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Assessing the impact of the Covid-19 pandemic on parental satisfaction in two European neonatal intensive care units

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Complete List of Authors:	Zorro, Carolina; King's College Hospital NHS Foundation Trust MacRae, Eva; King's College Hospital NHS Foundation Trust Teresa-Palacio, Marta; Barcelona Clinic University Hospital Biomedical Diagnosis Center, Neonatology Department Williams, Emma E.; King's College London, Department of Women and Children's Health Aldecoa-Bilbao, Victoria; Barcelona Biomedical Research Park, Neonatology Department Bhat, Ravindra; King's College Hospital NHS Foundation Trust, Neonatal Intensive Care Unit Hickey, Ann; King's College Hospital NHS Foundation Trust, Neonatal Intensive Care Unit Dassios, Theodore; King's College London, Department of Women and Children's Health, School of Life Sciences, Faculty of Life Science and Medicine; King's College Hospital NHS Foundation Trust, Neonatal Intensive Care Centre Greenough, Anne; King's College London, Department of Women and Children's Health, School of Life Sciences, Faculty of Life Science and Medicine; King's College London, Asthma UK Centre for Allergic Mechanisms in Asthma
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3 **Assessing the impact of the Covid-19 pandemic on parental satisfaction in two**
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5 **European neonatal intensive care units**
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10 Carolina Zorro¹, Eva MacRae¹, Marta Teresa-Palacio⁵, Emma E. Williams², Victoria
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12 Aldecoa-Bilbao⁵, Ravindra Bhat¹, Ann Hickey¹, Theodore Dassios^{1,2} and Anne
13
14 Greenough^{2,3,4}
15
16
17
18

19 ¹ Neonatal Intensive Care Centre, King's College Hospital NHS Foundation Trust,
20
21 London, United Kingdom
22

23 ² Department of Women and Children's Health, School of Life Course Sciences,
24
25 Faculty of Life Sciences and Medicine, King's College London, United Kingdom
26
27

28 ³ Asthma UK Centre for Allergic Mechanisms in Asthma, King's College London,
29
30 United Kingdom
31

32 ⁴ NIHR Biomedical Research Centre based at Guy's and St Thomas' NHS
33
34 Foundation Trust and King's College London, United Kingdom
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37 ⁵ Neonatology Department, Hospital Clinic Barcelona. BCNatal (Barcelona Center for
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39 Maternal-Foetal and Neonatal Medicine), Barcelona, Spain
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47 Corresponding author: Carolina Zorro. Neonatal Intensive Care Centre, 4th Floor
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49 Golden Jubilee Wing, King's College Hospital, Denmark Hill, London, SE5 9RS,
50
51 United Kingdom. Tel: +44 0203 299 8744 ; E-mail: carolina.zorro@nhs.net
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58 **Key words:** Covid-19; parental satisfaction; neonatal care
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ABSTRACT

Background: Neonatal units across the world have altered their policies to prevent the spread of infection during the Covid-19 pandemic. Our aim was to evaluate the impact of the pandemic on the experience of parents with newborns admitted to two tertiary neonatal intensive care units.

Methods: Parents of infants admitted to each neonatal unit were asked to complete a questionnaire regarding their experience during the Covid-19 pandemic. At Kings College Hospital, UK (KCH) data were collected prospectively between June 2020 and August 2020 (first wave). At the Hospital Clínic Barcelona (BCN) data were collected retrospectively from parents whose infants were admitted between September 2020 and February 2021 (second and third wave).

Results: A total of 74 questionnaires were completed (38 from KCH and 36 from BCN). The parents reported that they were fully involved or involved in the care of their infants in 89.4% of the responses in KCH and 91.6% in BCN. Quality time spent with infants during the pandemic was more negatively affected at KCH compared to BCN (63.2% versus 33.3%; $p=0.01$). Parents felt either satisfied or very satisfied with the updates from the clinical care team in 79.0% of the responses at KCH and 83.4% in BCN. The parents felt that the restrictions negatively affected breastfeeding in 15.8% of the responses at KCH and 5.2% in BCN. Travelling to the hospital was reported overall to be sometimes difficult (39.2%), this did not differ significantly between the two units ($p=0.826$). Furthermore, the self-reported amount of time spent giving kangaroo care did not differ significantly between the two countries ($p=0.05$).

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3 **Conclusion:** Restrictive visiting policies implemented due to the Covid-19 pandemic
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5 had a negative impact in perception of quality of time spent by parents with their
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7 newborns admitted to neonatal units.
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INTRODUCTION

The COVID-19 pandemic forced health care systems worldwide to introduce mitigating measures to reduce the impact of the disease. One of the recommendations was that “numbers of visitors and visiting periods should be highly restricted”.^[1] The Royal College of Paediatrics and Child Health (RCPCH) and the British Association of Perinatal Medicine (BAPM) issued guidance to aid policy makers.^[2] In response, many neonatal intensive care units amended their unit policies to maintain the safety of infants, parents and clinical staff, whilst continuing to promote family integrated care. The universal responses by most healthcare organisations in imposing restrictions particularly in the early stages, however, often did not consider the unique situation that arises with the newborn mother-baby dyad. A recent review suggested that the restrictions implemented by neonatal units during the Covid-19 pandemic increased parent and infant separation and subsequently reduced the establishment of successful breast-feeding.^[3] Furthermore, a joint UK and US survey of parental perceptions on visiting restrictions during the pandemic highlighted that parents reported reduced involvement and bonding experiences with their infant.^[4] Those findings, together with baseline risks already associated with the perinatal and postnatal periods, could worsen long-term parental mental health when the heightened general anxiety around the pandemic is considered.^[5] Indeed, parents report visiting restrictions limit their ability to bond and participate in their infant’s care, with concern expressed about receiving insufficient information and medical updates due to restrictions limiting ward round attendance.^[4, 6, 7] Furthermore parents described having unmet requirements for emotional and psychological support and facing difficulties with transport, work and medical expenses following discharge.^[8]

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3 The aim of this current study was to assess the effect of the pandemic on parental
4 experience within two neonatal intensive care units in Europe. Specifically, we
5 wanted to explore common themes experienced by families with infants admitted to
6 intensive care during the pandemic in two healthcare settings in Europe.
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14 **METHODS**

15 **London (KCH)**

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17 The neonatal unit at King's College Hospital NHS Foundation Trust (London, UK) is
18 a tertiary medical and surgical neonatal unit with an average of 700 annual
19 admissions. It has a total bed capacity of 36, including 12 intensive care cots, 12
20 high dependency care cots, 12 special care cots and an isolation room. In 2020,
21 there were 4,266 births with 575 infants admitted to the neonatal unit (13.4%), which
22 was the lowest admission rate in the last 10 years. Of all the admissions 194 (33.7%)
23 required intensive care, 261 (45.4%) were preterm <37 weeks and 100 (17.4%)
24 weighed less than 1500 grams. Parent facilities on-site include a coffee room and a
25 rest area with one rooming-in room. Pre-pandemic visiting policy allowed both
26 parents, grandparents, siblings and other family members to visit, with two adults at
27 the cot-side at any one time. Changes to the unit policy at King's College Hospital
28 during the Covid-19 pandemic were introduced in March 2020 following
29 recommendations from the Royal College of Paediatrics and Child Health (RCPCH)
30 and British Association of Perinatal Medicine (BAPM). Only one parent could visit
31 their baby at a time and no siblings (except twins) or other family members could
32 visit. The parents' facilities including coffee room, rest area and rooming-in room
33 were closed and parents were advised not to congregate in the reception area.
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35 Further, parents were advised to practice social distancing and to always wear face
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3 masks as per Government guidance. The unit continued to remain open for
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5 restrictive visiting 24/7. Parents were only able to spend time by their own infant's
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7 cot-side and advised to bring a separate shirt with them to the unit for kangaroo care.
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10 A maximum of four mothers were allowed in the expressing room. Parental craft
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12 skills and cares such as kangaroo care, nappy changes, skin care, feeding, bathing
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14 the baby and temperature measurements were all still actively encouraged.
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17 Furthermore, breast feeding support continued to be available every day of the
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19 week. When parents had to self-isolate, videocalls were arranged daily so they could
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21 see their baby. During the study period, there were no Covid-positive cases in infants
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23 admitted to the unit, but three parents tested positive for coronavirus and had to self-
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25 isolate.
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31 **Barcelona (BCN)**

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33 The neonatal unit at Hospital Clínic Barcelona (Barcelona, Spain) is a tertiary
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35 neonatal unit with an average of 550 annual admissions. It has a total bed capacity
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37 of 28 including eight intensive care cots, eight high dependency care cots and 12
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39 special care cots. In 2020, there were 3,295 births with 452 infants admitted to the
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41 neonatal unit (13.7%). From all the neonatal admissions, 211 (46.7%) required
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43 intensive care, 347 (76.7%) were preterm infants (<37 weeks) and 83 (23.9%)
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45 weighed less than 1500 grams. Parent facilities on-site include a coffee room and
46
47 rest area and there are 15 live video cameras available in the unit for families to see
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49 their infant when unable to visit. Pre-pandemic visiting policy allowed both parents,
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51 grandparents and siblings to enter the unit in groups of two people each time and the
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53 unit remained opened 24/7. From March 2020, following the Spanish Society of
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55 Neonatology (*Sociedad Española de Neonatología*) (SENEO) recommendations to
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3 prevent the spread of COVID-19 infection, a restrictive visiting policy was
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5 implemented. Only parents could visit their baby, one at a time, and they were
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7 required to wear a face mask at all times whilst on the unit. The parent facilities
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9 remained opened 24/7 but only one family could visit the parent room at any one
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11 time. From June 2020, a less restrictive visiting policy was implemented and both
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13 parents could visit their baby simultaneously, providing they did not have any
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15 coronavirus symptoms and had not been in contact with any person who had tested
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17 positive. There were no Covid-positive cases in babies admitted to the unit or their
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19 parents during the study period.
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26 **Questionnaire completion**

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28 Parents of infants admitted to Kings College Hospital, UK (KCH) neonatal intensive
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30 care unit were asked to complete a questionnaire prospectively regarding their
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32 experience during the Covid-19 pandemic. The parents received a written
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34 questionnaire and completed this when visiting their infant. Parents of infants
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36 admitted to the Hospital Clinic, Barcelona (BCN) neonatal intensive care unit were
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38 asked retrospectively to complete the same questionnaire which were sent online
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40 through an app utilised by the hospital which meets legal requirements of
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42 confidentiality. One questionnaire was given to each household and the responses
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44 from both countries were anonymised. Parents were eligible to complete the survey
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46 if their infant was admitted to the neonatal unit for at least one week. Parents of
47
48 infants receiving palliative care were excluded from the study. The questionnaire
49
50 contained only six questions aimed at assessing parental experience during the
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52 pandemic, and hence would be rapid and burden free for parents to complete. The
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54 questionnaire considered specific Covid-19 guidance laid out by the RCPCH, BAPM,
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3 SENE0 and the neonatal charity Bliss. Furthermore, parents were also requested to
4
5 give free text recommendations as to how the service could be improved during the
6
7 pandemic.
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12 At KCH data were collected prospectively over a six-week period, between 25th June
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14 2020 to 5th August 2020 (first wave). At BCN the data were collected retrospectively
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16 from parents whose infants were admitted between 22nd September 2020 to 28th
17
18 February 2021 (second and third wave) and when less restrictive visiting policies
19
20 were in place. Differences in parental experience between the two neonatal units
21
22 were compared for statistical significance using the Mann Whitney U test and
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24 analysed using SPSS version 26.
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31 **Patient and Public Involvement**

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35 It was not appropriate or possible to involve patients or the public in the design, or
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37 conduct, or reporting, or dissemination plans of our research due to the unpredicted
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39 nature of the Covid pandemic and associated restrictions.
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50 **RESULTS**

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52 A total of 74 questionnaires were analysed, 38 from KCH and 36 from BCN. Just
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54 over half of the parents felt fully involved with the care of their infant (58.1%),
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56 however this was larger in BCN compared to KCH (72.2% versus 44.7%; $p=0.027$).
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58 Quality time spent with infants during the pandemic was more negatively affected in
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3 KCH compared to BCN (63.2% versus 33.3%; $p=0.01$). For both countries, 59.5% of
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5 responders reported the pandemic did not affect the time spent breastfeeding, and
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7 62.2% reported giving Kangaroo Care was mostly unchanged. Parents from both
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9 units were satisfied with clinical updates from medical and nursing staff throughout
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11 the pandemic. Travelling back and forth to the hospital to visit their infant was
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13 reported overall to be sometimes difficult (39.2%), however this was no different in
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15 either country ($p=0.826$).
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22 The questionnaire incorporated a section where parents could write comments about
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24 their experience in the neonatal unit, including any suggestions they had to improve
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26 this.
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30 31 **KCH comments**

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33 Many parents expressed concern over the visiting restrictions as they worried it
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35 would impact on how often they would be able to see their baby and bond with them,
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37 although they appreciated the reasons for this. There were mothers who described
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39 having less time with their baby so that the fathers could also visit. Some parents
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41 described the impact it had on their emotional well-being as well as mental health
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43 and wishing their partner could be present to support them. Difficulties were
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45 expressed balancing home life with frequent visits to the hospital, especially with
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47 siblings or twins at home. Single parents requested being able to nominate a family
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49 member to provide additional support. A comment was made that opportunities to
50
51 express breast milk were affected by limited spaces in the expressing room due to
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53 the need for social distancing. One parent also felt that having less time with the
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55 baby reduced feeding opportunities. A few parents voiced that although wearing a
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3 face mask was understandable, it also made bonding difficult. They expressed
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5 feeling “sad” that their baby had never seen them without a mask. Parents worried
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7 that not being able to read their facial expressions might have consequences for the
8
9 baby’s development. A suggestion was made asking if doctors could offer regular
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11 conference calls to allow parents to discuss the medical care of their baby together.
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13 Overall, parents were very happy and thankful for the clinical care and continuous
14
15 support provided, despite the challenges of the pandemic.
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21 **BCN comments**

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23 The quality of time parents spent with their infant was reported by one family to have
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25 been negatively affected by the pandemic, mostly by the wearing of face masks
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27 which did not allow the parents to kiss their baby. Furthermore, quality of time was
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29 reported to be reduced by not being able to have other family members visit their
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31 infant. Parents did however report finding it particularly exciting seeing their infant’s
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33 name coloured on the wall next to their incubator and being able to use cameras to
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35 see them at any time.
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42 **DISCUSSION**

