The first 2 h after birth: prevalence and factors associated with neonatal care practices from a multicountry, facility-based, observational study


**Summary**

**Background** Amid efforts to improve the quality of care for women and neonates during childbirth, there is growing interest in the experience of care, including respectful care practices. However, there is little research on the prevalence of practices that might constitute mistreatment of neonates. This study aims to describe the care received by neonates up to 2 h after birth in a sample of three countries in west Africa.

**Methods** Data from this multicountry, facility-based, observational study were collected on 15 neonatal care practices across nine facilities in Ghana, Guinea, and Nigeria, as part of WHO’s wider multicountry study on how women are treated during childbirth. Women were eligible if they were admitted to the participating health facilities for childbirth, in early established labour or active labour, aged 15 years or older, and provided written informed consent on behalf of themselves and their neonate. All labour observations were continuous, one-to-one observations of women and neonates by independent data collectors. Descriptive statistics and multivariate logistic regressions were used to examine associations between these neonatal care practices, maternal and neonate characteristics, and maternal mistreatment. Early neonate deaths, stillbirths, and higher order multiple births were excluded from analysis.

**Findings** Data collection took place from Sept 19, 2016, to Feb 26, 2017, in Nigeria; from Aug 1, 2017, to Jan 18, 2018, in Ghana; and from July 1 to Oct 30, 2017, in Guinea. We included data for 362 women–neonate dyads (356 [98%] with available data for neonatal care practices) in Nigeria, 760 (749 [99%]) in Ghana, and 558 (522 [94%]) in Guinea. Delayed cord clamping was done for most neonates (1493 [91·8%] of 1627); other practices, such as skin-to-skin contact, were less commonly done (1048 [64·4%]). During the first 2 h after birth, separation of the mother and neonate occurred in 844 (51·9%) of 1627 cases; and was more common for mothers who were single (adjusted odds ratio [AOR; adjusting for country, maternal age, education, marital status, neonate weight at birth, and neonate sex] 1·8, 95% CI 1·3–2·6) than those who were married or cohabiting. Lack of maternal education was associated with increased likelihood of neonates not receiving recommended breastfeeding practices. Neonates with a low birthweight (<2·5 kg) were more likely (1·7, 95% CI 1·1–2·8) to not begin breastfeeding on demand than full weight neonates. When women experienced physical abuse from providers within 1 h before childbirth, their neonates were more likely to be slapped (AOR 1·9, 1·1–3·9).

**Interpretation** A high proportion of neonates did not receive recommended care practices, and some received practices that might constitute mistreatment. Further research is needed on understanding and measuring mistreatment to improve care, including respectful care, for mothers and neonates.


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**Introduction** Efforts to improve maternal and neonatal health are increasingly focusing on the need to provide high-quality clinical care and positive experiences of care for women and neonates. WHO’s vision for quality of care for pregnant women and neonates lays out a framework that places positive experiences of care as equally important to the provision of effective and competent clinical care. The 2016 WHO standards for improving quality of maternal and neonatal care in health facilities provide a series of clinical and experiential standards that health facilities and systems should strive to provide for all women and neonates around the time of birth.1 Recommended, evidence-based care for neonates...
Research in context

Evidence before this study
Although coverage and quality of individual aspects of neonatal care have previously been explored, we are unaware of any studies to date that have systematically examined observed practices related to neonatal care in health facilities across multiple countries. A 2017 literature review identified various types of neonatal care practices that might be considered as mistreatment, but noted that most included studies focused on neonates as a secondary concern to mistreatment of women giving birth. Previous studies have identified inequitable health-care treatment by subpopulation of neonates (eg, by sex, birthweight, or potential HIV exposure), but none have explored risk factors for neonates’ experience of care, such as maternal or neonatal characteristics (eg, economic status, ethnicity, or sex), or maternal experiences of mistreatment during childbirth.

Added value of this study
This study provides empirical evidence on practices related to experience of care for neonates in health facilities in the immediate postnatal period using a standardised tool across countries (Ghana, Guinea, and Nigeria). These multicountry data come from continuous, one-to-one observations of women throughout labour, childbirth, and the immediate postnatal period in nine facilities, reporting on 15 observed neonatal care practices. This study reveals that many neonates are not receiving recommended, high-quality, equitable care. This study identified significant associations between lack of maternal education, neonatal characteristics, and recommended neonatal care practices, such as breastfeeding, skin-to-skin care, and not being separated from the mother. Additionally, maternal mistreatment (physical abuse in the hour before childbirth) increased the likelihood of the neonate to experience practices that might constitute mistreatment, such as being slapped.

