

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



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## 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, 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.<sup>1</sup> 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.<sup>1</sup> Recommended, evidence-based care for neonates

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## 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.

includes promotion of early and exclusive breastfeeding, support for skin-to-skin care, and in most cases, delayed cord clamping and bathing.<sup>2-4</sup> It is also recommended that neonates be kept with a parent or guardian as much as possible (including during referrals or minor medical procedures), and handled gently.<sup>2</sup> Neonates should receive high-quality care regardless of their own or their family's characteristics.

A growing body of research has demonstrated the effect of quality, respectful care on health outcomes, especially for maternal and neonatal care.<sup>5,6</sup> Links between perceived quality of care and women's and families' decisions about when and where to seek care are now well established.<sup>7-11</sup> Regardless of the reason for a health care visit, if families feel that quality is poor or that they or their neonates are not well treated, they might avoid care-seeking for future paediatric issues, future pregnancies, or other health care needs.<sup>12</sup>

The past decade has seen substantial research related to respectful maternity care and the mistreatment of women during childbirth, including a landscape analysis,<sup>13</sup> systematic reviews,<sup>5,14</sup> and multiple efforts to measure prevalence of mistreatment during childbirth.<sup>15,16</sup> However, much less is known about how neonates experience care in facility settings in the immediate

postnatal period. There is growing interest in how the treatment of neonates might be defined, measured, and improved as part of the agenda to improve respectful, dignified, and quality of care for women and neonates.<sup>17</sup> A 2017 review identified evidence of potential mistreatment of neonates in a variety of categories, which mirrored those identified as maternal mistreatment, but also included additional categories such as bereavement care for families after stillbirth or neonatal death and absence of birth and death registration for neonates.<sup>18</sup>

There is currently no consensus on which neonatal care practices might be classified as mistreatment. However, practices can be observed that do not meet WHO recommendations for quality neonatal clinical care, such as immediate bathing or early cord clamping.<sup>2,3,19</sup> Other practices identified in a 2017 review<sup>18</sup> are likely to constitute mistreatment, such as rough handling and slapping, denial of medical care, or discrimination based on the mother's, family's, or neonate's characteristics, including economic status, ethnicity, or sex. Some of these practices might also constitute violations of human rights standards.<sup>18</sup>

Neonatal care practices after birth in health facilities have been examined in quantitative studies in countries such as Brazil, China, and Pakistan,<sup>20,21</sup> but these studies

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.<sup>22</sup> 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.<sup>15</sup> The wider study included a mixed-methods systematic review,<sup>5</sup> formative primary qualitative research in Nigeria, Ghana, Guinea, and Myanmar,<sup>23–28</sup> and a measurement phase that developed and validated two tools to measure the burden of mistreatment of women during childbirth across the four countries.<sup>29</sup> 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,<sup>29</sup> detailed study methods, and results of the primary analysis are described in detail elsewhere.<sup>15</sup>

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 Ethics Committee, Research Ethical Review Committee, Oyo State, and State Health Research Ethics Committee of Ondo State; in Ghana by the Ethical Review Committee of the Ghana Health Service, and the Ethical and Protocol

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<sup>29</sup> 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.<sup>29</sup> The tool is organised according to the type of mistreatment experienced by women during childbirth.<sup>5</sup> 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.<sup>29</sup>

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;

	Ghana (n=760)	Guinea (n=558)	Nigeria (n=362)	Total (n=1680)
<b>Maternal age, years</b>				
≤19	67 (8.8%)	148 (26.5%)	15 (4.1%)	230 (13.7%)
20–29	377 (49.6%)	307 (55.0%)	160 (44.2%)	844 (50.2%)
≥30	316 (41.6%)	103 (18.5%)	187 (51.7%)	606 (36.1%)
<b>Marital status</b>				
Single†	129 (17.0%)	26 (4.7%)	17 (4.7%)	172 (10.2%)
Married or cohabitating	606 (79.7%)	518 (92.8%)	337 (93.1%)	1461 (86.9%)
Other‡	25 (3.3%)	14 (2.5%)	8 (2.2%)	47 (2.8%)
<b>Education</b>				
No formal education	45 (5.9%)	256 (45.9%)	4 (1.1%)	305 (18.2%)
Some primary	64 (8.4%)	104 (18.6%)	5 (1.4%)	173 (10.3%)
Some secondary	278 (36.6%)	121 (21.7%)	31 (8.6%)	430 (25.6%)
Complete secondary	253 (33.3%)	42 (7.5%)	155 (42.8%)	450 (26.8%)
Complete tertiary	98 (12.9%)	16 (2.9%)	161 (44.5%)	275 (16.4%)
Vocational or unknown	22 (2.9%)	19 (3.4%)	6 (1.7%)	47 (2.8%)
<b>Number of previous pregnancies</b>				
1	188 (24.7%)	183 (32.8%)	97 (26.8%)	468 (27.9%)
2	174 (22.9%)	121 (21.7%)	88 (24.3%)	383 (22.8%)
≥3	392 (51.6%)	250 (44.8%)	170 (47.0%)	812 (48.3%)
Unknown	6 (0.8%)	4 (0.7%)	7 (1.9%)	17 (1.0%)
<b>Number of previous births</b>				
1	263 (34.6%)	186 (33.3%)	132 (36.5%)	581 (34.6%)
2	215 (28.3%)	126 (22.6%)	105 (29.0%)	446 (26.5%)
≥3	280 (36.8%)	244 (43.7%)	124 (34.3%)	648 (38.6%)
Unknown	2 (0.3%)	2 (0.4%)	1 (0.3%)	5 (0.3%)
<b>Mode of birth</b>				
Unassisted vaginal birth	689 (90.7%)	531 (95.2%)	352 (97.2%)	1572 (93.6%)
Assisted vaginal birth§	71 (9.3%)	27 (4.8%)	10 (2.8%)	108 (6.4%)