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44 We demonstrate that parents reported the overall quality of time spent with their
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46 infant to be reduced, especially when more restrictive policies were in place. This
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48 may also be related to the difficulties in travel to the hospital. Concerns were
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50 highlighted about parental emotional wellbeing, feelings of anxiety, bonding as a
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52 family and lack of support from partners.
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56 We considered why variation in parental satisfaction between the two countries may
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58 exist. Anxiety and apprehension during the first wave was high, with rates of major
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3 depressive symptoms in pregnant women within the UK peaking at 42%,^[9]
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5 compared to a lower proportion in Spain reporting such symptoms (38%).^[10] In our
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7 study parents with infants admitted to neonatal intensive care were asked to respond
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9 to the questionnaire during different waves of the pandemic. We speculate that the
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11 higher levels of self-reported quality time spent with infants and overall greater
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13 parental satisfaction in Barcelona than the UK may be secondary to previously
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15 reported lower baseline rates of depressive symptoms in pregnancy within the
16
17 Spanish population. More so, parents in the UK were also asked to complete the
18
19 questionnaire when visiting was most restrictive. Such differences in self-reported
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21 parental satisfaction within our study agree with a recent UK and US survey which
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23 explored varying policies between units, with a greater negative parental impact
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25 identified during stricter restrictions.^[7]
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33 Muniraman and colleagues conducted a cross-sectional survey of parents impacted
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35 by visitation policies in six tertiary neonatal units, from the UK and the USA
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37 assessing their visitation policies and impact on parents' ability to visit, care for and
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39 bond with their infants. In a total of 231 responses they reported that the visitation
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41 policies were perceived as restrictive by 62% of the respondents and 41% reporting
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43 being unable to bond enough. Mild to severe impact on breast feeding was reported
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45 by 36% (75/209) of respondents. Our study generally agrees with the above findings
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47 and complements the literature by reporting on two separate populations in two
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49 European countries with the Barcelona cohort coming later in time in the pandemic
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51 (up to February 2021 compared to August in 2020 in Muniraman et al.^[7]
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57 When considering important outcome related factors however, our questionnaire
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59 highlights that many parents within both the UK and Spain do not report a significant
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3 reduction in time spent breast-feeding or provision of kangaroo care. Furthermore,
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5 parental satisfaction in receiving medical updates was not affected regardless of
6
7 which pandemic restriction policy was employed.
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11 Less restrictive measures were in place during completion of the questionnaire in
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13 Barcelona, when both parents were able to visit their infant. Having both parents at
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15 the cot-side together may have facilitated kangaroo care, family-integrated care and
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17 receiving joint medical updates to both parents simultaneously.
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21 There were many comments made in our study regarding the impact on parental
22
23 emotional wellbeing. It is crucial that health professionals remain vigilant in
24
25 identifying parents who require additional emotional support and sign posting them to
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27 appropriate organisations.
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31 The availability of live video cameras within the neonatal unit in Spain for when
32
33 parents were unable to visit their infant may have been vital in parents feeling more
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35 involved with the care of the infant despite not being physical present. Our survey
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37 highlights the importance of incorporating different modalities into our clinical care
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39 such as telephone conferencing and secure video messaging. Indeed, one study
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41 reported that asynchronous video messaging supported models of family integrated
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43 care, improved parental experience and emotional closeness to their baby and built
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45 strong relationships between families and staff.[11] Furthermore, the use of cot-side
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47 cameras has been associated with a reduction in parental stress when infant
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49 separation occurs.[12] Such advancements in technology may thus be beneficial not
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51 only during future pandemics, but also in the provision and delivery of universal,
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53 sustainable and accessible neonatal care.
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3 Utilisation of digital innovations as a standard of care when considering service
4 provision and re-design of units may indeed remove some of the barriers and
5 obstacles often currently experienced by parents and health care workers in being
6 able to provide and promote family integrated care, and thus such advances may be
7 a beneficial side-product of the pandemic.[13-15]
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16 Mask wearing is a highly effective measure in reducing virus transmission at a
17 population level.[16] The use of face masks was a recurring theme expressed by
18 parents from both the UK and Spain. Wearing of face masks by parents whilst with
19 their infant was identified as a particular source of anxiety in both countries with
20 concern over the impact upon bonding. Indeed, there is little knowledge of this with
21 respect to the longer-term consequences on infant neurodevelopment. Wearing of
22 face masks may affect attachment processes between parents and their infant within
23 the first few days of life when there is little exposure to and visualisation of parental
24 facial expressions.[17] Suggested recommendations from the RCPCH with specific
25 regard to face mask coverings is that consideration for removal should be given for
26 asymptomatic parents when providing kangaroo care.[18] Furthermore, use of
27 transparent facemasks or visors, alongside regularly talking through the mask,
28 should be encouraged to enable bonding and attachment opportunities.[19] Balance
29 of risk must be made however between the unknown adverse impact of face
30 coverings on infant neurodevelopment with the global benefits of face masks in
31 reducing virus transmission.
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52 This study has strengths and some limitations. We have surveyed parents from two
53 tertiary neonatal intensive care units in Europe incorporating two different policies on
54 parental visiting during the Covid-19 pandemic. Answers from both cohorts of
55 parents, with different visiting restrictions, may therefore be useful in guiding further
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3 visiting policies in future pandemics to ensure parental satisfaction is taken into
4 consideration. Data were collected from KCH during the first wave of the pandemic
5 when lock down restrictions were being enforced, thereby capturing an accurate
6 depiction of parental experience in real time. Contrary to this, data from BCN were
7 collected retrospectively and when less restrictive visiting policies were in place, and
8 as such may have positively impacted the reflections of parents who were at home
9 when completing the form. Furthermore, we did not however have survey responses
10 to assess baseline perception and involvement in care pre-pandemic and thus how
11 self-reported parental satisfaction may have changed within each country when
12 visiting restrictions and policies were implemented.
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26 The long-term impact of the pandemic upon parents and infants admitted to neonatal
27 care is not known.
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33 In conclusion, restrictive visiting policies implemented due to the Covid-19 pandemic
34 have affected families with infants admitted to neonatal intensive care. Quality of
35 time spent with the babies was felt to be significantly affected, especially when more
36 restrictive visiting policies were implemented. Parental involvement in the care of
37 their babies and satisfaction with the care that infants received and with medical and
38 nursing updates, however, remained positive. The amount of time spent
39 breastfeeding and giving Kangaroo Care decreased during the pandemic, but was
40 not significantly different between the two units
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Competing interest statement: The authors have no conflict of interest to declare

Authors contribution:

Carolina Zorro designed the study, participated in the analysis of data and the writing of the manuscript

Eva MacRae participated in the design of the study, data acquisition, participated in the analysis and critically revised the manuscript

Marta Teresa-Palacio acquired the data from BCN, participated in the analysis and critically reviewed the manuscript

Emma E. Williams participated in the analysis of data and the writing of the manuscript

Victoria Aldecoa-Bilbao acquired the data from BCN, participated in the analysis and critically reviewed the manuscript

Ravindra Bhat participated in the design of the study and critically reviewed the manuscript

Ann Hickey participated in the design of the study and critically reviewed the manuscript

Theodore Dassios participated in the analysis of data and the writing of the manuscript

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3 Anne Greenough supervised the project, participated in the design and
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5 analysis of the study and critically revised the manuscript
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10 **Data sharing statement:** Data will be shared on reasonable request

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12 **Patient consent:** All parents consented to take part in the survey
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What is known about the subject

- The COVID-19 pandemic has led to restrictive visiting policies across neonatal units.
- Visiting policies varied between centers and over time, being stricter at the beginning of the pandemic.

What this study adds

- Despite the restrictive visiting policies implemented satisfaction with the care that infants received and with medical updates remained positive.
- Overall time spent in breastfeeding and in Kangaroo Care was affected by the pandemic but there were no significant differences between different visiting policies.
- The use of facemasks generates parental anxiety and difficulties in bonding with their babies.

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FIGURE LEGENDS

Figure 1: Parental involvement in the care of their babies

Figure 2: Effect of the pandemic in the quality of time spend with their babies

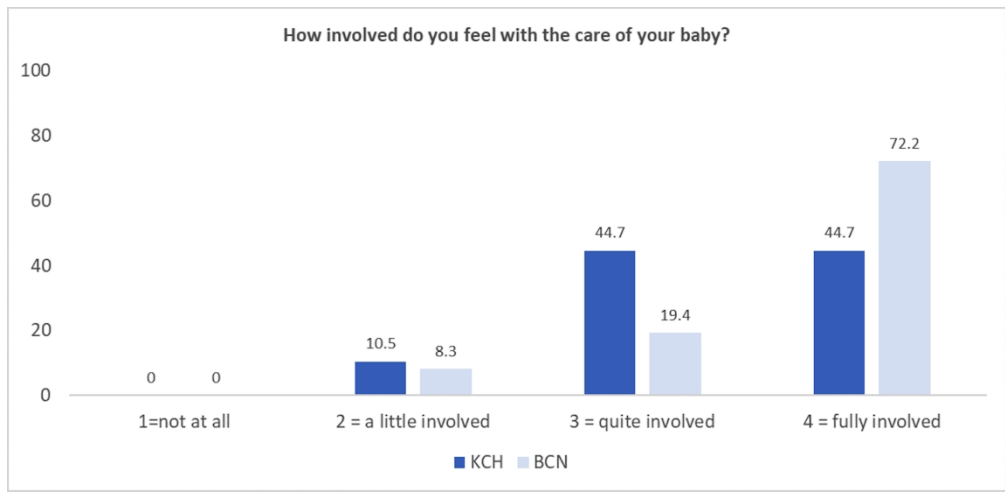
Figure 3: Effect of the pandemic in the amount of time spend giving Kangaroo Care

Figure 4: Effect of the pandemic in the amount of time spend breastfeeding

Figure 5: Parental satisfaction with the updates from the medical and nursing staff regarding their babies

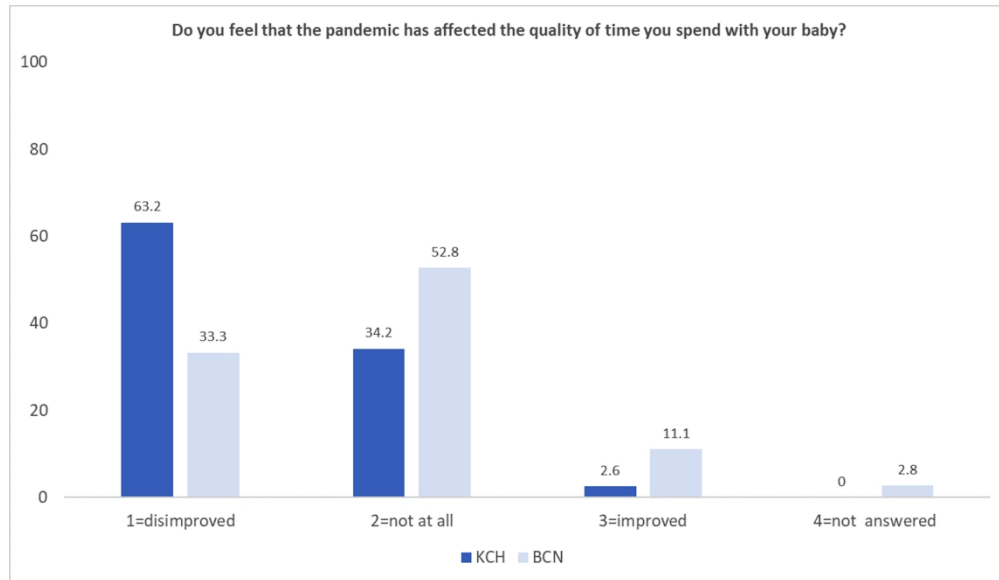
Figure 6: Parental difficulties in commuting to the hospital

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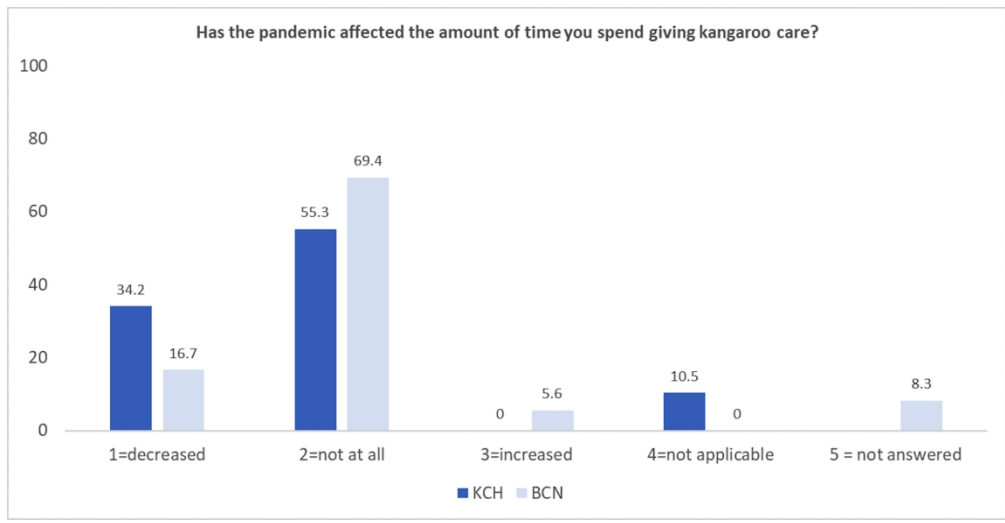
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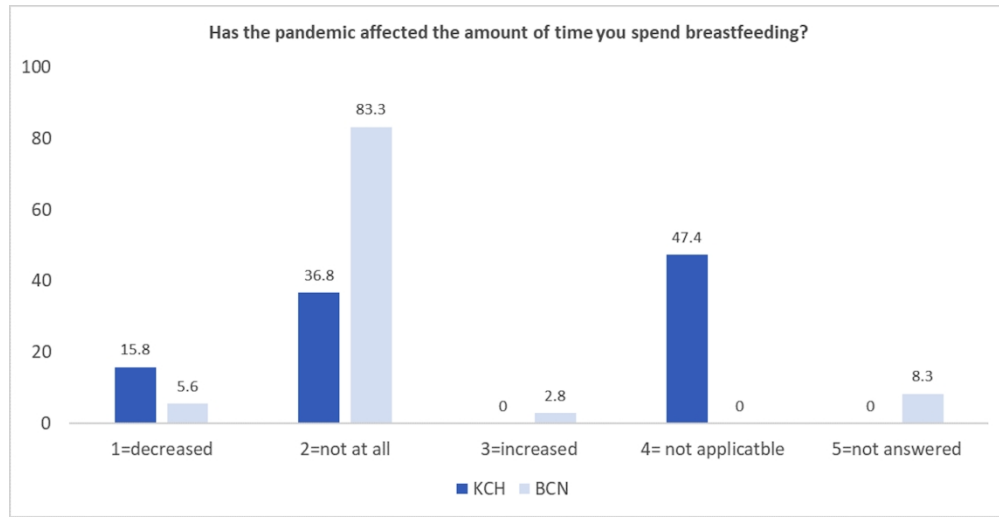


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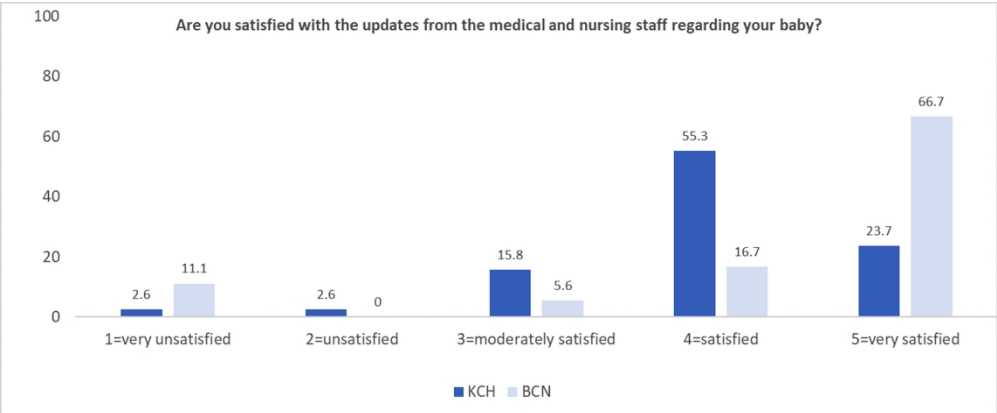