Implications of all the available evidence
All neonates are entitled to high-quality, respectful care after birth, yet many neonates are not receiving the full complement of recommended practices, and some are even receiving care that might constitute mistreatment. Relatively low cost, high impact interventions (such as skin-to-skin care and breastfeeding support) should be implemented routinely for all neonates after birth using the most updated information about recommended practices. More research is needed to understand the root causes of neonatal care practices that might constitute mistreatment; however, enabling environments, with proper staffing and equipment, are needed for health-care workers to provide the highest possible quality care. Through policies and enforcement, health systems must ensure that no patient is denied medical care due to non-payment. Facility environments that encourage the health and bonding of mother and their neonates should be instituted and enforced to ensure respectful and dignified care for all. This study can be used to inform future research around defining and measuring neonatal care practices that might constitute mistreatment, as well as improving policy and practice.
have largely focused on clinical care. A recent systematic review across sub-Saharan Africa concluded that there is considerable variation in the prevalence of immediate neonatal care practices between countries and more research is needed. There is little evidence and inconsistent measurement of neonatal care practices, including those that might constitute mistreatment. This study aims to describe the care received by neonates up to 2 h after birth in health facilities across three countries in west Africa using a standardised observation tool and to identify factors associated with these practices.

Methods
Study design and participants
This multicountry, facility-based, observational study is a secondary analysis of a subset of data from the WHO multicountry study on how women are treated during facility-based childbirth in Nigeria, Ghana, Guinea, and Myanmar. The wider study included a mixed-methods systematic review, formative primary qualitative research in Nigeria, Ghana, Guinea, and Myanmar, and a measurement phase that developed and validated two tools to measure the burden of mistreatment and a measurement phase that developed and validated the burden of mistreatment of women during childbirth across the four countries. In each country, three public health facilities were selected based on the following inclusion criteria (1) facilities that were not included in the formative phase of research, (2) secondary-level facility or higher, (3) 200 or more births per month, and (4) a well-defined community catchment area. Data collection took place from Sept 19, 2016, to Feb 26, 2017, in Nigeria; from Aug 1, 2017, to Jan 18, 2018, in Ghana; from July 1 to Oct 30, 2017, in Guinea; and from June 26 to Sept 5, 2017, in Myanmar. The methodological development of the measurement tools, detailed study methods, and results of the primary analysis are described in detail elsewhere.

This analysis used data collected across three countries (Ghana, Guinea, and Nigeria) from the labour observation tool, because labour observations were not done in Myanmar. Women were eligible for labour observations if they were admitted to the participating health facilities for childbirth in early established labour or active labour, aged 15 years or older, willing and able to participate, and provided written informed consent on behalf of themselves and the neonate.

Institutional permission for recruitment and observation was obtained from each site; consent was not sought from providers. This study was approved by the WHO Ethical Review Committee (A65880) and WHO Review Panel on Research Projects. In Guinea this study was approved by le comité national d'éthique pour la recherche en santé; in Nigeria by the Federal Capital Territory Health Research Committee and Department of Medical Research; in Ghana by the Ethical Review Committee of the College of Health Sciences, University of Ghana; and in Myanmar by the Ethics Review Committee and Department of Medical Research.

Procedures
The labour observation tool is publicly available and is comprised of an admission form, an incidents of mistreatment report form, and a childbirth, interventions, and discharge form that includes a subsection on neonatal practices. The tool is organised according to the type of mistreatment experienced by women during childbirth. All labour observations were continuous, one-to-one observations of women and their neonates by independent data collectors. Once a woman gave consent (inclusive of her neonate) and was enrolled, observations continued throughout labour, childbirth, and until 2 h after birth. The tool development and validation process has been described elsewhere.

