SDQ parent report and the WISC child assessment were conducted in person
130 between October 2018 and July 2021.

131 **CRISIS Questionnaire**

132 The Online Surveys platform (<https://www.onlinesurveys.ac.uk>) was used to obtain
133 participants' informed consent and complete the CRISIS. The survey was completed
134 by one of the child's legal guardians (97% birth mothers, 3% birth fathers). All the
135 other assessments had already been collected as part of BIPP study prior to the
136 CRISIS completion.

137 The CRISIS was created to assess the mental health impact of the COVID-19
138 pandemic, covering key domains relevant to mental distress and resilience (Nikolaidis
139 et al., 2021). All three versions (for adults, parents/caregivers and youth) cover six
140 domains, including COVID-19 exposure, COVID-19-related emotions/worries, life
141 changes, mood states, substance use and daily behaviors. Our online survey used the
142 parent/caregiver form to assess the impact of COVID-19 on children, and the adult
143 self-report form to assess its impact on the responding parent (V1.0,
144 <http://www.crisissurvey.org/download/>). Questions were rephrased to reflect the time
145 during the UK's government-imposed COVID-19 lockdown period, rather than
146 focusing only on the past two weeks, as in the original version. The varying degrees
147 of national restrictions in the United Kingdom ranged from forced "stay at home
148 measures" to eased "2m rules" and "Rule of six" .

149 For this study, we focused only on items in the "Emotions/Worries" sections
150 pertaining to either the child or the parent (see Table 1 and Appendix). Responses to
151 13 items in the Emotions/Worries section of the parent/caregiver form were coded as
152 0 to 4 and the sum of scores was calculated to derive a continuous child emotions
153 variable. The same coding was used for 10 questions in the "Emotions/Worries"
154 section of the adult self-report form, and the sum of scores was calculated as a
155 continuous variable to reflect parent emotions. Internal reliability of both the child
156 and parent emotions subscales were found to be acceptable in our sample, with
157 Cronbach's alpha for the child emotions subscale of 0.828, 95% CI [0.747, 0.880];
158 and for the parent emotions subscale of 0.735, 95% CI [0.622, 0.804].

159 **Strengths and Difficulties Questionnaire (SDQ)**

160 Parents had previously completed the Strengths and Difficulties Questionnaire (SDQ)
161 (Goodman, 1997, Goodman et al., 2010) as part of the BIPP study. The SDQ is a 25-
162 item questionnaire to assess behavioral and emotional symptoms used to evaluate
163 mental health concerns in children and young people aged 4 to 17. The SDQ
164 comprises five sub-scales of five items each: emotional symptoms; conduct problems,
165 hyperactivity/inattention, peer relationship problems and prosocial behavior. For this
166 study, the "Emotional Symptoms" and "Peer relationship" subscales were combined
167 into an internalizing subscale, while the "Conduct problems" and
168 "Hyperactivity/inattention" subscales were combined into an externalizing subscale
169 (Goodman et al., 2010).

170 Internalizing and externalizing subscales were considered to reflect pre-existing

171 psychopathology in the children. However, given the between-participant variation in
172 the amount of time elapsing between completion of the SDQ and the CRISIS, a time
173 gap variable was calculated as the number of days between the SDQ assessments and
174 CRISIS survey completion, which was used in all further analyses as a covariate of
175 interest.

176 **Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV)**

177 The Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV) (Wechsler,
178 2003) was administered as part of the BIPP study. Full-scale intelligence quotient
179 (IQ) scores were derived as a measure of children's cognitive abilities.

180 **2.3 Statistical analysis**

181 Statistical analyses were performed in R-4.2.1 and RStudio-1.4.1717. Independent
182 samples t-tests were used to probe differences between the VPT and the full-term
183 (FT) groups on continuous variables of interest. Separate linear regression models
184 were run to test for the effects of pre-existing internalizing symptoms (or
185 externalizing symptoms, respectively) and group (VPT vs FT) on children's emotions
186 during the lockdown. These regression models controlled for sex, age, time interval
187 (between SDQ and CRISIS assessments), and parent's emotions during the lockdown.