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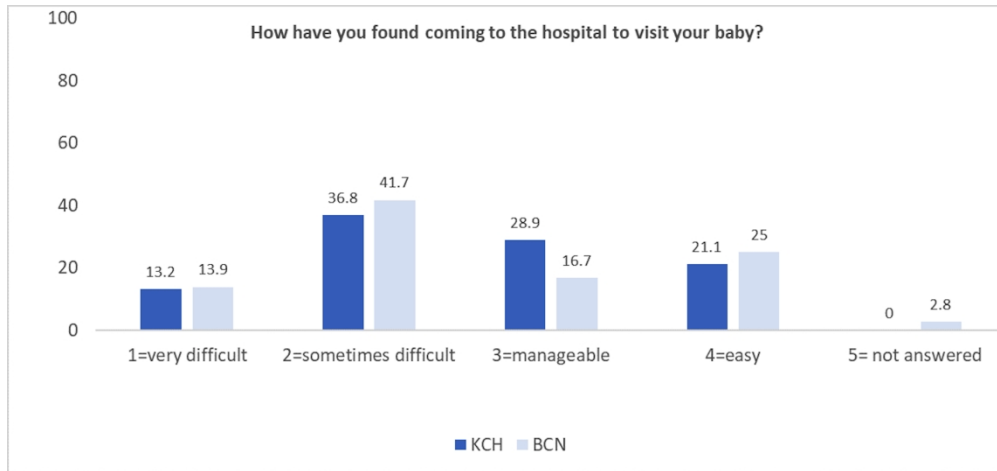
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Assessing the impact of the Covid-19 pandemic on parental satisfaction in two European neonatal intensive care units

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3 **Assessing the impact of the Covid-19 pandemic on parental satisfaction in two**
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5 **European neonatal intensive care units**
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10 Carolina Zorro¹, Eva MacRae¹, Marta Teresa-Palacio⁵, Emma E. Williams², Victoria Aldecoa-
11 Bilbao⁵, Ravindra Bhat¹, Ann Hickey¹, Theodore Dassios^{1,2} and Anne Greenough^{2,3,4}
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18 ¹ Neonatal Intensive Care Centre, King's College Hospital NHS Foundation Trust, London,
19 United Kingdom
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22 ² Department of Women and Children's Health, School of Life Course Sciences, Faculty of
23 Life Sciences and Medicine, King's College London, United Kingdom
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27 ³ Asthma UK Centre for Allergic Mechanisms in Asthma, King's College London, United
28 Kingdom
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32 ⁴ NIHR Biomedical Research Centre based at Guy's and St Thomas' NHS Foundation Trust
33 and King's College London, United Kingdom
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37 ⁵ Neonatology Department, Hospital Clinic Barcelona. BCNatal (Barcelona Center for
38 Maternal-Foetal and Neonatal Medicine), Barcelona, Spain
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45 Corresponding author: Carolina Zorro. Neonatal Intensive Care Centre, 4th Floor Golden
46 Jubilee Wing, King's College Hospital, Denmark Hill, London, SE5 9RS, United Kingdom.
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48 Tel: +44 0203 299 8744 ; E-mail: carolina.zorro@nhs.net
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57 **Key words:** Covid-19; parental satisfaction; neonatal care
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ABSTRACT

Background: Neonatal units across the world have altered their policies to prevent the spread of infection during the Covid-19 pandemic. Our aim was to report parental experience in two European neonatal units during the pandemic.

Methods: Parents of infants admitted to each neonatal unit were asked to complete a questionnaire regarding their experience during the Covid-19 pandemic. At Kings College Hospital, UK (KCH) data were collected prospectively between June 2020 and August 2020 (first wave). At the Hospital Clínic Barcelona (BCN) data were collected retrospectively from parents whose infants were admitted between September 2020 and February 2021 (second and third wave).

Results: A total of 74 questionnaires were completed (38 from KCH and 36 from BCN). The parents reported that they were fully involved or involved in the care of their infants in 34 (89.4%) responses in KCH and 33 (91.6%) responses in BCN. Quality time spent with infants during the pandemic was more negatively affected at KCH compared to BCN [n=24 (63.2%) versus n=12 (33.3%]. Parents felt either satisfied or very satisfied with the updates from the clinical care team in 30 (79, 0%) responses at KCH and 30 (83, 4%) responses in BCN. The parents felt that the restrictions negatively affected breastfeeding in 6 (15.8%) responses at KCH and 2 (5.6%) responses in BCN. Travelling to the hospital was reported overall to be sometimes difficult (39.2%); this did not differ-between the two units [14 (36.8%) respondents at KCH and 15 (41.6%) from BCN]. Furthermore, the self-reported amount of time spent giving kangaroo care also did not differ between the two countries.

Conclusion: Restrictive policies implemented due to the Covid-19 pandemic had a negative impact on the perception of quality of time spent by parents with their newborns admitted to neonatal units.

INTRODUCTION

The COVID-19 pandemic forced health care systems worldwide to introduce mitigating measures to reduce the impact of the disease. One of the recommendations was that “numbers of visitors and visiting periods should be highly restricted”. [1] The Royal College of Paediatrics and Child Health (RCPCH) and the British Association of Perinatal Medicine (BAPM) issued guidance to aid policy makers. [2] In response, many neonatal intensive care units amended their unit policies to maintain the safety of infants, parents and clinical staff, whilst continuing to promote family integrated care. The universal responses by most healthcare organisations in imposing restrictions particularly in the early stages, however, often did not consider the unique situation that arises with the mother-baby dyad. Furthermore, restrictions associated with the Covid-19 pandemic in relation to healthcare settings should be taken into account by both health professionals and policy makers as described in a recent global survey. [3] A recent review suggested that the restrictions implemented by neonatal units during the Covid-19 pandemic increased parent and infant separation and subsequently reduced the establishment of successful breast-feeding. [4] Furthermore, a joint UK and US survey of parental perceptions on visiting restrictions during the pandemic highlighted that parents reported reduced involvement and bonding experiences with their infant. [5] Those findings, together with baseline risks already associated with the perinatal and postnatal periods, could worsen long-term parental mental health when the heightened general anxiety around the pandemic is considered. [6] Indeed, parents report visiting restrictions limit their ability to bond and participate in their infant’s care, with concern expressed about receiving insufficient information and medical updates due to restrictions limiting ward round attendance. [5, 7, 8] Furthermore parents described having unmet requirements for emotional and psychological support and facing difficulties with transport, work and medical expenses following discharge. [9]

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3 The aim of this observational study was to demonstrate the difference between how two
4 European neonatal units changed their policies for parents during the pandemic and to
5 describe parental satisfaction during this time. Specifically, we wanted to explore common
6 themes experienced by families with infants admitted to intensive care during the pandemic
7 in two healthcare settings in Europe.
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17 **METHODS**

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19 An observational study was undertaken to describe parental experiences in two European
20 neonatal intensive care units during the Covid-19 pandemic.
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27 **London (KCH)**

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29 The neonatal unit at King's College Hospital NHS Foundation Trust (London, UK) is a tertiary
30 medical and surgical neonatal unit with an average of 700 annual admissions. It has a total
31 bed capacity of 36, including 12 intensive care cots (ITU), 12 high dependency care cots
32 (HDU), 12 special care (SCBU) cots and an isolation room. In 2020, there were 4,266 births
33 with 575 infants admitted to the neonatal unit (13.4%), which was the lowest admission rate
34 in the last 10 years. Of all the admissions 194 (33.7%) required intensive care, 261 (45.4%)
35 were preterm <37 weeks and 100 (17.4%) weighed less than 1500 grams. Nursing staffing
36 ratio was 1:1 to 1:2 in ITU, 1:2 in HDU and 1:4 in SCBU per shift and medical staffing ratio
37 was 1:4 including middle grade doctors and consultants per weekday shift. Parent facilities
38 on-site include a coffee room and a rest area with one rooming-in room. Pre-pandemic
39 parental policies allowed both parents, grandparents, siblings and other family members to
40 visit, with two adults at the cot-side at any one time. Changes to the unit policy at King's
41 College Hospital during the Covid-19 pandemic were introduced in March 2020 following
42 recommendations from the Royal College of Paediatrics and Child Health (RCPCH) and
43 British Association of Perinatal Medicine (BAPM). Only one parent could stay with their baby
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3 at a time and no siblings (except twins) or other family members could visit. The parents'
4 facilities including coffee room, rest area and rooming-in room were closed and parents were
5 advised not to congregate in the reception area. Further, parents were advised to practice
6 social distancing and to always wear face masks as per Government guidance. The unit
7 continued to remain open for restrictive parental attendance 24/7. Parents were only able to
8 spend time by their own infant's cot-side and advised to bring a separate shirt with them to
9 the unit for kangaroo care. A maximum of four mothers were allowed in the expressing room.
10 Parental craft skills and cares such as kangaroo care, nappy changes, skin care, feeding,
11 bathing the baby and temperature measurements were all still actively encouraged.
12 Furthermore, breast feeding support continued to be available every day of the week. When
13 parents had to self-isolate, videocalls were arranged daily so they could see their baby.
14 During the study period, there were no Covid-positive cases in infants admitted to the unit,
15 but three parents tested positive for coronavirus and had to self-isolate.
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34 **Barcelona (BCN)**

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36 The neonatal unit at Hospital Clínic Barcelona (Barcelona, Spain) is a tertiary neonatal unit
37 with an average of 550 annual admissions. It has a total bed capacity of 28 including eight
38 intensive care cots, eight high dependency care cots and 12 special care cots. In 2020, there
39 were 3,295 births with 452 infants admitted to the neonatal unit (13.7%). From all the
40 neonatal admissions, 211 (46.7%) required intensive care, 347 (76.7%) were preterm infants
41 (<37 weeks) and 83 (23.9%) weighed less than 1500 grams. Nursing staffing ratio was 1:1 to
42 1:2 in ITU, 1:2 in HDU and 1:4 in SCBU per shift and medical staffing ratio was 1:4 to 1:4.6
43 including middle grade doctors and consultants per weekday shift. Parent facilities on-site
44 include a coffee room and rest area and there are 15 live video cameras available in the unit
45 for families to see their infant when unable to attend the unit. Pre-pandemic parental policies
46 allowed both parents, grandparents and siblings to enter the unit in groups of two people
47 each time and the unit remained opened 24/7. From March 2020, following the Spanish
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3 Society of Neonatology (*Sociedad Española de Neonatología*) (SENEO) recommendations
4 to prevent the spread of COVID-19 infection, a restrictive parental policy was implemented.
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6 Only parents could see their baby, one at a time, and they were required to wear a face
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8 mask at all times whilst on the unit. The parent facilities remained opened 24/7 but only one
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10 family could use the parent room at any one time. From June 2020, a less restrictive
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12 parental policy was implemented and both parents could stay with their baby simultaneously,
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14 providing they did not have any coronavirus symptoms and had not been in contact with any
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16 person who had tested positive. There were no Covid-positive cases in babies admitted to
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18 the unit or their parents during the study period.
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25 **Questionnaire completion**

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28 This survey was performed as a service evaluation and improvement project and therefore
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30 ethical approval was not sought. Parents were invited to voluntarily participate and
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32 understood the aim of the survey. All answers were anonymized, and all patient identifiable
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34 information was removed to preserve confidentiality and privacy. The survey was designed
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36 by one of the doctors at KCH. A similar neonatal unit in Spain was identified, with the aim to
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38 have a broader view of the parental experience during the pandemic. Only one questionnaire
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40 was provided per household, so if parents had multiple infants (eg. twins) admitted to the
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42 neonatal unit then they were invited only to participate once. See Figure 1 for infant eligibility
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44 and inclusion per neonatal unit.
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50 Parents of infants admitted to Kings College Hospital, UK (KCH) neonatal intensive care unit
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52 were asked to complete a questionnaire prospectively regarding their experience during the
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54 Covid-19 pandemic. The parents were approached by the member of the medical team who
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56 was leading the survey, who discussed the aim of the survey with them and, after giving
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58 verbal consent, they received a written questionnaire and completed this while their baby
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3 was still admitted. Questionnaire responses were anonymized after completion and data
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5 collected using a Microsoft Excel spreadsheet.
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10 Families of babies admitted to the Hospital Clinic in Barcelona are asked to provide contact
11 details and an email address at the beginning of the admission and when they provided it,
12 they consent to be contacted via email. The hospital has a quality and safety management
13 program (“ISO 9001” and “UNE179003) by which questionnaires are sent via the online
14 statistical survey application “Lyme Survey” which meets legal requirements of confidentiality
15 and by completing them, they consent to its final use. Parents of infants admitted to the
16 Hospital Clinic, Barcelona (BCN) neonatal intensive care unit were asked retrospectively to
17 complete the same questionnaire used at KCH. One questionnaire was given to each
18 household and completed anonymously.
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33 Parents were eligible to complete the survey if their infant was admitted to the neonatal unit
34 for at least one week. Parents of infants receiving palliative care were excluded from the
35 study. The questionnaire contained only six questions aimed at assessing parental
36 experience during the pandemic, and hence would be rapid and burden free for parents to
37 complete. The questionnaire considered specific Covid-19 guidance laid out by the RCPCH,
38 BAPM, SENEIO and the neonatal charity Bliss. Furthermore, parents were also requested to
39 give free text recommendations as to how the service could be improved during the
40 pandemic.
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53 At KCH data were collected prospectively over a six-week period, between 25th June 2020 to
54 5th August 2020 (first wave). At BCN the data were collected retrospectively from parents
55 whose infants were admitted between 22nd September 2020 to 28th February 2021 (second
56 and third wave) and when less restrictive parental policies were in place.
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Patient and Public Involvement

It was not possible to involve patients or the public in the design, or conduct, or reporting, or dissemination plans of our research due to the unpredicted nature of the Covid pandemic and associated restrictions.

RESULTS

A total of 74 questionnaires were analysed, 38 from KCH and 36 from BCN. Just over half of the parents felt fully involved with the care of their infant (n=43; 58.1%), however this was larger in BCN compared to KCH [n=26 (72.2%) versus n=17 (44.7%)]. Quality time spent with infants during the pandemic was more negatively affected in KCH compared to BCN [n=24 (63.2%) versus n=12 (33.3%)]. For both countries, 44 (59.5%) responders reported the pandemic did not affect the time spent breastfeeding, and 46 (62.2%) reported giving Kangaroo Care was mostly unchanged. Parents from both units were satisfied with clinical updates from medical and nursing staff throughout the pandemic. Travelling back and forth to the hospital to see their infant was reported overall to be sometimes difficult in 29 responses (39.2%), however this was no different in either country (14 from KCH versus 15 at BCN). All infants in both cohorts survived to hospital discharge. See Table 1 for parental responses as per each neonatal unit.

The questionnaire incorporated a section where parents could write comments about their experience in the neonatal unit, including any suggestions they had to improve this. The results of the survey were shared in both units and acknowledged as part of service improvement.