Data were collected using digital, tablet-based tools with built-in quality checks and validation rules (BLU Studio XL2, Android, BLU Products; Miami, FL, USA). Data were submitted securely to a central database (WHO;
Table 2: Neonate characteristics

<table>
<thead>
<tr>
<th>Neonate status at birth</th>
<th>Ghana (n=760)</th>
<th>Guinea (n=558)</th>
<th>Nigeria (n=362)</th>
<th>Total (n=1680)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neonate status at birth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alive at birth</td>
<td>751 (98.8%)</td>
<td>530 (95.0%)</td>
<td>357 (98.6%)</td>
<td>1638 (97.5%)</td>
</tr>
<tr>
<td>Fresh stillbirth</td>
<td>3 (0.4%)</td>
<td>18 (3.2%)</td>
<td>1 (0.3%)</td>
<td>22 (1.3%)</td>
</tr>
<tr>
<td>Macerated stillbirth</td>
<td>5 (0.7%)</td>
<td>10 (1.8%)</td>
<td>3 (0.8%)</td>
<td>18 (1.1%)</td>
</tr>
<tr>
<td>Unknown, don’t know, or missing</td>
<td>1 (0.1%)</td>
<td>0</td>
<td>1 (0.3%)</td>
<td>2 (0.1%)</td>
</tr>
<tr>
<td><strong>Singleton or multiple birth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singleton</td>
<td>745 (98.0%)</td>
<td>540 (96.8%)</td>
<td>355 (98.1%)</td>
<td>1640 (97.6%)</td>
</tr>
<tr>
<td>Multiple†</td>
<td>15 (2.0%)</td>
<td>18 (3.2%)</td>
<td>7 (1.9%)</td>
<td>40 (2.4%)</td>
</tr>
<tr>
<td><strong>Neonate weight, kg</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2.5</td>
<td>66 (8.7%)</td>
<td>44 (7.9%)</td>
<td>18 (5.0%)</td>
<td>128 (7.6%)</td>
</tr>
<tr>
<td>≥2.5</td>
<td>690 (90.8%)</td>
<td>502 (90.0%)</td>
<td>339 (93.6%)</td>
<td>1531 (91.1%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>4 (0.5%)</td>
<td>12 (2.2%)</td>
<td>5 (1.4%)</td>
<td>21 (1.3%)</td>
</tr>
<tr>
<td><strong>Apgar score at 5 min</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;7</td>
<td>61 (8.0%)</td>
<td>40 (7.2%)</td>
<td>17 (4.7%)</td>
<td>118 (7.0%)</td>
</tr>
<tr>
<td>≥7</td>
<td>691 (90.9%)</td>
<td>513 (91.9%)</td>
<td>342 (94.5%)</td>
<td>1546 (92.0%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>8 (1.1%)</td>
<td>5 (0.9%)</td>
<td>3 (0.8%)</td>
<td>16 (1.0%)</td>
</tr>
<tr>
<td><strong>Neonate status at end of 2 h observation period or discharge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neonate admitted to special care neonatal unit</td>
<td>86 (11.3%)</td>
<td>7 (1.3%)</td>
<td>36 (9.9%)</td>
<td>127 (7.7%)</td>
</tr>
<tr>
<td>Very early infant death within 2 h after birth</td>
<td>3 (0.4%)</td>
<td>8 (1.4%)</td>
<td>2 (0.6%)</td>
<td>13 (0.8%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (0.1%)</td>
<td>24 (4.3%)</td>
<td>24 (6.6%)</td>
<td>49 (2.9%)</td>
</tr>
</tbody>
</table>

Data are n (%). †Neonates delivered via vaginal birth, only singleton babies and the first-born twin included. ‡Twins.

Statistical analysis

For standardised comparison of findings across countries, this analysis was restricted to women who had a vaginal birth only and, in the case of multiple births, only the first-born neonate. Maternal sociodemographic, obstetric, and neonatal characteristics were aggregated and presented as proportion of women who had a vaginal birth and by country. The χ² test was used to compare differences of maternal and neonatal characteristics across the three countries (Nigeria, Ghana, and Guinea).

Descriptive analyses were done to explore 15 observed neonatal practices, including recommended practices and practices that might constitute mistreatment across the three countries. For this analysis, we excluded early neonatal deaths and stillbirths (fresh or macerated). The χ² test was used to compare differences of neonatal care practices across the three countries.

We evaluated factors potentially associated with the provision of the four practices that WHO recommends as routine care for all neonates and breastfeeding: immediate skin-to-skin contact with mother, non-separation of the neonate from the mother after birth, breastfeeding within 30 min after birth, and breastfeeding on neonate demand. Multivariable logistic regression models were fitted to evaluate whether maternal age, education, marital status, neonate weight at birth, and neonate sex were associated with the occurrence of these neonatal practices.

Mistreatment of women by health care providers, particularly physical abuse, is highly prevalent in the 1 h before childbirth; therefore, we explored the associations, using multivariable logistic regression, between women who experienced physical abuse 1 h before childbirth and observations related to the physical handling of the neonate, such as slapping of the neonate and holding the neonate by the leg or upside down. The multivariable model included potential associated factors—ie, country, maternal age, maternal education, marital status, neonate weight at birth, and neonate sex. Data analysis was done using SAS, version 9.4.