188 Each model was compared to a further model including the interaction between
189 internalizing (or externalizing, respectively) and group using likelihood ratio F-tests,
190 to determine whether the association between pre-existing mental health symptoms
191 and children's emotions differed between groups. In the case of a significant
192 interaction, simple slope analyses were conducted to quantify the effect. Due to group
193 differences in IQ, we also reran these regression analyses after inclusion of IQ as an
194 additional covariate of no interest in all models.

195 **3 Results**

196 **3.1 Sample characteristics**

197 Table 2 presents the characteristics of the study sample. There were more boys than
198 girls in the VPT group and more girls than boys in the control group, but there was no
199 group difference in age, internalizing, or externalizing symptoms. FT children had
200 significantly higher IQ than VPT children. There were no significant differences
201 between participants included in this study and the overall BIPP sample at time of study
202 in terms of SDQ internalizing symptoms, externalizing symptoms, age, or sex
203 distribution, all $ps > .05$.

204 **3.2 COVID-19 related child and parent emotions**

205 In order to explore differences between group in COVID-19 related child and parent's
206 emotions (indexed by the CRISIS), univariate linear regressions were conducted with
207 group, sex, age and time gap as predictors. There was no difference in COVID-19

208 related child emotions between the VPT (M = 16.97, SD = 9.16) and control (M = 15.66,
209 SD = 5.84) groups, B=0.77 [-3.71,5.25], p=0.73; and no difference in parent emotions
210 between the VPT (M = 19.75, SD = 6.48) and control (M = 19.13, SD = 6.17) groups,
211 B=-0.10 [-1.84 3.63,3.41], p=0.95, after accounting for the aforementioned confounders.

212 **3.3 Pre-existing internalizing and externalizing symptoms and COVID-19 related** 213 **child emotions**

214 A model comparison using likelihood ratio F-test demonstrated that the model
215 predicting child emotions during the lockdown from pre-existing internalizing
216 symptoms (and adjusting for age, sex, time gap, and parent's emotions) was
217 significantly improved by the inclusion of an interaction between group and pre-
218 existing internalizing symptoms (F=13.09, p<0.001). The results of this model are
219 shown in Table 3 and Figure 2a. A simple slope analysis revealed that, while in FT
220 children there was no significant association between pre-existing internalizing
221 symptoms and lockdown-related emotional problems (simple slope=0.12, p=0.74),
222 VPT children showed a significant positive association between the two (simple
223 slope=1.95, p<0.001), suggesting that higher pre-existing internalizing symptoms were
224 associated with greater emotional problems and worries during the COVID-19
225 lockdown. Interestingly, after including these effects of pre-existing internalizing
226 symptoms and their interaction with group, the main effect of group on COVID-19
227 related child emotions also became significant, indicating increased emotional
228 problems in VPT compared to FT children (see Table 3) when taking internalizing
229 problems into account. Inclusion of IQ in both the simple and interaction model did not
230 alter the results of the model comparison (F=12.89, p<0.001).

231 Another model comparison using the likelihood ratio F-test demonstrated that the fully
232 adjusted model (age, sex, time gap, and parent emotions) predicting child emotions
233 during the lockdown from pre-existing externalizing symptoms was not significantly
234 improved by the inclusion of interaction between group and pre-existing externalizing
235 symptoms (F=17.97, p=0.53). The results of this model are shown in Table 3 and Figure
236 2b. Results suggest that there was no association between externalizing symptoms and
237 emotional problems and worries during the COVID-19 lockdown in either VPT or FT
238 children. Inclusion of IQ in both the simple and interaction model did not alter the
239 results of the model comparison (F=0.24, p=0.63).

240 **4 Discussion**

241 Results of this study indicate that the emotional impact of the COVID-19 lockdown did
242 not differ between VPT children and their term-born peers as a whole; they also show
243 comparable effects of lockdown-related stressors on emotions and worries of the
244 parents of VPT and full-term children. However, results of this study indicate that
245 specifically among VPT children, higher pre-existing internalizing symptoms were
246 associated with more COVID-19 related emotional problems and concerns during the
247 lockdown. Importantly, these findings control for key demographic variables as well as

248 the parents' own lockdown-related emotions and worries. The latter was indeed found
249 to be significantly associated with children's emotions, which likely reflects both
250 shared familial effects of the lockdown on parent and child, as well as potential rater
251 bias given that all scales were completed by the parent.