KCH comments

Many parents expressed concern over the restrictions as they worried it would impact on how often they would be able to see their baby and bond with them, although they appreciated the reasons for this. Parents said it was “difficult with both parents not visiting together”, felt “one parent rule was punishing” and they “could not spend time as a family”. There were mothers who described having less time with their baby so that the fathers could also attend; one said it felt “rushed and stressful having to leave so the father can see the baby”. Some parents described the impact it had on their emotional well-being as well as mental health. For instance, one of them said she had “severe anxiety and was struggling without her partner’s support” and another parent said it was “very difficult to take turns to see our baby when we were under considerable emotional stress”. Difficulties were expressed balancing home life with frequent visits to the hospital, especially with siblings at home, as prior to the pandemic, siblings could be by the cotside or wait with their relatives and use the family facilities with relatives while waiting. One of them said it was “incredibly hard with a twin not allowed in”. Single parents requested being able to nominate a family member to provide additional support. A comment was made that opportunities to express breast milk were affected by limited spaces in the expressing room due to the need for social distancing. One parent also felt that having less time with the baby reduced feeding opportunities. A few parents voiced that although wearing a face mask was understandable, it also made bonding difficult. They expressed feeling “sad” that their baby had never seen them without a mask. Parents worried that not being able to read their facial expressions might have consequences for the baby’s development. A suggestion was made asking if doctors could offer regular conference calls to allow parents to discuss the medical care of their baby together. Parents said they “have been very impressed with the care and felt reassured their baby was in the best hands”, “nurses and doctors are very helpful” and “staff do a good job with getting parents stuck in with cares and bonding”. Overall, parents were

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2
3 very happy and thankful for the clinical care and continuous support provided, despite the
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5 challenges of the pandemic.
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10 **BCN comments**

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13 The quality of time parents spent with their infant was reported by one family to have been
14
15 negatively affected by the pandemic, mostly by the wearing of face masks which did not
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17 allow the parents to kiss their baby. Furthermore, quality of time was reported to be reduced
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19 by not being able to have other family members visit their infant. Parents did however report
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21 finding it particularly exciting seeing their infant's name coloured on the wall next to their
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23 incubator and being able to use cameras to see them at any time.
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30 **DISCUSSION**

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32 We demonstrate that parents reported the overall quality of time spent with their infant to be
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34 reduced, especially when more restrictive policies were in place. This may also be related to
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36 the difficulties in travel to the hospital. Concerns were highlighted about parental emotional
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38 wellbeing, feelings of anxiety, bonding as a family and lack of support from partners.
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44 We considered why variation in parental satisfaction between the two countries may exist.
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46 Anxiety and apprehension during the first wave was high, with rates of major depressive
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48 symptoms in pregnant women within the UK peaking at 42%,[10] compared to a lower
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50 proportion in Spain reporting such symptoms (38%).[11] In our study parents with infants
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52 admitted to neonatal intensive care were asked to respond to the questionnaire during
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54 different waves of the pandemic. We speculate that the higher levels of self-reported quality
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56 time spent with infants and overall greater parental satisfaction in Barcelona than the UK
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58 may be secondary to previously reported lower baseline rates of depressive symptoms in
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3 pregnancy within the Spanish population. More so, parents in the UK were also asked to
4 complete the questionnaire when visiting was most restrictive. Such differences in self-
5 reported parental satisfaction within our study agree with a recent UK and US survey which
6 explored varying policies between units, with a greater negative parental impact identified
7 during stricter restrictions.[8]
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17 Muniraman and colleagues conducted a cross-sectional survey of parents impacted by
18 restrictive policies in six tertiary neonatal units, from the UK and the USA assessing their
19 visitation policies and impact on parents' ability to see, care for and bond with their infants. In
20 a total of 231 responses they reported that the policies were perceived as restrictive by 62%
21 of the respondents and 41% reporting being unable to bond enough. Mild to severe impact
22 on breast feeding was reported by 36% (75/209) of respondents. Our study generally agrees
23 with the above findings and complements the literature by reporting on two separate
24 populations in two European countries with the Barcelona cohort coming later in time in the
25 pandemic (up to February 2021 compared to August in 2020 in Muniraman et al.[8])
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39 When considering important outcome related factors however, our questionnaire highlights
40 that many parents within both the UK and Spain do not report a reduction in time spent
41 breast-feeding or provision of kangaroo care. Over half of our respondents felt kangaroo
42 care was not affected during the pandemic, which may be reflective of less strict restrictions.
43 Indeed, this is much higher in comparison to a recent global survey of parental experiences
44 during the pandemic which found only less than half of respondents reported no change to
45 the frequency of kangaroo care, however this global survey included some units where
46 neither parent was allowed to visit during the restrictions.[3] Furthermore, parental
47 satisfaction in receiving medical updates was not affected regardless of which pandemic
48 restriction policy was employed.
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3 Less restrictive measures were in place during completion of the questionnaire in Barcelona,
4 when both parents were able to stay with their infant. Having both parents at the cot-side
5 together may have facilitated kangaroo care, family-integrated care and receiving joint
6 medical updates to both parents simultaneously.
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14 There were many comments made in our study regarding the impact on parental emotional
15 wellbeing. It is crucial that health professionals remain vigilant in identifying parents who
16 require additional emotional support and sign posting them to appropriate organisations.
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24 The availability of live video cameras within the neonatal unit in Spain for when parents were
25 unable to see their infant may have been vital in parents feeling more involved with the care
26 of the infant despite not being physical present. Our survey highlights the importance of
27 incorporating different modalities into our clinical care such as telephone conferencing and
28 secure video messaging. Indeed, one study reported that asynchronous video messaging
29 supported models of family integrated care, improved parental experience and emotional
30 closeness to their baby and built strong relationships between families and staff.[12]
31
32 Furthermore, the use of cot-side cameras has been associated with a reduction in parental
33 stress when infant separation occurs.[13] Such advancements in technology may thus be
34 beneficial not only during future pandemics, but also in the provision and delivery of
35 universal, sustainable and accessible neonatal care.
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51 Utilisation of digital innovations as a standard of care when considering service provision
52 and re-design of units may indeed remove some of the barriers and obstacles often currently
53 experienced by parents and health care workers in being able to provide and promote family
54 integrated care, and thus such advances may be a beneficial side-product of the
55 pandemic.[14-16]
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3 Mask wearing is a highly effective measure in reducing virus transmission at a population
4 level.[17] The use of face masks was a recurring theme expressed by parents from both the
5 UK and Spain. Wearing of face masks by parents whilst with their infant was identified as a
6 particular source of anxiety in both countries with concern over the impact upon bonding.
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8 Indeed, there is little knowledge of this with respect to the longer-term consequences on
9 infant neurodevelopment. Wearing of face masks may affect attachment processes between
10 parents and their infant within the first few days of life when there is little exposure to and
11 visualisation of parental facial expressions.[18] Suggested recommendations from the
12 RCPCH with specific regard to face mask coverings is that consideration for removal should
13 be given for asymptomatic parents when providing kangaroo care.[19] Furthermore, use of
14 transparent facemasks or visors, alongside regularly talking through the mask, should be
15 encouraged to enable bonding and attachment opportunities.[20] Balance of risk must be
16 made however between the unknown adverse impact of face coverings on infant
17 neurodevelopment with the global benefits of face masks in reducing virus transmission.
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36 The results of this survey were shared amongst both units and actions including updating
37 unit policies, parents' facilities, psychological support on site and communication with
38 parents have been taken to improve parental experience and service development. To
39 improve care in both units and determine the benefits of differing approaches to the
40 pandemic it would be interesting in future studies to conduct the same survey and data
41 collection process in the same units over varying time periods during different restrictive
42 measures of the pandemic.
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54 This study has strengths and some limitations. We have surveyed parents from two tertiary
55 neonatal intensive care units in Europe incorporating two different policies on parental
56 restrictions during the Covid-19 pandemic. Answers from both cohorts of parents, with
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3 different restrictions, may therefore be useful in guiding further policies in future pandemics
4 to ensure parental satisfaction is taken into consideration. Data were collected from KCH
5 during the first wave of the pandemic when lock down restrictions were being enforced,
6 thereby capturing an accurate depiction of parental experience in real time. Contrary to this,
7 data from BCN were collected retrospectively and when less restrictive policies were in
8 place, and as such may have positively impacted the reflections of parents who were at
9 home when completing the form, hence the retrospective nature of the Spanish data
10 collection acts as a limitation to the study. As responses from Spain were anonymous, it was
11 not possible to determine how sick the infants were during admission, or how long post
12 discharge the surveys were completed and how these influences may have further impacted
13 parental views. Information on whether parents from either country were first time parents
14 was also not collected. Finally, no control group pre-pandemic was included and we did not
15 have survey responses to assess baseline perception involvement in care pre-pandemic,
16 therefore, how self-reported parental satisfaction may have changed within each country
17 when restrictions and policies were implemented could not be elicited.

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The long-term impact of the pandemic upon parents and infants admitted to neonatal care is not known.

In conclusion, restrictive policies implemented due to the Covid-19 pandemic have affected families with infants admitted to neonatal intensive care. Quality of time spent with the babies was felt to be significantly affected, especially when more restrictive policies were implemented. Parental involvement in the care of their babies and satisfaction with the care that infants received and with medical and nursing updates, however, remained positive. The amount of time spent breastfeeding and giving Kangaroo Care decreased during the pandemic, but was not significantly different between the two units. Neonatal units need to find strategies to mitigate the impact of separation on parental experience and bonding if a similar situation occurs in the future.

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Competing interest statement: The authors have no conflict of interest to declare

Authors contribution:

Carolina Zorro designed the study, participated in the analysis of data and the writing of the manuscript

Eva MacRae participated in the design of the study, data acquisition, participated in the analysis and critically revised the manuscript

Marta Teresa-Palacio acquired the data from BCN, participated in the analysis and critically reviewed the manuscript

Emma E. Williams participated in the analysis of data and the writing of the manuscript

Victoria Aldecoa-Bilbao acquired the data from BCN, participated in the analysis and critically reviewed the manuscript

Ravindra Bhat participated in the design of the study and critically reviewed the manuscript

Ann Hickey participated in the design of the study and critically reviewed the manuscript

Theodore Dassios participated in the analysis of data and the writing of the manuscript

Anne Greenough supervised the project, participated in the design and analysis of the study and critically revised the manuscript

Data sharing statement: Data will be shared on reasonable request

Patient consent: All parents consented to take part in the survey

What is known about the subject

- The COVID-19 pandemic has led to restrictive policies across neonatal units.
- Parental policies varied between centers and over time, being stricter at the beginning of the pandemic.

What this study adds

- Despite the restrictive policies implemented satisfaction with the care that infants received and with medical updates remained positive.
- Overall time spent in breastfeeding and in Kangaroo Care was affected by the pandemic but there were no differences between different policies.
- The use of facemasks generated parental anxiety and difficulties in bonding with their babies.

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Table 1: Parental responses as per each neonatal unit. Data are expressed as number with**percent (%)****in brackets**

	KCH [n=38 (%)]	BCN [n=36 (%)]
How involved do you feel with the care of your baby?		
<i>1=not at all</i>	0 (0.0)	0 (0.0)
<i>2 = a little involved</i>	4 (10.5)	3 (8.3)
<i>3 = quite involved</i>	17 (44.7)	7 (19.4)
<i>4 = fully involved</i>	17 (44.7)	26 (72.2)
Do you feel that the pandemic has affected the quality of time you spend with your baby?		
<i>1=disimproved</i>	24 (63.2)	12 (33.3)
<i>2=not at all</i>	13 (34.2)	19 (52.8)
<i>3=improved</i>	1 (2.6)	4 (11.1)
<i>4=not answered</i>	0 (0.0)	1 (2.8)
Has the pandemic affected the amount of time you spend giving kangaroo care?		
<i>1=decreased</i>	13 (34.2)	6 (16.7)
<i>2=not at all</i>	21 (55.3)	25 (69.4)
<i>3=increased</i>	0 (0.0)	2 (5.6)
<i>4=not applicable</i>	4 (10.5)	0 (0.0)
<i>5 = not answered</i>	0 (0.0)	3 (8.3)
Has the pandemic affected the amount of time you spend breastfeeding?		
<i>1=decreased</i>	6 (15.8)	2 (5.6)
<i>2=not at all</i>	14 (36.8)	30 (83.3)
<i>3=increased</i>	0 (0.0)	1 (2.8)
<i>4= not applicable</i>	18 (47.4)	0 (0.0)
<i>5=not answered</i>	0 (0.0)	3 (8.3)

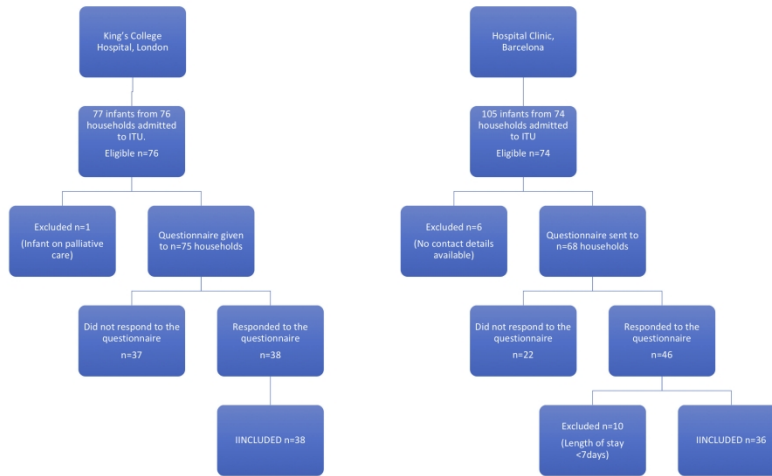
Are you satisfied with the updates from the medical and nursing staff regarding your baby?		
<i>1=very unsatisfied</i>	1 (2.6)	4 (11.1)
<i>2=unsatisfied</i>	1 (2.6)	0 (0.0)
<i>3=moderately satisfied</i>	6 (15.8)	2 (5.6)
<i>4=satisfied</i>	21 (55.3)	6 (16.7)
<i>5=very satisfied</i>	9 (23.7)	24 (66.7)
How have you found coming to the hospital to visit your baby?		
<i>1=very difficult</i>	5 (13.2)	5 (13.9)
<i>2=sometimes difficult</i>	14 (36.8)	15 (41.7)
<i>3=manageable</i>	11 (28.9)	6 (16.7)
<i>4=easy</i>	8 (21.1)	9 (25.0)
<i>5= not answered</i>	0 (0.0)	1 (2.8)

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FIGURE LEGENDS

Figure 1: Consort diagram to portray participant inclusion per neonatal unit.

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Parental satisfaction questionnaire during COVID-19 pandemic

Hospital No:

This questionnaire is aimed at assessing whether you feel the coronavirus pandemic has affected your experience on NICU and bonding with your baby

1. How involved do you feel with the care of your baby (e.g. feeding, bathing, skin care, taking the temperature, changing the nappy)?
 - a. Not at all
 - b. A little involved
 - c. Quite Involved
 - d. Fully involved

2. Do you feel that the pandemic has affected the quality of time you spend with your baby?
 - a. Not at all
 - b. Improved quality of time
 - c. Disimproved quality of time

- 3a. Has the pandemic affected the amount of time you spend giving kangaroo care?
 - a. No at all
 - b. Increased
 - c. Decreased
 - d. Not applicable (please give a reason) _____

- 3b. How has the pandemic has affected the amount of time you spend breastfeeding your baby? (please specify if you have decided not to breastfeed)
 - a. Not at all
 - b. Increased
 - c. Decreased
 - d. Not applicable (please give a reason) _____

- 4 Are you satisfied with the updates from the medical and nursing staff regarding your baby?
 - a. Very unsatisfied
 - b. Unsatisfied
 - c. Moderately satisfied
 - d. Satisfied
 - e. Very satisfied

Parental satisfaction questionnaire during COVID-19 pandemic

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- 5 How have you found coming to the hospital to visit your baby?
- a. Very difficult
 - b. Sometimes Difficult
 - c. Manageable
 - d. Easy

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- 6 If you would like to add any comments or suggestions on any of the above, please complete the box below



BMJ Paediatrics Open

Assessing the impact of the Covid-19 pandemic on parental satisfaction in two European neonatal intensive care units

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Keywords:	COVID-19, Neonatology

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3 **Assessing the impact of the Covid-19 pandemic on parental satisfaction in two**
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10 Carolina Zorro¹, Eva MacRae¹, Marta Teresa-Palacio⁵, Emma E. Williams², Victoria Aldecoa-
11 Bilbao⁵, Ravindra Bhat¹, Ann Hickey¹, Theodore Dassios^{1,2} and Anne Greenough^{2,3,4}
12
13
14
15
16
17

18 ¹ Neonatal Intensive Care Centre, King's College Hospital NHS Foundation Trust, London,
19 United Kingdom
20
21

22 ² Department of Women and Children's Health, School of Life Course Sciences, Faculty of
23 Life Sciences and Medicine, King's College London, United Kingdom
24
25
26

27 ³ Asthma UK Centre for Allergic Mechanisms in Asthma, King's College London, United
28 Kingdom
29
30
31

32 ⁴ NIHR Biomedical Research Centre based at Guy's and St Thomas' NHS Foundation Trust
33 and King's College London, United Kingdom
34
35
36

37 ⁵ Neonatology Department, Hospital Clinic Barcelona. BCNatal (Barcelona Center for
38 Maternal-Foetal and Neonatal Medicine), Barcelona, Spain
39
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43
44

45 Corresponding author: Carolina Zorro. Neonatal Intensive Care Centre, 4th Floor Golden
46 Jubilee Wing, King's College Hospital, Denmark Hill, London, SE5 9RS, United Kingdom.
47
48 Tel: +44 0203 299 8744 ; E-mail: carolina.zorro@nhs.net
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55 **Word count:** 3752
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57 **Key words:** Covid-19; parental satisfaction; neonatal care
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ABSTRACT

Background: Neonatal units across the world have altered their policies to prevent the spread of infection during the Covid-19 pandemic. Our aim was to report parental experience in two European neonatal units during the pandemic.