Role of the funding source

The funders of the study were involved in developing the research question and in investigator meetings, but had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

We included 1680 women and their neonates born of vaginal birth (first born if multiple births), with 760 (45.2%) in Ghana, 558 (33.2%) in Guinea, and 362 (21.6%) in Nigeria (table 1). 844 (50.2%) of 1680 women were aged 20–29 years, with a slightly larger proportion of women younger than 19 years (148 [26·5%] of 558) in Guinea than in Ghana or Nigeria. Most women were married or in cohabitation (1461 [86·9%] of 1680), with slightly more unmarried women in Ghana than in Guinea or Nigeria. There was variation in educational attainment: 256 (45·9%) of 558 women in Guinea had no formal education, while 161 (44·5%) of 362 women in Nigeria had tertiary education. Almost two-thirds of women in the sample were multiparous (1094 [65·1%] of 1680). Overall, 108 (6·4%) of 1680 women in the sample had assisted vaginal birth (using forceps or vacuum). Assisted vaginal births were slightly higher among women in Ghana (71 [9·3%] of 760) than in Guinea or Nigeria.
1618 (97.5%) of 1680 neonates were alive at birth, and 1640 (97.6%) of 1680 were singletons (table 2). About 6-6% of births in Guinea were stillbirths compared with less than 2-0% in Ghana and Nigeria. There was a similar number of female and male neonates across countries. 128 (7.6%) of 1680 neonates had a low birthweight of less than 2·5 kg, with 47 (2.7%) weighing less than 2·0 kg. 118 (7.0%) neonates had 5 min APgar scores of less than 7. Additionally, 129 (7.7%) neonates were admitted to an intensive or special care unit by the end of the observation period.

Neonatal care practices are analysed only for the sample of neonates born vaginally (singletons or the first born of a multiple birth), alive at birth, and alive at the end of the 2 h observation period (n=1627). Significant differences were observed across the three countries for almost all neonatal practices (table 3). However, some of the recommended neonatal care practices were widely observed. Most neonates (1493 [91.8%] of 1627) had delayed cord clamping. Almost all neonates in Ghana and Guinea received delayed cord clamping after birth, compared with (258 [72.5%] of 356) in Nigeria. Few neonates (21 [1.3%] of 1627) underwent rubbing with alcohol during the observation period. Healthcare providers in Guinea and Ghana rarely bathed neonates; however, 81 (22.8%) of 356 neonates in Nigeria were bathed within the first 2 h of life. Only 1048 (64.4%) of 1627 neonates received immediate skin-to-skin care. Routine suctioning of the neonate was relatively common in all countries (1101 [67.7%] of 1627) even though it is not recommended. Breastfeeding within the first 30 min was relatively low in Ghana (65 [12.5%] of 522) and Nigeria (36 [10.1%] of 356) but was considerably higher (288 [38.0%] of 749) in Ghana. Breastfeeding on demand was also highest in Ghana (346 [45.7%] of 749), and lowest in Guinea (125 [23.9%] of 522) and Nigeria (43 [12.1%] of 356).

There were only a few cases of the neonate being left unattended (14 [0.9%] of 1627), which occurred at least once in each of the three countries (table 3). Overall, more than half of neonates were separated from the mother within the first 2 h after birth (844 [51.9%] of 1627; table 3). All facilities had instances of neonates being held by the leg (132 [8.1%] of 1627), held upside down (108 [6.6%] of 1627), having their legs flexed towards the abdomen (94 [5.8%] of 1627), being slapped (70 [4.3%] of 1627), or having their chest milked (67 [4.1%] of 1627). In Ghana (seven [0.9%] of 749) and Nigeria (three [0.8%] of 356), there were a few cases of refusal to provide postnatal care to the mother and neonate in the first 2 h after delivery due to the inability to pay.

The mother not having a formal education was associated with the increased likelihood of not receiving recommended neonatal care practices, compared with neonates of mothers with at least some years of schooling (table 4), including no immediate skin-to-skin contact with mother, neonate separated from mother after birth, and no breastfeeding on neonate demand. Single women were more likely than married or cohabiting women to be separated from their neonates within the first 2 h after birth (table 4). Maternal age had no effect on neonatal care practices received. Neonates with a low birthweight (<2·5 kg) were less likely to be breastfed on demand than their full weight counterparts. For women who experienced any physical abuse within 1 h before giving birth,
their neonates were more likely to be slapped, compared with women not experiencing physical abuse, adjusting for country, maternal age, education, marital status, neonate weight at birth, and neonate sex (table 5). There was no statistically significant difference between women who experienced physical abuse within 1 h after giving birth and their neonates being held by the leg or upside down, compared with women who did not experience physical abuse (table 5).