252 Our findings are in line with a recent longitudinal study which showed that preterm
253 birth and pre-existing mental health problems were associated with a greater risk for
254 emotional and attention-deficit/hyperactivity disorder symptoms during lockdown
255 (Bailhache et al., 2022). Another study comparing the impact of the COVID-19
256 lockdown on three groups of children found that the lockdown had a substantial
257 influence on the entire family and added stress to families with children who were at
258 risk for neurodevelopmental deficits (Ehrler et al., 2021). Evidence from two British
259 cohorts also suggested that children with autism and their parents, who had experienced
260 more pre-pandemic mental health symptoms, were more likely to have more pandemic-
261 related mental health symptoms (Palmer et al., 2022).

262 In terms of the association between pre-existing psychiatric risk and the emotional
263 impact of national lockdowns, findings to date have been inconsistent. A recent study
264 indicated that the emotional impact of COVID-19 was not exacerbated in children with
265 early brain injury or low IQ (Williams et al., 2022); another study showed a detrimental
266 impact of lockdowns on mental well-being only in young people without pre-existing
267 depressive symptoms (Joensen et al., 2022). However, other studies found that the
268 lockdown had severely increased pre-existing stress and depression (Buneviciene et al.,
269 2022, Palit et al., 2022), suggesting there is substantial heterogeneity in COVID-19
270 related emotional impact across different populations (Ma et al., 2021, Panchal et al.,
271 2021, Lovato et al., 2022, Stinson et al., 2021, Viner et al., 2022). Our findings suggest
272 that preterm children with pre-existing psychopathology represent a particularly
273 vulnerable group in this context.

274 This study has several limitations. Firstly, the CRISIS questionnaire was administered
275 only once and probed parents' and children's emotion during the course of COVID-19
276 lockdown, thus preventing a detailed evaluation of the timing and trajectories of
277 lockdown effects on mental health. Some studies have in fact described gradually
278 increasing symptom severity at the beginning of lockdown, which decreased after the
279 lockdown ended (Castellini et al., 2021, Caldiroli et al., 2022), while others suggested
280 that the most severe mental health symptoms occurred in the early stages of lockdown,
281 but declined fairly rapidly afterwards (Fancourt et al., 2021). Secondly, our sample size
282 is relatively small for both groups, and findings therefore may not be generalizable to
283 all VPT and term children; however, the studied sample did not significantly differ from
284 the overall sample in terms of key characteristics such as age, sex, and psychopathology,
285 which have also been tested in other analysis based on the same sample (Leoni et al.,
286 2022, Leoni et al., 2023). Our study is also limited by the non-random sampling method
287 for term-born peers, although this approach may ensure greater similarity between
288 control and preterm participants (Marlow et al., 2005). Thirdly, all assessments relied
289 on parent-report, which could have led to measurement bias, although we included

290 parents' emotional problems as a confounding variable in our analyses to control for
291 this. Finally, as our findings relate to a UK-based sample, their generalizability to other
292 countries may be limited, given substantial differences in relevant variables such as
293 healthcare or severity of nationally imposed COVID-related restrictions.

294 **5. Conclusion**

295 This study demonstrates that internalizing problems were associated with greater
296 susceptibility to a negative emotional impact of the COVID-19 lockdown in VPT, but
297 not term-born children. Our results suggest that VPT children with pre-existing
298 internalizing problems may be more vulnerable to the negative impact of certain
299 societal and familial stressors, such as social restrictions during the national COVID-
300 19 lockdown periods. Further rigorous work is required to assess the severity of
301 increased risks for this particularly vulnerable group in the context of potentially
302 stressful life changes and adjustments.

303 **Data Availability Statement**

304 Datasets are available on request: The raw data supporting the conclusions of this
305 article will be made available by the authors, without undue reservation.

306 **Author Contributions**

307 ZS, LH, CN, LV have substantial contributions to the conception or design of the
308 work as well as the acquisition, analysis, or interpretation of data for the work. All
309 authors contributed to drafting the work or revising it critically for important
310 intellectual content as well as the final approval of the version to be published. ZS,
311 CN, LV agree to be accountable for all aspects of the work in ensuring that questions
312 related to the accuracy or integrity of any part of the work are appropriately
313 investigated and resolved.