Methods: Parents of infants admitted to each neonatal unit were asked to complete a questionnaire regarding their experience during the Covid-19 pandemic. At Kings College Hospital, UK (KCH) data were collected prospectively between June 2020 and August 2020 (first wave). At the Hospital Clínic Barcelona (BCN) data were collected retrospectively from parents whose infants were admitted between September 2020 and February 2021 (second and third wave).

Results: A total of 74 questionnaires were completed (38 from KCH and 36 from BCN). The parents reported that they were fully involved or involved in the care of their infants in 34 (89.4%) responses in KCH and 33 (91.6%) responses in BCN. Quality time spent with infants during the pandemic was more negatively affected at KCH compared to BCN [n=24 (63.2%) versus n=12 (33.3%]. Parents felt either satisfied or very satisfied with the updates from the clinical care team in 30 (79, 0%) responses at KCH and 30 (83, 4%) responses in BCN. The parents felt that the restrictions negatively affected breastfeeding in 6 (15.8%) responses at KCH and 2 (5.6%) responses in BCN. Travelling to the hospital was reported overall to be sometimes difficult (39.2%); this did not differ-between the two units [14 (36.8%) respondents at KCH and 15 (41.6%) from BCN]. Furthermore, the self-reported amount of time spent giving kangaroo care also did not differ between the two countries.

Conclusion: Restrictive policies implemented due to the Covid-19 pandemic had a negative impact on the perception of quality of time spent by parents with their newborns admitted to neonatal units.

INTRODUCTION

The COVID-19 pandemic forced health care systems worldwide to introduce mitigating measures to reduce the impact of the disease. One of the recommendations was that “numbers of visitors and visiting periods should be highly restricted”. [1] The Royal College of Paediatrics and Child Health (RCPCH) and the British Association of Perinatal Medicine (BAPM) issued guidance to aid policy makers. [2] In response, many neonatal intensive care units amended their unit policies to maintain the safety of infants, parents and clinical staff, whilst continuing to promote family integrated care. The universal responses by most healthcare organisations in imposing restrictions particularly in the early stages, however, often did not consider the unique situation that arises with the mother-baby dyad. Furthermore, restrictions associated with the Covid-19 pandemic in relation to healthcare settings should be taken into account by both health professionals and policy makers as described in a recent global survey. [3] A recent review suggested that the restrictions implemented by neonatal units during the Covid-19 pandemic increased parent and infant separation and subsequently reduced the establishment of successful breast-feeding. [4] Furthermore, a joint UK and US survey of parental perceptions on visiting restrictions during the pandemic highlighted that parents reported reduced involvement and bonding experiences with their infant. [5] Those findings, together with baseline risks already associated with the perinatal and postnatal periods, could worsen long-term parental mental health when the heightened general anxiety around the pandemic is considered. [6] Indeed, parents report visiting restrictions limit their ability to bond and participate in their infant’s care, with concern expressed about receiving insufficient information and medical updates due to restrictions limiting ward round attendance. [5, 7, 8] Furthermore parents described having unmet requirements for emotional and psychological support and facing difficulties with transport, work and medical expenses following discharge. [9]

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3 The aim of this observational study was to demonstrate the difference between how two
4 European neonatal units changed their policies for parents during the pandemic and to
5 describe parental satisfaction during this time. Specifically, we wanted to explore common
6 themes experienced by families with infants admitted to intensive care during the pandemic
7 in two healthcare settings in Europe.
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17 **METHODS**

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20 An observational study was undertaken to describe parental experiences in two European
21 neonatal intensive care units during the Covid-19 pandemic. The study was registered as a
22 service evaluation with the Clinical Governance Department of King's College Hospital NHS
23 Foundation Trust, London, UK. The Health Research Authority Toolkit of the Medical
24 Research Council, UK confirmed that the study would not be considered as research and
25 would not require regulatory approval by a research ethics committee.
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35 **London (KCH)**

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38 The neonatal unit at King's College Hospital NHS Foundation Trust (London, UK) is a tertiary
39 medical and surgical neonatal unit with an average of 700 annual admissions. It has a total
40 bed capacity of 36, including 12 intensive care cots (ITU), 12 high dependency care cots
41 (HDU), 12 special care (SCBU) cots and an isolation room. In 2020, there were 4,266 births
42 with 575 infants admitted to the neonatal unit (13.4%), which was the lowest admission rate
43 in the last 10 years. Of all the admissions 194 (33.7%) required intensive care, 261 (45.4%)
44 were preterm <37 weeks and 100 (17.4%) weighed less than 1500 grams. Nursing staffing
45 ratio was 1:1 to 1:2 in ITU, 1:2 in HDU and 1:4 in SCBU per shift and medical staffing ratio
46 was 1:4 including middle grade doctors and consultants per weekday shift. Parent facilities
47 on-site include a coffee room and a rest area with one rooming-in room. Pre-pandemic
48 parental policies allowed both parents, grandparents, siblings and other family members to
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3 visit, with two adults at the cot-side at any one time. Changes to the unit policy at King's
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5 College Hospital during the Covid-19 pandemic were introduced in March 2020 following
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7 recommendations from the Royal College of Paediatrics and Child Health (RCPCH) and
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9 British Association of Perinatal Medicine (BAPM). Only one parent could stay with their baby
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11 at a time and no siblings (except twins) or other family members could visit. The parents'
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13 facilities including coffee room, rest area and rooming-in room were closed and parents were
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15 advised not to congregate in the reception area. Further, parents were advised to practice
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17 social distancing and to always wear face masks as per Government guidance. The unit
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19 continued to remain open for restrictive parental attendance 24/7. Parents were only able to
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21 spend time by their own infant's cot-side and advised to bring a separate shirt with them to
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23 the unit for kangaroo care. A maximum of four mothers were allowed in the expressing room.
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25 Parental craft skills and cares such as kangaroo care, nappy changes, skin care, feeding,
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27 bathing the baby and temperature measurements were all still actively encouraged.
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29 Furthermore, breast feeding support continued to be available every day of the week. When
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31 parents had to self-isolate, videocalls were arranged daily so they could see their baby.
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33 During the study period, there were no Covid-positive cases in infants admitted to the unit,
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35 but three parents tested positive for coronavirus and had to self-isolate.
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42 **Barcelona (BCN)**

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45 The neonatal unit at Hospital Clínic Barcelona (Barcelona, Spain) is a tertiary neonatal unit
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47 with an average of 550 annual admissions. It has a total bed capacity of 28 including eight
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49 intensive care cots, eight high dependency care cots and 12 special care cots. In 2020, there
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51 were 3,295 births with 452 infants admitted to the neonatal unit (13.7%). From all the
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53 neonatal admissions, 211 (46.7%) required intensive care, 347 (76.7%) were preterm infants
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55 (<37 weeks) and 83 (23.9%) weighed less than 1500 grams. Nursing staffing ratio was 1:1 to
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57 1:2 in ITU, 1:2 in HDU and 1:4 in SCBU per shift and medical staffing ratio was 1:4 to 1:4.6
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59 including middle grade doctors and consultants per weekday shift. Parent facilities on-site
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3 include a coffee room and rest area and there are 15 live video cameras available in the unit
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5 for families to see their infant when unable to attend the unit. Pre-pandemic parental policies
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7 allowed both parents, grandparents and siblings to enter the unit in groups of two people
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9 each time and the unit remained opened 24/7. From March 2020, following the Spanish
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11 Society of Neonatology (*Sociedad Española de Neonatología*) (SENEO) recommendations
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13 to prevent the spread of COVID-19 infection, a restrictive parental policy was implemented.
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15 Only parents could see their baby, one at a time, and they were required to wear a face
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17 mask at all times whilst on the unit. The parent facilities remained opened 24/7 but only one
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19 family could use the parent room at any one time. From June 2020, a less restrictive
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21 parental policy was implemented and both parents could stay with their baby simultaneously,
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23 providing they did not have any coronavirus symptoms and had not been in contact with any
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25 person who had tested positive. There were no Covid-positive cases in babies admitted to
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27 the unit or their parents during the study period.
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34 **Questionnaire completion**

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36 This survey was performed as a service evaluation and improvement project and therefore
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38 ethical approval was not sought. Parents were invited to voluntarily participate and
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40 understood the aim of the survey. All answers were anonymized, and all patient identifiable
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42 information was removed to preserve confidentiality and privacy. The survey was designed
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44 by one of the doctors at KCH. A similar neonatal unit in Spain was identified, with the aim to
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46 have a broader view of the parental experience during the pandemic. Only one questionnaire
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48 was provided per household, so if parents had multiple infants (eg. twins) admitted to the
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50 neonatal unit then they were invited only to participate once. See Figure 1 for infant eligibility
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52 and inclusion per neonatal unit.
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3 Parents of infants admitted to Kings College Hospital, UK (KCH) neonatal intensive care unit
4 were asked to complete a questionnaire prospectively regarding their experience during the
5 Covid-19 pandemic. The parents were approached by the member of the medical team who
6 was leading the survey, who discussed the aim of the survey with them and, after giving
7 verbal consent, they received a written questionnaire and completed this while their baby
8 was still admitted. Questionnaire responses were anonymized after completion and data
9 collected using a Microsoft Excel spreadsheet.
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21 Families of babies admitted to the Hospital Clinic in Barcelona are asked to provide contact
22 details and an email address at the beginning of the admission and when they provided it,
23 they consent to be contacted via email. The hospital has a quality and safety management
24 program ("ISO 9001" and "UNE179003) by which questionnaires are sent via the online
25 statistical survey application "Lyme Survey" which meets legal requirements of confidentiality
26 and by completing them, they consent to its final use. Parents of infants admitted to the
27 Hospital Clinic, Barcelona (BCN) neonatal intensive care unit were asked retrospectively to
28 complete the same questionnaire used at KCH. One questionnaire was given to each
29 household and completed anonymously.
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44 Parents were eligible to complete the survey if their infant was admitted to the neonatal unit
45 for at least one week. Parents of infants receiving palliative care were excluded from the
46 study. The questionnaire contained only six questions aimed at assessing parental
47 experience during the pandemic, and hence would be rapid and burden free for parents to
48 complete. The questionnaire considered specific Covid-19 guidance laid out by the RCPCH,
49 BAPM, SENEIO and the neonatal charity Bliss. Furthermore, parents were also requested to
50 give free text recommendations as to how the service could be improved during the
51 pandemic.
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6 At KCH data were collected prospectively over a six-week period, between 25th June 2020 to
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8 5th August 2020 (first wave). At BCN the data were collected retrospectively from parents
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10 whose infants were admitted between 22nd September 2020 to 28th February 2021 (second
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12 and third wave) and when less restrictive parental policies were in place.
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15 **Patient and Public Involvement**

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18 It was not possible to involve patients or the public in the design, or conduct, or reporting, or
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20 dissemination plans of our research due to the unpredicted nature of the Covid pandemic
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22 and associated restrictions.
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26 **RESULTS**

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29 A total of 74 questionnaires were analysed, 38 from KCH and 36 from BCN. Just over half of
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31 the parents felt fully involved with the care of their infant (n=43; 58.1%), however this was
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33 larger in BCN compared to KCH [n=26 (72.2%) versus n=17 (44.7%)]. Quality time spent
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35 with infants during the pandemic was more negatively affected in KCH compared to BCN
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37 [n=24 (63.2%) versus n=12 (33.3%)]. For both countries, 44 (59.5%) responders reported
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39 the pandemic did not affect the time spent breastfeeding, and 46 (62.2%) reported giving
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41 Kangaroo Care was mostly unchanged. Parents from both units were satisfied with clinical
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43 updates from medical and nursing staff throughout the pandemic. Travelling back and forth
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45 to the hospital to see their infant was reported overall to be sometimes difficult in 29
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47 responses (39.2%), however this was no different in either country (14 from KCH versus 15
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49 at BCN. All infants in both cohorts survived to hospital discharge. See Table 1 for parental
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51 responses as per each neonatal unit.
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3 The questionnaire incorporated a section where parents could write comments about their
4 experience in the neonatal unit, including any suggestions they had to improve this. The
5 results of the survey were shared in both units and acknowledged as part of service
6 improvement.
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11 12 13 14 15 16 17 **KCH comments**

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20 Many parents expressed concern over the restrictions as they worried it would impact on
21 how often they would be able to see their baby and bond with them, although they
22 appreciated the reasons for this. Parents said it was “difficult with both parents not visiting
23 together”, felt “one parent rule was punishing” and they “could not spend time as a family”.
24 There were mothers who described having less time with their baby so that the fathers could
25 also attend; one said it felt “rushed and stressful having to leave so the father can see the
26 baby”. Some parents described the impact it had on their emotional well-being as well as
27 mental health. For instance, one of them said she had “severe anxiety and was struggling
28 without her partner’s support” and another parent said it was “very difficult to take turns to
29 see our baby when we were under considerable emotional stress”. Difficulties were
30 expressed balancing home life with frequent visits to the hospital, especially with siblings at
31 home, as prior to the pandemic, siblings could be by the cotside or wait with their relatives
32 and use the family facilities with relatives while waiting. One of them said it was “incredibly
33 hard with a twin not allowed in”. Single parents requested being able to nominate a family
34 member to provide additional support. A comment was made that opportunities to express
35 breast milk were affected by limited spaces in the expressing room due to the need for social
36 distancing. One parent also felt that having less time with the baby reduced feeding
37 opportunities. A few parents voiced that although wearing a face mask was understandable,
38 it also made bonding difficult. They expressed feeling “sad” that their baby had never seen
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3 them without a mask. Parents worried that not being able to read their facial expressions
4 might have consequences for the baby's development. A suggestion was made asking if
5 doctors could offer regular conference calls to allow parents to discuss the medical care of
6 their baby together. Parents said they "have been very impressed with the care and felt
7 reassured their baby was in the best hands", "nurses and doctors are very helpful" and "staff
8 do a good job with getting parents stuck in with cares and bonding". Overall, parents were
9 very happy and thankful for the clinical care and continuous support provided, despite the
10 challenges of the pandemic.
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23 **BCN comments**