Data are n (%). \*Of women in the total study cohort who had a vaginal birth. †Single, separated, or divorced. ‡Other category indicates "other", "don't know", and "unknown" responses, or that data were missing. §Vacuum or forceps.

**Table 1: Maternal sociodemographic and obstetric characteristics\***

	Ghana (n=760)	Guinea (n=558)	Nigeria (n=362)	Total (n=1680)
<b>Neonate status at birth</b>				
Alive at birth	751 (98.8%)	530 (95.0%)	357 (98.6%)	1638 (97.5%)
Fresh stillbirth	3 (0.4%)	18 (3.2%)	1 (0.3%)	22 (1.3%)
Macerated stillbirth	5 (0.7%)	10 (1.8%)	3 (0.8%)	18 (1.1%)
Unknown, don't know, or missing	1 (0.1%)	0	1 (0.3%)	2 (0.1%)
<b>Singleton or multiple birth</b>				
Singleton	745 (98.0%)	540 (96.8%)	355 (98.1%)	1640 (97.6%)
Multiple†	15 (2.0%)	18 (3.2%)	7 (1.9%)	40 (2.4%)
<b>Neonate sex</b>				
Female	368 (48.4%)	271 (48.6%)	166 (45.9%)	805 (47.9%)
Male	387 (50.9%)	286 (51.3%)	196 (54.1%)	869 (51.7%)
Unknown	5 (0.7%)	1 (0.2%)	0	6 (0.4%)
<b>Neonate weight, kg</b>				
<2.5	66 (8.7%)	44 (7.9%)	18 (5.0%)	128 (7.6%)
≥2.5	690 (90.8%)	502 (90.0%)	339 (93.6%)	1531 (91.1%)
Unknown	4 (0.5%)	12 (2.2%)	5 (1.4%)	21 (1.3%)
<b>Apgar score at 5 min</b>				
<7	61 (8.0%)	40 (7.2%)	17 (4.7%)	118 (7.0%)
≥7	691 (90.9%)	513 (91.9%)	342 (94.5%)	1546 (92.0%)
Unknown	8 (1.1%)	5 (0.9%)	3 (0.8%)	16 (1.0%)
<b>Neonate status at end of 2 h observation period or discharge</b>				
Neonate admitted to special care neonatal unit	86 (11.3%)	7 (1.3%)	36 (9.9%)	129 (7.7%)
Very early infant death within 2 h after birth	3 (0.4%)	8 (1.4%)	2 (0.6%)	13 (0.8%)
Unknown	1 (0.1%)	24 (4.3%)	24 (6.6%)	49 (2.9%)

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

Table 2: Neonate characteristics\*

Geneva, Switzerland) using a 3G cellular connection or wireless internet. Consistency checks for screening logs, recruitment, and data were done weekly by WHO and country research teams; inconsistencies were resolved during data collection.

For this analysis, we used neonate data collected during the 2 h period after birth (from the childbirth interventions and discharge form) and maternal data collected during the entire study.<sup>15</sup> Data on 15 observed neonatal practices were collected and measured once at the end of the 2 h observation period.

### 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  $\chi^2$  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  $\chi^2$  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<sup>19</sup> and breastfeeding:<sup>4</sup> 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;<sup>15</sup> 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.