314 **Conflict of Interest**

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

317 **Acknowledgments**

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319 **Reference**

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In review

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Table 1 Adapted CRISIS questions for each item included in the primary outcome variables (child’s emotions and parent’s emotions).

Variable	Item
Child emotions/worries (during the lockdown period):	1. How worried was your child generally?
	2. How happy versus sad was your child?
	3. How much was your child able to enjoy his/her usual activities?
	4. How relaxed versus anxious was your child?
	5. How fidgety or restless was your child?
	6. How fatigued or tired was your child?
	7. For their age, how well has your child been able to concentrate or focus?
	8. How irritable or easily angered was your child?
	9. How physically aggressive towards others was your child?
	10. How physically aggressive have others been towards your child?
	11. How lonely was your child?
	12. How worried was your child about being infected?
	13. How worried was your child about friends or family being infected?
Parent’s emotions/worries (during the lockdown period):	1. How worried were you generally?
	2. How happy versus sad were you?
	3. How much were you able to enjoy your usual activities?
	4. How relaxed versus anxious were you?
	5. How fidgety or restless were you?
	6. How fatigued or tired were you?
	7. How well were you able to concentrate or focus?
	8. How irritable or easily angered were you?
	9. How lonely were you?
	10. How worried were you that you or someone in your family would become infected?

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Table 2 Demographic, clinical, cognitive and pre-lockdown mental health characteristics of the study participants.

	Variable	Full-term (n=29)	Preterm (n=32)	Statistics
Demographic and clinical measures	Sex n (number, %)			Chi-Square
	Male	8 (27.6)	20 (62.5)	X ² =6.13 *
	Female	21 (72.4)	12 (37.5)	
		Mean (SD)	Mean (SD)	t (95%CI)
	Age	8.8 (0.8)	8.7 (0.7)	0.58 (-0.27, 0.49)
	Gestational Weeks	39.9 (1.2)	29.8 (2.3)	22.08 (9.14, 10.97) ***
Pre-lockdown measures	IQ	112.1 (12.5)	104.0 (16.0)	2.19 (0.70, 15.45) *
	SDQ Externalising	4.9 (2.9)	6.3 (3.7)	-1.66 (-3.05, 0.28)
	SDQ Internalising	4.7 (3.0)	5.9 (2.7)	-1.57 (-2.62, 0.32)

474 *- $p < 0.05$; **- $p < 0.01$; ***- $p < 0.001$

475 *SD*- standard deviation; *SDQ* - Strengths and Difficulties Questionnaire.

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477 **Table 3** COVID-19 related child's emotions model predictors

Dependent variable: Child's emotions during lockdown		
Model 1 Predictors	B [95% CI]	p-value
Group: VPT	-10.28 [-16.53, -4.04]	0.002
Age	0.64 [-1.64, 2.92]	0.575
Sex: Male	0.63 [-2.63, 3.88]	0.702
Time gap	0.00 [-0.00, 0.00]	0.413
Pre-lockdown internalizing symptoms	0.12 [-0.59, 0.83]	0.740
Parent's emotions during lockdown	0.59 [0.35, 0.83]	<0.001
Interaction of group and internalizing symptoms	1.84 [0.81, 2.86]	<0.001
Model 2 Predictors	B [95% CI]	p-value
Group: VPT	0.63 [-3.15, 4.42]	0.346
Age	1.46 [-1.28, 4.21]	0.291
Sex: Male	-0.66 [-4.61, 3.27]	0.736
Time gap	0.00 [-0.00, 0.01]	0.223
Pre-lockdown externalizing symptoms	0.24 [-0.31, 0.79]	0.378
Parent's emotions during lockdown	0.69 [0.40, 0.98]	<0.001

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480 **Figure Caption**

481 Figure 1: Flow chart of participants inclusion. For the follow-up at 4-7 years of age, a
482 convenience sample (N=251) was recruited corresponding to 82% of 306 participants
483 who were past their fourth birthday by the follow-up study end date (September 1st,
484 2019), and had consented to be contacted for future research.