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26 The quality of time parents spent with their infant was reported by one family to have been
27 negatively affected by the pandemic, mostly by the wearing of face masks which did not
28 allow the parents to kiss their baby. Furthermore, quality of time was reported to be reduced
29 by not being able to have other family members visit their infant. Parents did however report
30 finding it particularly exciting seeing their infant's name coloured on the wall next to their
31 incubator and being able to use cameras to see them at any time.
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42 **DISCUSSION**

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45 We demonstrate that parents reported the overall quality of time spent with their infant to be
46 reduced, especially when more restrictive policies were in place. This may also be related to
47 the difficulties in travel to the hospital. Concerns were highlighted about parental emotional
48 wellbeing, feelings of anxiety, bonding as a family and lack of support from partners.
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57 We considered why variation in parental satisfaction between the two countries may exist.
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59 Anxiety and apprehension during the first wave was high, with rates of major depressive
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3 symptoms in pregnant women within the UK peaking at 42%,[10] compared to a lower
4 proportion in Spain reporting such symptoms (38%).[11] In our study parents with infants
5 admitted to neonatal intensive care were asked to respond to the questionnaire during
6 different waves of the pandemic. We speculate that the higher levels of self-reported quality
7 time spent with infants and overall greater parental satisfaction in Barcelona than the UK
8 may be secondary to previously reported lower baseline rates of depressive symptoms in
9 pregnancy within the Spanish population. More so, parents in the UK were also asked to
10 complete the questionnaire when visiting was most restrictive. Such differences in self-
11 reported parental satisfaction within our study agree with a recent UK and US survey which
12 explored varying policies between units, with a greater negative parental impact identified
13 during stricter restrictions.[8]

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Muniraman and colleagues conducted a cross-sectional survey of parents impacted by
restrictive policies in six tertiary neonatal units, from the UK and the USA assessing their
visitation policies and impact on parents' ability to see, care for and bond with their infants. In
a total of 231 responses they reported that the policies were perceived as restrictive by 62%
of the respondents and 41% reporting being unable to bond enough. Mild to severe impact
on breast feeding was reported by 36% (75/209) of respondents. Our study generally agrees
with the above findings and complements the literature by reporting on two separate
populations in two European countries with the Barcelona cohort coming later in time in the
pandemic (up to February 2021 compared to August in 2020 in Muniraman et al.[8])

When considering important outcome related factors however, our questionnaire highlights
that many parents within both the UK and Spain do not report a reduction in time spent
breast-feeding or provision of kangaroo care. Over half of our respondents felt kangaroo
care was not affected during the pandemic, which may be reflective of less strict restrictions.
Indeed, this is much higher in comparison to a recent global survey of parental experiences

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3 during the pandemic which found only less than half of respondents reported no change to
4 the frequency of kangaroo care, however this global survey included some units where
5 neither parent was allowed to visit during the restrictions.[3] Furthermore, parental
6 satisfaction in receiving medical updates was not affected regardless of which pandemic
7 restriction policy was employed.
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14 Less restrictive measures were in place during completion of the questionnaire in Barcelona,
15 when both parents were able to stay with their infant. Having both parents at the cot-side
16 together may have facilitated kangaroo care, family-integrated care and receiving joint
17 medical updates to both parents simultaneously.
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25 There were many comments made in our study regarding the impact on parental emotional
26 wellbeing. It is crucial that health professionals remain vigilant in identifying parents who
27 require additional emotional support and sign posting them to appropriate organisations.
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35 The availability of live video cameras within the neonatal unit in Spain for when parents were
36 unable to see their infant may have been vital in parents feeling more involved with the care
37 of the infant despite not being physical present. Our survey highlights the importance of
38 incorporating different modalities into our clinical care such as telephone conferencing and
39 secure video messaging. Indeed, one study reported that asynchronous video messaging
40 supported models of family integrated care, improved parental experience and emotional
41 closeness to their baby and built strong relationships between families and staff.[12]
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49 Furthermore, the use of cot-side cameras has been associated with a reduction in parental
50 stress when infant separation occurs.[13] Such advancements in technology may thus be
51 beneficial not only during future pandemics, but also in the provision and delivery of
52 universal, sustainable and accessible neonatal care.
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3 Utilisation of digital innovations as a standard of care when considering service provision
4 and re-design of units may indeed remove some of the barriers and obstacles often currently
5 experienced by parents and health care workers in being able to provide and promote family
6 integrated care, and thus such advances may be a beneficial side-product of the
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11 pandemic.[14-16]

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14 Mask wearing is a highly effective measure in reducing virus transmission at a population
15 level.[17] The use of face masks was a recurring theme expressed by parents from both the
16 UK and Spain. Wearing of face masks by parents whilst with their infant was identified as a
17 particular source of anxiety in both countries with concern over the impact upon bonding.
18 Indeed, there is little knowledge of this with respect to the longer-term consequences on
19 infant neurodevelopment. Wearing of face masks may affect attachment processes between
20 parents and their infant within the first few days of life when there is little exposure to and
21 visualisation of parental facial expressions.[18] Suggested recommendations from the
22 RCPCH with specific regard to face mask coverings is that consideration for removal should
23 be given for asymptomatic parents when providing kangaroo care.[19] Furthermore, use of
24 transparent facemasks or visors, alongside regularly talking through the mask, should be
25 encouraged to enable bonding and attachment opportunities.[20] Balance of risk must be
26 made however between the unknown adverse impact of face coverings on infant
27 neurodevelopment with the global benefits of face masks in reducing virus transmission.
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47 The results of this survey were shared amongst both units and actions including updating
48 unit policies, parents' facilities, psychological support on site and communication with
49 parents have been taken to improve parental experience and service development. To
50 improve care in both units and determine the benefits of differing approaches to the
51 pandemic it would be interesting in future studies to conduct the same survey and data
52 collection process in the same units over varying time periods during different restrictive
53 measures of the pandemic.
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6 This study has strengths and some limitations. We have surveyed parents from two tertiary
7 neonatal intensive care units in Europe incorporating two different policies on parental
8 restrictions during the Covid-19 pandemic. Answers from both cohorts of parents, with
9 different restrictions, may therefore be useful in guiding further policies in future pandemics
10 to ensure parental satisfaction is taken into consideration. Data were collected from KCH
11 during the first wave of the pandemic when lock down restrictions were being enforced,
12 thereby capturing an accurate depiction of parental experience in real time. Contrary to this,
13 data from BCN were collected retrospectively and when less restrictive policies were in
14 place, and as such may have positively impacted the reflections of parents who were at
15 home when completing the form, hence the retrospective nature of the Spanish data
16 collection acts as a limitation to the study. As responses from Spain were anonymous, it was
17 not possible to determine how sick the infants were during admission, or how long post
18 discharge the surveys were completed and how these influences may have further impacted
19 parental views. Information on whether parents from either country were first time parents
20 was also not collected. Finally, no control group pre-pandemic was included and we did not
21 have survey responses to assess baseline perception involvement in care pre-pandemic,
22 therefore, how self-reported parental satisfaction may have changed within each country
23 when restrictions and policies were implemented could not be elicited.
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44 The long-term impact of the pandemic upon parents and infants admitted to neonatal care is
45 not known.
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52 In conclusion, restrictive policies implemented due to the Covid-19 pandemic have affected
53 families with infants admitted to neonatal intensive care. Quality of time spent with the
54 babies was felt to be significantly affected, especially when more restrictive policies were
55 implemented. Parental involvement in the care of their babies and satisfaction with the care
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3 that infants received and with medical and nursing updates, however, remained positive. The
4 amount of time spent breastfeeding and giving Kangaroo Care decreased during the
5 pandemic, but was not significantly different between the two units. Neonatal units need to
6 find strategies to mitigate the impact of separation on parental experience and bonding if a
7 similar situation occurs in the future.
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15
16
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20 necessarily those of the NHS, the NIHR or the Department of Health.
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25 **Competing interest statement:** The authors have no conflict of interest to declare
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27

28 **Authors contribution:**

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31 Carolina Zorro designed the study, participated in the analysis of data and the writing of the
32 manuscript
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34
35 Eva MacRae participated in the design of the study, data acquisition, participated in the
36 analysis and critically revised the manuscript
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40 Marta Teresa-Palacio acquired the data from BCN, participated in the analysis and critically
41 reviewed the manuscript
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43
44 Emma E. Williams participated in the analysis of data and the writing of the manuscript
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47 Victoria Aldecoa-Bilbao acquired the data from BCN, participated in the analysis and
48 critically reviewed the manuscript
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51 Ravindra Bhat participated in the design of the study and critically reviewed the
52 manuscript
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55 Ann Hickey participated in the design of the study and critically reviewed the
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60 Theodore Dassios participated in the analysis of data and the writing of the manuscript

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3 Anne Greenough supervised the project, participated in the design and
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5 analysis of the study and critically revised the manuscript
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8 **Data sharing statement:** Data will be shared on reasonable request
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10 **Patient consent:** All parents consented to take part in the survey
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Confidential: For Review Only

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9 **What is known about the subject**

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- The COVID-19 pandemic has led to restrictive policies across neonatal units.
 - Parental policies varied between centers and over time, being stricter at the beginning of the pandemic.

21 **What this study adds**

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- Despite the restrictive policies implemented satisfaction with the care that infants received and with medical updates remained positive.
 - Overall time spent in breastfeeding and in Kangaroo Care was affected by the pandemic but there were no differences between different policies.
 - The use of facemasks generated parental anxiety and difficulties in bonding with their babies.

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Table 1: Parental responses as per each neonatal unit. Data are expressed as number with

percent (%)

in brackets

	KCH [n=38 (%)]	BCN [n=36 (%)]
How involved do you feel with the care of your baby?		
<i>1=not at all</i>	0 (0.0)	0 (0.0)
<i>2 = a little involved</i>	4 (10.5)	3 (8.3)
<i>3 = quite involved</i>	17 (44.7)	7 (19.4)
<i>4 = fully involved</i>	17 (44.7)	26 (72.2)
Do you feel that the pandemic has affected the quality of time you spend with your baby?		
<i>1=disimproved</i>	24 (63.2)	12 (33.3)
<i>2=not at all</i>	13 (34.2)	19 (52.8)
<i>3=improved</i>	1 (2.6)	4 (11.1)
<i>4=not answered</i>	0 (0.0)	1 (2.8)
Has the pandemic affected the amount of time you spend giving kangaroo care?		
<i>1=decreased</i>	13 (34.2)	6 (16.7)
<i>2=not at all</i>	21 (55.3)	25 (69.4)
<i>3=increased</i>	0 (0.0)	2 (5.6)
<i>4=not applicable</i>	4 (10.5)	0 (0.0)
<i>5 = not answered</i>	0 (0.0)	3 (8.3)
Has the pandemic affected the amount of time you spend breastfeeding?		
<i>1=decreased</i>	6 (15.8)	2 (5.6)
<i>2=not at all</i>	14 (36.8)	30 (83.3)
<i>3=increased</i>	0 (0.0)	1 (2.8)
<i>4= not applicable</i>	18 (47.4)	0 (0.0)
<i>5=not answered</i>	0 (0.0)	3 (8.3)

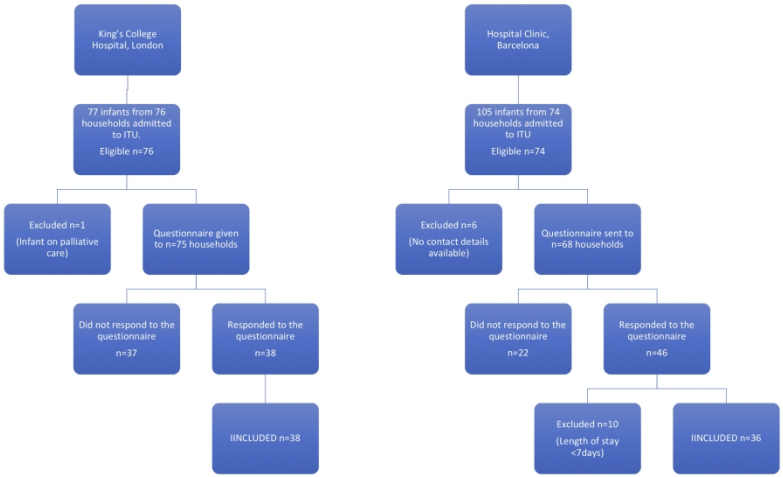
Are you satisfied with the updates from the medical and nursing staff regarding your baby?		
<i>1=very unsatisfied</i>	1 (2.6)	4 (11.1)
<i>2=unsatisfied</i>	1 (2.6)	0 (0.0)
<i>3=moderately satisfied</i>	6 (15.8)	2 (5.6)
<i>4=satisfied</i>	21 (55.3)	6 (16.7)
<i>5=very satisfied</i>	9 (23.7)	24 (66.7)
How have you found coming to the hospital to visit your baby?		
<i>1=very difficult</i>	5 (13.2)	5 (13.9)
<i>2=sometimes difficult</i>	14 (36.8)	15 (41.7)
<i>3=manageable</i>	11 (28.9)	6 (16.7)
<i>4=easy</i>	8 (21.1)	9 (25.0)
<i>5= not answered</i>	0 (0.0)	1 (2.8)

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3 **FIGURE LEGENDS**
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6 **Figure 1:** Consort diagram to portray participant inclusion per neonatal unit.
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Parental satisfaction questionnaire during COVID-19 pandemic

Hospital No:

This questionnaire is aimed at assessing whether you feel the coronavirus pandemic has affected your experience on NICU and bonding with your baby

1. How involved do you feel with the care of your baby (e.g. feeding, bathing, skin care, taking the temperature, changing the nappy)?
 - a. Not at all
 - b. A little involved
 - c. Quite Involved
 - d. Fully involved
2. Do you feel that the pandemic has affected the quality of time you spend with your baby?
 - a. Not at all
 - b. Improved quality of time
 - c. Disimproved quality of time
- 3a. Has the pandemic affected the amount of time you spend giving kangaroo care?
 - a. No at all
 - b. Increased
 - c. Decreased
 - d. Not applicable (please give a reason) _____
- 3b. How has the pandemic has affected the amount of time you spend breastfeeding your baby? (please specify if you have decided not to breastfeed)
 - a. Not at all
 - b. Increased
 - c. Decreased
 - d. Not applicable (please give a reason) _____
4. Are you satisfied with the updates from the medical and nursing staff regarding your baby?
 - a. Very unsatisfied
 - b. Unsatisfied
 - c. Moderately satisfied
 - d. Satisfied
 - e. Very satisfied

Parental satisfaction questionnaire during COVID-19 pandemic

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- 5 How have you found coming to the hospital to visit your baby?
 - a. Very difficult
 - b. Sometimes Difficult
 - c. Manageable
 - d. Easy

6 If you would like to add any comments or suggestions on any of the above, please complete the box below



Only

Go straight to content.



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Is my study research?

i To print your result with title and IRAS Project ID please enter your details below:

Title of your research:

Assessing the impact of the Covid-19 pandemic on parental satisfaction in two European neonatal intensive care units

IRAS Project ID (if available):

You selected:

- **'No'** - Are the participants in your study randomised to different groups?
- **'No'** - Does your study protocol demand changing treatment/ patient care from accepted standards for any of the patients involved?
- **'No'** - Are your findings going to be generalisable?

Your study would NOT be considered Research by the NHS.