Discussion
This study used multicountry, facility-based, prospectively collected data from direct observations to report on neonatal care practices up to 2 h after birth. There was variation in the prevalence of neonatal care practices. Some practices, such as routine suctioning, were common in all countries, despite not being recommended. The prevalence of the recommended neonatal care practices relevant to breastfeeding ranged from 10% to 46%. The prevalence of the recommended practice of immediate skin-to-skin contact had wide variation, ranging from 25% to 94%. Keeping the neonate with the mother was also not universally practiced, with prevalence of separation consistently from 46% to 61%. This separation has negative implications for breastfeeding, maternal–infant bonding, and the ability of mothers to monitor their neonate’s health and consent for their care.3

Because neonates have a limited capacity for communication, understanding which practices might constitute mistreatment is challenging. Previous studies on maternity care can provide useful frameworks for how certain practices might be categorised into those considered disrespectful by all, versus those that might not always be considered abusive but are deviations from national or international standards.39 Certain practices such as slapping or holding the neonate upside down or by the leg might constitute mistreatment, and were experienced by up to a third of neonates. Separation of neonates from their mothers occurred in more than half of observed cases.

Understanding the reasons for the persistence of harmful practices is also challenging because there might be multiple drivers simultaneously operating at individual, facility, and policy levels. Providers might not consider certain physical handling of the neonate as mistreatment if the intentions were to benefit the neonate’s health (eg, encourage movement, stimulate respiration, clean the skin). A neonate might be left unattended because of an inattentive or unskilled provider, but the situation might also have been caused by facility deficiencies if there were not enough providers or physical space for patients to be treated safely. Health system strengthening, including a robust and competent workforce, can benefit both the woman and neonate and contribute to improved care.31 Facilities should implement policies that are supportive of parental access to their neonates as much as possible, and a parent, guardian, or health-care worker should be with the neonate at all times.2,9,31 Health providers might not have received updated or refresher training, and they might be unintentionally harming neonates by performing non-recommended practices; thus, providers should have access to the most updated protocols and recommendations. Despite evidence against certain practices, some were still observed in this study, such as rubbing the neonate with alcohol, milking the chest, or holding the neonate by leg or upside down, which could be addressed through improved pre-service and in-service clinical training. Additionally, enabling environments are crucial to allow health workers to provide high-quality care, including sufficient staff support, resources, and respect for themselves.2,12 Further research is needed to develop innovative strategies for updating provider and patient interactions (including knowledge, skill, and communication) and ways to reduce misguided, inadvertent, or iatrogenic harm.

A striking finding was that more than 50% of neonates were separated from their mothers within the first 2 h of life. In many settings, separation of the neonate from the mother immediately after birth might be routine practice, for example, to wipe and weigh the neonate or allow the mother to rest. Separation of neonate might also be influenced by the physical environment such as the space and design of the delivery room (eg, beds or tables), which might not allow the presence of the neonate in the room during the first hour, particularly where they have more than one woman in the room. Separation should occur only in rare, medically urgent circumstances,3 and for as short a duration as possible, because separation can disrupt or delay initiation of breastfeeding, interfere with bonding, and cause parental stress, especially if the neonate’s whereabouts or reasons for separation are unknown, or care was not consented. It is recommended that parents should be allowed to stay with their neonates, even during non-surgical medical procedures, and separation should be discouraged and minimised.4

The mother having no formal education was associated with higher prevalence of receipt of non-recommended neonatal practices (separation after birth, no breastfeeding on demand, no skin-to-skin care) and
unmarried women were also more vulnerable to being separated from their neonates. Furthermore, women who experienced physical abuse in the hour immediately before childbirth were more likely to have their neonates slapped. It is plausible that this correlation is due to the same providers caring for both women and their neonates, but there might be other factors. Maternal mistreatment might be related to discrimination, low health literacy, or lack of empowerment in the face of unequal power dynamics, which might extend to their neonates. Elimination of gendered discrimination, as well as promotion of female education and health literacy, can help ensure a more respectful environment for all mothers and their infants. More research is needed to understand the drivers of these behaviours; for example, why neonates whose mothers experience discrimination based on individual-level characteristics are more likely to experience harmful practices or receive poor quality care themselves.