485 Figure 2: Scatter linear regression plot describing associations between pre-existing
486 internalizing (a) and externalizing (b) symptoms and emotions during lockdown in
487 VPT and FT children.

In review

Figure 1.JPEG

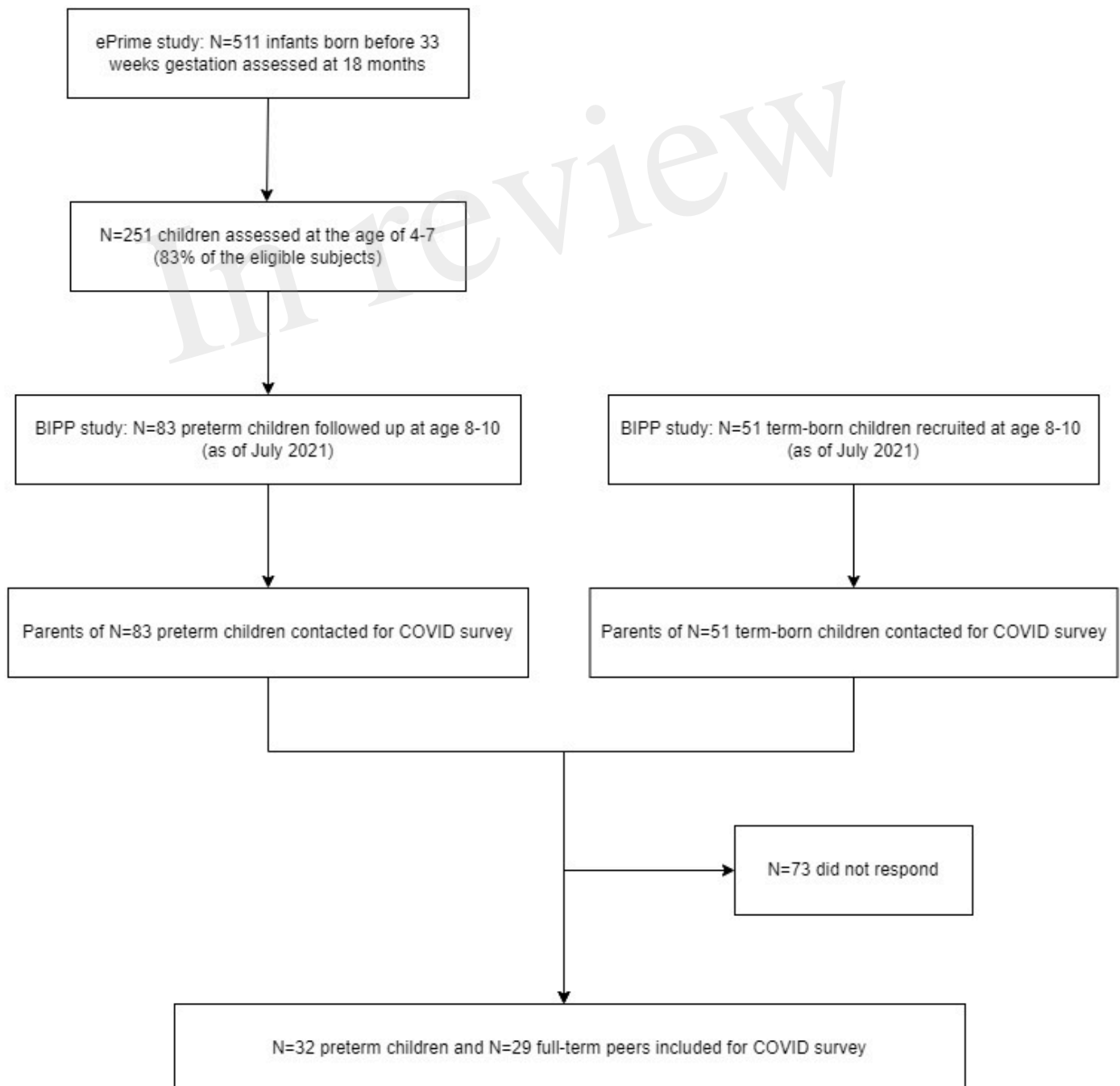


Figure 2.JPEG