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Assessing the impact of the Covid-19 pandemic on parental satisfaction in two European neonatal intensive care units

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Keywords:	COVID-19, Neonatology

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3 **Assessing the impact of the Covid-19 pandemic on parental satisfaction in two**
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5 **European neonatal intensive care units**
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10 Carolina Zorro¹, Eva MacRae¹, Marta Teresa-Palacio⁵, Emma E. Williams², Victoria Aldecoa-
11 Bilbao⁵, Ravindra Bhat¹, Ann Hickey¹, Theodore Dassios^{1,2} and Anne Greenough^{2,3,4}
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18 ¹ Neonatal Intensive Care Centre, King's College Hospital NHS Foundation Trust, London,
19 United Kingdom
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21

22 ² Department of Women and Children's Health, School of Life Course Sciences, Faculty of
23 Life Sciences and Medicine, King's College London, United Kingdom
24
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27 ³ Asthma UK Centre for Allergic Mechanisms in Asthma, King's College London, United
28 Kingdom
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32 ⁴ NIHR Biomedical Research Centre based at Guy's and St Thomas' NHS Foundation Trust
33 and King's College London, United Kingdom
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37 ⁵ Neonatology Department, Hospital Clinic Barcelona. BCNatal (Barcelona Center for
38 Maternal-Foetal and Neonatal Medicine), Barcelona, Spain
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45 Corresponding author: Carolina Zorro. Neonatal Intensive Care Centre, 4th Floor Golden
46 Jubilee Wing, King's College Hospital, Denmark Hill, London, SE5 9RS, United Kingdom.
47
48 Tel: +44 0203 299 8744 ; E-mail: carolina.zorro@nhs.net
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55 **Word count:** 3752
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57 **Key words:** Covid-19; parental satisfaction; neonatal care
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ABSTRACT

Background: Neonatal units across the world have altered their policies to prevent the spread of infection during the Covid-19 pandemic. Our aim was to report parental experience in two European neonatal units during the pandemic.

Methods: Parents of infants admitted to each neonatal unit were asked to complete a questionnaire regarding their experience during the Covid-19 pandemic. At Kings College Hospital, UK (KCH) data were collected prospectively between June 2020 and August 2020 (first wave). At the Hospital Clínic Barcelona (BCN) data were collected retrospectively from parents whose infants were admitted between September 2020 and February 2021 (second and third wave).

Results: A total of 74 questionnaires were completed (38 from KCH and 36 from BCN). The parents reported that they were fully involved or involved in the care of their infants in 34 (89.4%) responses in KCH and 33 (91.6%) responses in BCN. Quality time spent with infants during the pandemic was more negatively affected at KCH compared to BCN [n=24 (63.2%) versus n=12 (33.3%]. Parents felt either satisfied or very satisfied with the updates from the clinical care team in 30 (79, 0%) responses at KCH and 30 (83, 4%) responses in BCN. The parents felt that the restrictions negatively affected breastfeeding in 6 (15.8%) responses at KCH and 2 (5.6%) responses in BCN. Travelling to the hospital was reported overall to be sometimes difficult (39.2%); this did not differ-between the two units [14 (36.8%) respondents at KCH and 15 (41.6%) from BCN]. Furthermore, the self-reported amount of time spent giving kangaroo care also did not differ between the two countries.

Conclusion: Restrictive policies implemented due to the Covid-19 pandemic had a negative impact on the perception of quality of time spent by parents with their newborns admitted to neonatal units.

INTRODUCTION

The COVID-19 pandemic forced health care systems worldwide to introduce mitigating measures to reduce the impact of the disease. One of the recommendations was that “numbers of visitors and visiting periods should be highly restricted”. [1] The Royal College of Paediatrics and Child Health (RCPCH) and the British Association of Perinatal Medicine (BAPM) issued guidance to aid policy makers. [2] In response, many neonatal intensive care units amended their unit policies to maintain the safety of infants, parents and clinical staff, whilst continuing to promote family integrated care. The universal responses by most healthcare organisations in imposing restrictions particularly in the early stages, however, often did not consider the unique situation that arises with the mother-baby dyad. Furthermore, restrictions associated with the Covid-19 pandemic in relation to healthcare settings should be taken into account by both health professionals and policy makers as described in a recent global survey. [3] A recent review suggested that the restrictions implemented by neonatal units during the Covid-19 pandemic increased parent and infant separation and subsequently reduced the establishment of successful breast-feeding. [4] Furthermore, a joint UK and US survey of parental perceptions on visiting restrictions during the pandemic highlighted that parents reported reduced involvement and bonding experiences with their infant. [5] Those findings, together with baseline risks already associated with the perinatal and postnatal periods, could worsen long-term parental mental health when the heightened general anxiety around the pandemic is considered. [6] Indeed, parents report visiting restrictions limit their ability to bond and participate in their infant’s care, with concern expressed about receiving insufficient information and medical updates due to restrictions limiting ward round attendance. [5, 7, 8] Furthermore parents described having unmet requirements for emotional and psychological support and facing difficulties with transport, work and medical expenses following discharge. [9]

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3 The aim of this observational study was to demonstrate the difference between how two
4 European neonatal units changed their policies for parents during the pandemic and to
5 describe parental satisfaction during this time. Specifically, we wanted to explore common
6 themes experienced by families with infants admitted to intensive care during the pandemic
7 in two healthcare settings in Europe.
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17 **METHODS**

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20 An observational study was undertaken to describe parental experiences in two European
21 neonatal intensive care units during the Covid-19 pandemic. The study was registered as a
22 service evaluation with the Clinical Governance Department of King's College Hospital NHS
23 Foundation Trust, London, UK and the Legal Department of Hospital Clínic Barcelona,
24 Barcelona, Spain. The Health Research Authority Toolkit of the Medical Research Council,
25 UK confirmed that the study would not be considered as research and would not require
26 regulatory approval by a research ethics committee.
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37 **London (KCH)**

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40 The neonatal unit at King's College Hospital NHS Foundation Trust (London, UK) is a tertiary
41 medical and surgical neonatal unit with an average of 700 annual admissions. It has a total
42 bed capacity of 36, including 12 intensive care cots (ITU), 12 high dependency care cots
43 (HDU), 12 special care (SCBU) cots and an isolation room. In 2020, there were 4,266 births
44 with 575 infants admitted to the neonatal unit (13.4%), which was the lowest admission rate
45 in the last 10 years. Of all the admissions 194 (33.7%) required intensive care, 261 (45.4%)
46 were preterm <37 weeks and 100 (17.4%) weighed less than 1500 grams. Nursing staffing
47 ratio was 1:1 to 1:2 in ITU, 1:2 in HDU and 1:4 in SCBU per shift and medical staffing ratio
48 was 1:4 including middle grade doctors and consultants per weekday shift. Parent facilities
49 on-site include a coffee room and a rest area with one rooming-in room. Pre-pandemic
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parental policies allowed both parents, grandparents, siblings and other family members to visit, with two adults at the cot-side at any one time. Changes to the unit policy at King's College Hospital during the Covid-19 pandemic were introduced in March 2020 following recommendations from the Royal College of Paediatrics and Child Health (RCPCH) and British Association of Perinatal Medicine (BAPM). Only one parent could stay with their baby at a time and no siblings (except twins) or other family members could visit. The parents' facilities including coffee room, rest area and rooming-in room were closed and parents were advised not to congregate in the reception area. Further, parents were advised to practice social distancing and to always wear face masks as per Government guidance. The unit continued to remain open for restrictive parental attendance 24/7. Parents were only able to spend time by their own infant's cot-side and advised to bring a separate shirt with them to the unit for kangaroo care. A maximum of four mothers were allowed in the expressing room. Parental craft skills and cares such as kangaroo care, nappy changes, skin care, feeding, bathing the baby and temperature measurements were all still actively encouraged. Furthermore, breast feeding support continued to be available every day of the week. When parents had to self-isolate, videocalls were arranged daily so they could see their baby. During the study period, there were no Covid-positive cases in infants admitted to the unit, but three parents tested positive for coronavirus and had to self-isolate.

Barcelona (BCN)

The neonatal unit at Hospital Clínic Barcelona (Barcelona, Spain) is a tertiary neonatal unit with an average of 550 annual admissions. It has a total bed capacity of 28 including eight intensive care cots, eight high dependency care cots and 12 special care cots. In 2020, there were 3,295 births with 452 infants admitted to the neonatal unit (13.7%). From all the neonatal admissions, 211 (46.7%) required intensive care, 347 (76.7%) were preterm infants (<37 weeks) and 83 (23.9%) weighed less than 1500 grams. Nursing staffing ratio was 1:1 to 1:2 in ITU, 1:2 in HDU and 1:4 in SCBU per shift and medical staffing ratio was 1:4 to 1:4.6

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3 including middle grade doctors and consultants per weekday shift. Parent facilities on-site
4 include a coffee room and rest area and there are 15 live video cameras available in the unit
5 for families to see their infant when unable to attend the unit. Pre-pandemic parental policies
6 allowed both parents, grandparents and siblings to enter the unit in groups of two people
7 each time and the unit remained opened 24/7. From March 2020, following the Spanish
8 Society of Neonatology (*Sociedad Española de Neonatología*) (SENEO) recommendations
9 to prevent the spread of COVID-19 infection, a restrictive parental policy was implemented.
10 Only parents could see their baby, one at a time, and they were required to wear a face
11 mask at all times whilst on the unit. The parent facilities remained opened 24/7 but only one
12 family could use the parent room at any one time. From June 2020, a less restrictive
13 parental policy was implemented and both parents could stay with their baby simultaneously,
14 providing they did not have any coronavirus symptoms and had not been in contact with any
15 person who had tested positive. There were no Covid-positive cases in babies admitted to
16 the unit or their parents during the study period.
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36 **Questionnaire completion**

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38 This survey was performed as a service evaluation and improvement project and therefore
39 ethical approval was not sought. Parents were invited to voluntarily participate and
40 understood the aim of the survey. All answers were anonymized, and all patient identifiable
41 information was removed to preserve confidentiality and privacy. The survey was designed
42 by one of the doctors at KCH. A similar neonatal unit in Spain was identified, with the aim to
43 have a broader view of the parental experience during the pandemic. Only one questionnaire
44 was provided per household, so if parents had multiple infants (eg. twins) admitted to the
45 neonatal unit then they were invited only to participate once. See Figure 1 for infant eligibility
46 and inclusion per neonatal unit.
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3 Parents of infants admitted to Kings College Hospital, UK (KCH) neonatal intensive care unit
4 were asked to complete a questionnaire prospectively regarding their experience during the
5 Covid-19 pandemic. The parents were approached by the member of the medical team who
6 was leading the survey, who discussed the aim of the survey with them and, after giving
7 verbal consent, they received a written questionnaire and completed this while their baby
8 was still admitted. Questionnaire responses were anonymized after completion and data
9 collected using a Microsoft Excel spreadsheet.
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21 Families of babies admitted to the Hospital Clinic in Barcelona are asked to provide contact
22 details and an email address at the beginning of the admission and when they provided it,
23 they consent to be contacted via email. The hospital has a quality and safety management
24 program ("ISO 9001" and "UNE179003") by which questionnaires are sent via the online
25 statistical survey application "Lyme Survey" which meets legal requirements of confidentiality
26 and by completing them, they consent to its final use. Parents of infants admitted to the
27 Hospital Clinic, Barcelona (BCN) neonatal intensive care unit were asked retrospectively to
28 complete the same questionnaire used at KCH. One questionnaire was given to each
29 household and completed anonymously.
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44 Parents were eligible to complete the survey if their infant was admitted to the neonatal unit
45 for at least one week. Parents of infants receiving palliative care were excluded from the
46 study. The questionnaire contained only six questions aimed at assessing parental
47 experience during the pandemic, and hence would be rapid and burden free for parents to
48 complete. The questionnaire considered specific Covid-19 guidance laid out by the RCPCH,
49 BAPM, SENEIO and the neonatal charity Bliss. Furthermore, parents were also requested to
50 give free text recommendations as to how the service could be improved during the
51 pandemic.
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6 At KCH data were collected prospectively over a six-week period, between 25th June 2020 to
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8 5th August 2020 (first wave). At BCN the data were collected retrospectively from parents
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10 whose infants were admitted between 22nd September 2020 to 28th February 2021 (second
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12 and third wave) and when less restrictive parental policies were in place.
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14 15 **Patient and Public Involvement**

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18 It was not possible to involve patients or the public in the design, or conduct, or reporting, or
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20 dissemination plans of our research due to the unpredicted nature of the Covid pandemic
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22 and associated restrictions.
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26 27 **RESULTS**

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30 A total of 74 questionnaires were analysed, 38 from KCH and 36 from BCN. Just over half of
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32 the parents felt fully involved with the care of their infant (n=43; 58.1%), however this was
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34 larger in BCN compared to KCH [n=26 (72.2%) versus n=17 (44.7%)]. Quality time spent
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36 with infants during the pandemic was more negatively affected in KCH compared to BCN
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38 [n=24 (63.2%) versus n=12 (33.3%)]. For both countries, 44 (59.5%) responders reported
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40 the pandemic did not affect the time spent breastfeeding, and 46 (62.2%) reported giving
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42 Kangaroo Care was mostly unchanged. Parents from both units were satisfied with clinical
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44 updates from medical and nursing staff throughout the pandemic. Travelling back and forth
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46 to the hospital to see their infant was reported overall to be sometimes difficult in 29
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48 responses (39.2%), however this was no different in either country (14 from KCH versus 15
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50 at BCN. All infants in both cohorts survived to hospital discharge. See Table 1 for parental
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52 responses as per each neonatal unit.
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3 The questionnaire incorporated a section where parents could write comments about their
4 experience in the neonatal unit, including any suggestions they had to improve this. The
5 results of the survey were shared in both units and acknowledged as part of service
6 improvement.
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11 12 13 14 15 16 17 18 **KCH comments**

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20 Many parents expressed concern over the restrictions as they worried it would impact on
21 how often they would be able to see their baby and bond with them, although they
22 appreciated the reasons for this. Parents said it was “difficult with both parents not visiting
23 together”, felt “one parent rule was punishing” and they “could not spend time as a family”.
24 There were mothers who described having less time with their baby so that the fathers could
25 also attend; one said it felt “rushed and stressful having to leave so the father can see the
26 baby”. Some parents described the impact it had on their emotional well-being as well as
27 mental health. For instance, one of them said she had “severe anxiety and was struggling
28 without her partner’s support” and another parent said it was “very difficult to take turns to
29 see our baby when we were under considerable emotional stress”. Difficulties were
30 expressed balancing home life with frequent visits to the hospital, especially with siblings at
31 home, as prior to the pandemic, siblings could be by the cotside or wait with their relatives
32 and use the family facilities with relatives while waiting. One of them said it was “incredibly
33 hard with a twin not allowed in”. Single parents requested being able to nominate a family
34 member to provide additional support. A comment was made that opportunities to express
35 breast milk were affected by limited spaces in the expressing room due to the need for social
36 distancing. One parent also felt that having less time with the baby reduced feeding
37 opportunities. A few parents voiced that although wearing a face mask was understandable,
38 it also made bonding difficult. They expressed feeling “sad” that their baby had never seen
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3 them without a mask. Parents worried that not being able to read their facial expressions
4 might have consequences for the baby's development. A suggestion was made asking if
5 doctors could offer regular conference calls to allow parents to discuss the medical care of
6 their baby together. Parents said they "have been very impressed with the care and felt
7 reassured their baby was in the best hands", "nurses and doctors are very helpful" and "staff
8 do a good job with getting parents stuck in with cares and bonding". Overall, parents were
9 very happy and thankful for the clinical care and continuous support provided, despite the
10 challenges of the pandemic.
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23 **BCN comments**

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26 The quality of time parents spent with their infant was reported by one family to have been
27 negatively affected by the pandemic, mostly by the wearing of face masks which did not
28 allow the parents to kiss their baby. Furthermore, quality of time was reported to be reduced
29 by not being able to have other family members visit their infant. Parents did however report
30 finding it particularly exciting seeing their infant's name coloured on the wall next to their
31 incubator and being able to use cameras to see them at any time.
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42 **DISCUSSION**