In Ghana and Nigeria, postnatal care was denied due to non-payment. These instances are rare, but not zero, and might have serious implications for those families. Withholding care or detaining patients due to non-payment has been documented elsewhere, and is an urgent priority to address because occurrences might be more frequent at different types of health facilities or in other settings and countries beyond those included here.

Neonates with birthweights less than 2.5 kg were less likely to be breastfed on demand in the first hours of life than full weight neonates. Low birthweight neonates require additional support for breastfeeding, but it is recommended that they initiate as soon as possible and receive frequent feedings, because colostrum can have additional immunological benefits for preterm neonates who are more susceptible to bacterial and viral sepsis. Promotion of skin-to-skin care and minimizing separation of the mother and neonate can promote early and effective breastfeeding, even and especially for low birthweight and preterm neonates. The WHO Nurturing Care Framework also recommends gentle care of low birthweight infants, with specific attention to sleep, sounds, skin, and parental involvement, in order to optimise early childhood development. However, it should be noted that low birthweight neonates especially under 2 kg (47 neonates in our study) might have delayed initiation of breastfeeding as they might not yet have been medically stable or might have had low demand for breastfeeding until after the 2 h period.

With increasing research on respectful maternity care, it is becoming clearer that the experience of care is important for all women and neonates. A 2019 study in Tanzania found that more than 74% of a woman’s outpatient health-care visits were for her child’s health, and further linked the experience of respectful care during that visit to satisfaction with the clinic and trust in the facility. The global agenda to promote respectful maternity care was always intended to include neonates, and to give priority to the mother–neonate dyad or family unit. However, without explicit attention, neonates might be inadvertently left out. New efforts aim to incorporate specific concepts concerning neonates into existing maternal and child health documents, and advocate that all neonates, including those who are small or sick, are individuals with rights from the moment of birth. Beyond evidence-based clinical care, neonates are entitled to dignified and respectful health care from the moment of birth, and the full complement of human rights, including an identity and nationality. Providing care that is evidence-based and respectful will be crucial for building partnerships between families and the health system and ensuring better care and improving health outcomes for all.

The main purpose of the observational tool was to measure mistreatment of women during childbirth; therefore, it had limitations for the use in observing neonatal care practices. For example, the tool measured initiation of breastfeeding within 30 min but the WHO recommendation is to initiate breastfeeding within 1 h, meaning that this measurement could be revised in future data collection instruments. The neonatal practices were measured once at the end of the 2 h observation period and so it is possible that the data collectors might have missed real-time information.

The tool did not include reasons for maternal–neonate separation nor the length of separation (eg, minutes vs the entire 2 h period), and thus we cannot provide further exploration into duration and the types of separation, including if some were medically indicated, and the presence or not of another parent or family member. The high prevalence would suggest that most cases of separation are not due to medical necessity, but this is an area for further investigation. Details on how exactly denial of care occurred were not captured; in the future,
studies should explore if patients are verbally or physically turned away, redirected to other facilities, forced to wait longer for procedures, or experience other types of denial of care. Because this analysis was restricted to the first 2 h after birth, future research should also explore practice, including denial of care, at later time points. Future research might include qualitative components to explore families’ and health workers’ priorities, perceptions, and expectations of care for their neonates, including among those who had a stillbirth or neonatal death.

This study illustrates that substandard care of neonates is not isolated to individual incidents, but rather health system failures across observed settings. Mistreatment of neonates might be linked to mistreatment of their mothers, both in terms of physical treatment and demographic factors. Further research is needed to better understand women’s and families’ expectations and preferences around facility-based neonatal care practices, as well as what practices might constitute mistreatment. This study provides an important examination of types of neonatal care practices occurring in health facilities, and highlights where action can be taken immediately, especially around improving uptake of recommended practices and ensuring that children are not separated from their families or denied care. These data can inform future studies on potential interventions, and can provide an impetus for improving respectful, dignified, high-quality care for neonates and their families.

Contributors
ES, HM, MB, and OT conceptualised the analysis. KA-B, EM, RA, CG, MDB, BAD, A-MS, TAI, AOA, AKA, TMM, and NOM did training of data collectors, data collection, and data management. ES, HM, SST, and OT did the data analysis and prepared the first draft of the manuscript. All authors were involved in data interpretation and review of the final manuscript.

Declaration of interests
We declare no competing interests.

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