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45 We demonstrate that parents reported the overall quality of time spent with their infant to be
46 reduced, especially when more restrictive policies were in place. This may also be related to
47 the difficulties in travel to the hospital. Concerns were highlighted about parental emotional
48 wellbeing, feelings of anxiety, bonding as a family and lack of support from partners.
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57 We considered why variation in parental satisfaction between the two countries may exist.
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59 Anxiety and apprehension during the first wave was high, with rates of major depressive
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3 symptoms in pregnant women within the UK peaking at 42%,[10] compared to a lower
4 proportion in Spain reporting such symptoms (38%).[11] In our study parents with infants
5 admitted to neonatal intensive care were asked to respond to the questionnaire during
6 different waves of the pandemic. We speculate that the higher levels of self-reported quality
7 time spent with infants and overall greater parental satisfaction in Barcelona than the UK
8 may be secondary to previously reported lower baseline rates of depressive symptoms in
9 pregnancy within the Spanish population. More so, parents in the UK were also asked to
10 complete the questionnaire when visiting was most restrictive. Such differences in self-
11 reported parental satisfaction within our study agree with a recent UK and US survey which
12 explored varying policies between units, with a greater negative parental impact identified
13 during stricter restrictions.[8]

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30 Muniraman and colleagues conducted a cross-sectional survey of parents impacted by
31 restrictive policies in six tertiary neonatal units, from the UK and the USA assessing their
32 visitation policies and impact on parents' ability to see, care for and bond with their infants. In
33 a total of 231 responses they reported that the policies were perceived as restrictive by 62%
34 of the respondents and 41% reporting being unable to bond enough. Mild to severe impact
35 on breast feeding was reported by 36% (75/209) of respondents. Our study generally agrees
36 with the above findings and complements the literature by reporting on two separate
37 populations in two European countries with the Barcelona cohort coming later in time in the
38 pandemic (up to February 2021 compared to August in 2020 in Muniraman et al.[8])

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51 When considering important outcome related factors however, our questionnaire highlights
52 that many parents within both the UK and Spain do not report a reduction in time spent
53 breast-feeding or provision of kangaroo care. Over half of our respondents felt kangaroo
54 care was not affected during the pandemic, which may be reflective of less strict restrictions.
55 Indeed, this is much higher in comparison to a recent global survey of parental experiences

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3 during the pandemic which found only less than half of respondents reported no change to
4 the frequency of kangaroo care, however this global survey included some units where
5 neither parent was allowed to visit during the restrictions.[3] Furthermore, parental
6 satisfaction in receiving medical updates was not affected regardless of which pandemic
7 restriction policy was employed.
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14 Less restrictive measures were in place during completion of the questionnaire in Barcelona,
15 when both parents were able to stay with their infant. Having both parents at the cot-side
16 together may have facilitated kangaroo care, family-integrated care and receiving joint
17 medical updates to both parents simultaneously.
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25 There were many comments made in our study regarding the impact on parental emotional
26 wellbeing. It is crucial that health professionals remain vigilant in identifying parents who
27 require additional emotional support and sign posting them to appropriate organisations.
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35 The availability of live video cameras within the neonatal unit in Spain for when parents were
36 unable to see their infant may have been vital in parents feeling more involved with the care
37 of the infant despite not being physical present. Our survey highlights the importance of
38 incorporating different modalities into our clinical care such as telephone conferencing and
39 secure video messaging. Indeed, one study reported that asynchronous video messaging
40 supported models of family integrated care, improved parental experience and emotional
41 closeness to their baby and built strong relationships between families and staff.[12]
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49 Furthermore, the use of cot-side cameras has been associated with a reduction in parental
50 stress when infant separation occurs.[13] Such advancements in technology may thus be
51 beneficial not only during future pandemics, but also in the provision and delivery of
52 universal, sustainable and accessible neonatal care.
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3 Utilisation of digital innovations as a standard of care when considering service provision
4 and re-design of units may indeed remove some of the barriers and obstacles often currently
5 experienced by parents and health care workers in being able to provide and promote family
6 integrated care, and thus such advances may be a beneficial side-product of the
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11 pandemic.[14-16]

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14 Mask wearing is a highly effective measure in reducing virus transmission at a population
15 level.[17] The use of face masks was a recurring theme expressed by parents from both the
16 UK and Spain. Wearing of face masks by parents whilst with their infant was identified as a
17 particular source of anxiety in both countries with concern over the impact upon bonding.
18 Indeed, there is little knowledge of this with respect to the longer-term consequences on
19 infant neurodevelopment. Wearing of face masks may affect attachment processes between
20 parents and their infant within the first few days of life when there is little exposure to and
21 visualisation of parental facial expressions.[18] Suggested recommendations from the
22 RCPCH with specific regard to face mask coverings is that consideration for removal should
23 be given for asymptomatic parents when providing kangaroo care.[19] Furthermore, use of
24 transparent facemasks or visors, alongside regularly talking through the mask, should be
25 encouraged to enable bonding and attachment opportunities.[20] Balance of risk must be
26 made however between the unknown adverse impact of face coverings on infant
27 neurodevelopment with the global benefits of face masks in reducing virus transmission.
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47 The results of this survey were shared amongst both units and actions including updating
48 unit policies, parents' facilities, psychological support on site and communication with
49 parents have been taken to improve parental experience and service development. To
50 improve care in both units and determine the benefits of differing approaches to the
51 pandemic it would be interesting in future studies to conduct the same survey and data
52 collection process in the same units over varying time periods during different restrictive
53 measures of the pandemic.
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6 This study has strengths and some limitations. We have surveyed parents from two tertiary
7 neonatal intensive care units in Europe incorporating two different policies on parental
8 restrictions during the Covid-19 pandemic. Answers from both cohorts of parents, with
9 different restrictions, may therefore be useful in guiding further policies in future pandemics
10 to ensure parental satisfaction is taken into consideration. Data were collected from KCH
11 during the first wave of the pandemic when lock down restrictions were being enforced,
12 thereby capturing an accurate depiction of parental experience in real time. Contrary to this,
13 data from BCN were collected retrospectively and when less restrictive policies were in
14 place, and as such may have positively impacted the reflections of parents who were at
15 home when completing the form, hence the retrospective nature of the Spanish data
16 collection acts as a limitation to the study. As responses from Spain were anonymous, it was
17 not possible to determine how sick the infants were during admission, or how long post
18 discharge the surveys were completed and how these influences may have further impacted
19 parental views. Information on whether parents from either country were first time parents
20 was also not collected. Finally, no control group pre-pandemic was included and we did not
21 have survey responses to assess baseline perception involvement in care pre-pandemic,
22 therefore, how self-reported parental satisfaction may have changed within each country
23 when restrictions and policies were implemented could not be elicited.
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44 The long-term impact of the pandemic upon parents and infants admitted to neonatal care is
45 not known.
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52 In conclusion, restrictive policies implemented due to the Covid-19 pandemic have affected
53 families with infants admitted to neonatal intensive care. Quality of time spent with the
54 babies was felt to be significantly affected, especially when more restrictive policies were
55 implemented. Parental involvement in the care of their babies and satisfaction with the care
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3 that infants received and with medical and nursing updates, however, remained positive. The
4 amount of time spent breastfeeding and giving Kangaroo Care decreased during the
5 pandemic, but was not significantly different between the two units. Neonatal units need to
6 find strategies to mitigate the impact of separation on parental experience and bonding if a
7 similar situation occurs in the future.
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20 necessarily those of the NHS, the NIHR or the Department of Health.
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25 **Competing interest statement:** The authors have no conflict of interest to declare
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27

28 **Authors contribution:**

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30
31 Carolina Zorro designed the study, participated in the analysis of data and the writing of the
32 manuscript
33

34
35 Eva MacRae participated in the design of the study, data acquisition, participated in the
36 analysis and critically revised the manuscript
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39
40 Marta Teresa-Palacio acquired the data from BCN, participated in the analysis and critically
41 reviewed the manuscript
42

43
44 Emma E. Williams participated in the analysis of data and the writing of the manuscript
45

46
47 Victoria Aldecoa-Bilbao acquired the data from BCN, participated in the analysis and
48 critically reviewed the manuscript
49

50
51 Ravindra Bhat participated in the design of the study and critically reviewed the
52 manuscript
53

54
55 Ann Hickey participated in the design of the study and critically reviewed the
56 manuscript
57
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59
60 Theodore Dassios participated in the analysis of data and the writing of the manuscript

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3 Anne Greenough supervised the project, participated in the design and
4
5 analysis of the study and critically revised the manuscript
6
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8 **Data sharing statement:** Data will be shared on reasonable request
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10 **Patient consent:** All parents consented to take part in the survey
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9 **What is known about the subject**

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- The COVID-19 pandemic has led to restrictive policies across neonatal units.
 - Parental policies varied between centers and over time, being stricter at the beginning of the pandemic.

21 **What this study adds**

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- Despite the restrictive policies implemented satisfaction with the care that infants received and with medical updates remained positive.
 - Overall time spent in breastfeeding and in Kangaroo Care was affected by the pandemic but there were no differences between different policies.
 - The use of facemasks generated parental anxiety and difficulties in bonding with their babies.

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Table 1: Parental responses as per each neonatal unit. Data are expressed as number with

percent (%)

in brackets

	KCH [n=38 (%)]	BCN [n=36 (%)]
How involved do you feel with the care of your baby?		
<i>1=not at all</i>	0 (0.0)	0 (0.0)
<i>2 = a little involved</i>	4 (10.5)	3 (8.3)
<i>3 = quite involved</i>	17 (44.7)	7 (19.4)
<i>4 = fully involved</i>	17 (44.7)	26 (72.2)
Do you feel that the pandemic has affected the quality of time you spend with your baby?		
<i>1=disimproved</i>	24 (63.2)	12 (33.3)
<i>2=not at all</i>	13 (34.2)	19 (52.8)
<i>3=improved</i>	1 (2.6)	4 (11.1)
<i>4=not answered</i>	0 (0.0)	1 (2.8)
Has the pandemic affected the amount of time you spend giving kangaroo care?		
<i>1=decreased</i>	13 (34.2)	6 (16.7)
<i>2=not at all</i>	21 (55.3)	25 (69.4)
<i>3=increased</i>	0 (0.0)	2 (5.6)
<i>4=not applicable</i>	4 (10.5)	0 (0.0)
<i>5 = not answered</i>	0 (0.0)	3 (8.3)
Has the pandemic affected the amount of time you spend breastfeeding?		
<i>1=decreased</i>	6 (15.8)	2 (5.6)
<i>2=not at all</i>	14 (36.8)	30 (83.3)
<i>3=increased</i>	0 (0.0)	1 (2.8)
<i>4= not applicable</i>	18 (47.4)	0 (0.0)
<i>5=not answered</i>	0 (0.0)	3 (8.3)

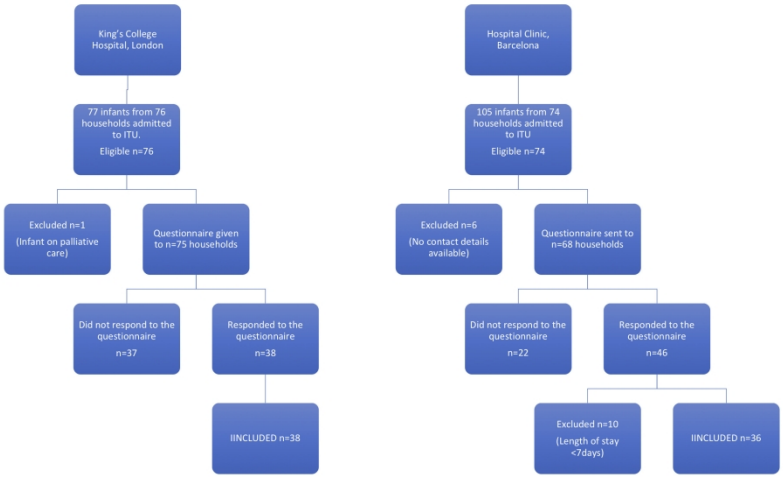
Are you satisfied with the updates from the medical and nursing staff regarding your baby?		
<i>1=very unsatisfied</i>	1 (2.6)	4 (11.1)
<i>2=unsatisfied</i>	1 (2.6)	0 (0.0)
<i>3=moderately satisfied</i>	6 (15.8)	2 (5.6)
<i>4=satisfied</i>	21 (55.3)	6 (16.7)
<i>5=very satisfied</i>	9 (23.7)	24 (66.7)
How have you found coming to the hospital to visit your baby?		
<i>1=very difficult</i>	5 (13.2)	5 (13.9)
<i>2=sometimes difficult</i>	14 (36.8)	15 (41.7)
<i>3=manageable</i>	11 (28.9)	6 (16.7)
<i>4=easy</i>	8 (21.1)	9 (25.0)
<i>5= not answered</i>	0 (0.0)	1 (2.8)

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3 **FIGURE LEGENDS**
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6 **Figure 1:** Consort diagram to portray participant inclusion per neonatal unit.
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Parental satisfaction questionnaire during COVID-19 pandemic

Hospital No:

This questionnaire is aimed at assessing whether you feel the coronavirus pandemic has affected your experience on NICU and bonding with your baby

1. How involved do you feel with the care of your baby (e.g. feeding, bathing, skin care, taking the temperature, changing the nappy)?
 - a. Not at all
 - b. A little involved
 - c. Quite Involved
 - d. Fully involved
2. Do you feel that the pandemic has affected the quality of time you spend with your baby?
 - a. Not at all
 - b. Improved quality of time
 - c. Disimproved quality of time
- 3a. Has the pandemic affected the amount of time you spend giving kangaroo care?
 - a. No at all
 - b. Increased
 - c. Decreased
 - d. Not applicable (please give a reason) _____
- 3b. How has the pandemic has affected the amount of time you spend breastfeeding your baby? (please specify if you have decided not to breastfeed)
 - a. Not at all
 - b. Increased
 - c. Decreased
 - d. Not applicable (please give a reason) _____
- 4 Are you satisfied with the updates from the medical and nursing staff regarding your baby?
 - a. Very unsatisfied
 - b. Unsatisfied
 - c. Moderately satisfied
 - d. Satisfied
 - e. Very satisfied

Parental satisfaction questionnaire during COVID-19 pandemic

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- 5 How have you found coming to the hospital to visit your baby?
- a. Very difficult
 - b. Sometimes Difficult
 - c. Manageable
 - d. Easy

6 If you would like to add any comments or suggestions on any of the above, please complete the box below



Only

Go straight to content.



Medical
Research
Council



Is my study research?

i To print your result with title and IRAS Project ID please enter your details below:

Title of your research:

Assessing the impact of the Covid-19 pandemic on parental satisfaction in two European neonatal intensive care units

IRAS Project ID (if available):

You selected:

- **'No'** - Are the participants in your study randomised to different groups?
- **'No'** - Does your study protocol demand changing treatment/ patient care from accepted standards for any of the patients involved?
- **'No'** - Are your findings going to be generalisable?

Your study would NOT be considered Research by the NHS.

You may still need other approvals.

Researchers requiring further advice (e.g. those not confident with the outcome of this tool) should contact their R&D office or sponsor in the first instance, or the **HRA** to discuss your study. If contacting the HRA for advice, do this by sending an outline of the project (maximum one page), summarising its purpose, methodology, type of participant and planned location as well as a copy of this results page and a summary of the aspects of the decision(s) that you need further advice on to the HRA Queries Line at Queries@hra.nhs.uk.

For more information please visit the [Defining Research](#) table.

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