1638 (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 Guinea (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,

	Ghana (n=749)	Guinea (n=522)	Nigeria (n=356)	Total (n=1627)
Cord clamping done $\geq$ 60 s after birth†	723 (96.5%)	512 (98.1%)	258 (72.5%)	1493 (91.8%)
Immediate skin-to-skin contact with mother†	707 (94.4%)	130 (24.9%)	211 (59.3%)	1048 (64.4%)
Breastfeeding within 30 min after birth†	288 (38.5%)	65 (12.5%)	36 (10.1%)	389 (23.9%)
Breastfeeding on neonates demand†	346 (46.2%)	125 (23.9%)	43 (12.1%)	514 (31.6%)
Neonate separated from mother after birth†	346 (46.2%)	317 (60.7%)	181 (50.8%)	844 (51.9%)
Routine suctioning of neonate†	490 (65.4%)	389 (74.5%)	222 (62.4%)	1101 (67.7%)
Rubbing the neonate with alcohol†	11 (1.5%)	1 (0.2%)	9 (2.5%)	21 (1.3%)
Bathing during observation period†	19 (2.5%)	0	81 (22.8%)	100 (6.1%)
Flexing the neonates legs towards the abdomen†	63 (8.4%)	28 (5.4%)	3 (0.8%)	94 (5.6%)
Milking the neonates chest	43 (5.7%)	14 (2.7%)	10 (2.8%)	67 (4.1%)
Slapping the neonate†	27 (3.6%)	5 (1.0%)	38 (10.7%)	70 (4.3%)
Holding the neonate upside down†	17 (2.3%)	30 (5.7%)	71 (19.9%)	118 (7.1%)
Holding the neonate by the leg†	20 (2.7%)	15 (2.9%)	97 (27.2%)	132 (8.1%)
Neonate left unattended	7 (0.9%)	1 (0.2%)	6 (1.7%)	14 (0.9%)
Refusal to provide postnatal care for mother and neonate due to inability to pay	7 (0.9%)	0	3 (0.8%)	10 (0.6%)

Data are n (%). \*Excludes stillbirths, early neonate death, and second borns in multiple births. †p<0.05.

**Table 3: Neonatal care practices after vaginal birth\***

	No immediate skin-to-skin contact with mother	Neonate separated from mother after birth	No breastfeeding within 30 min after birth	No breastfeeding on neonate demand
<b>Maternal age, years</b>				
$\leq$ 19	0.74 (0.5-1.2)	0.93 (0.7-1.3)	1.3 (0.8-2.1)	1.3 (0.8-1.9)
20-29	0.89 (0.7-1.2)	1.1 (0.9-1.4)	1.1 (0.8-1.4)	1.0 (0.7-1.2)
$\geq$ 30	Reference	Reference	Reference	Reference
<b>Maternal education</b>				
No education	1.5* (1.0-2.2)	1.4* (1.0-1.8)	1.5 (0.9-2.2)	1.4* (1.0-2.0)
At least some education	Reference	Reference	Reference	Reference
<b>Maternal marital status</b>				
Single†	1.2 (0.7-2.1)	1.8* (1.3-2.6)	0.7 (0.5-1.0)	0.9 (0.7-1.4)
Married or cohabitating	Reference	Reference	Reference	Reference
<b>Neonate weight at birth, kg</b>				
<2.5	1.5 (0.9-2.5)	1.3 (0.9-1.9)	1.6 (0.9-2.6)	1.7* (1.1-2.8)
$\geq$ 2.5	Reference	Reference	Reference	Reference
<b>Neonate sex</b>				
Male	1.0 (0.8-1.3)	1.0 (0.84-1.3)	1.1 (0.8-1.4)	1 (0.1-1.3)
Female	Reference	Reference	Reference	Reference

Data are adjusted odds ratio (95% CI). \*p<0.05; all models adjusted for country. †Single, separated, or divorced.

**Table 4: Maternal and neonate factors associated with neonatal care practices**

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,

	Slapping the neonate			Neonate held upside down or by the leg		
	n/N (%)	Unadjusted OR (95% CI)*	Adjusted OR (95% CI)†	n/N (%)	Unadjusted OR (95% CI)*	Adjusted OR (95% CI)†
Maternal physical abuse (n=161)	13/161 (8.1%)	2.1 (1.1–4.2)‡	1.9 (1.1–3.9)‡	24/161 (14.9%)	0.97 (0.58–1.7)	0.98 (0.61–1.6)
No maternal physical abuse (n=1300)	45/1300 (3.5%)	Reference	Reference	132/1300 (10.2%)	Reference	Reference

OR=odds ratio. \*Adjusted for country only. †Adjusted for maternal age, maternal marital status, maternal education, neonate weight, neonate sex, and country. ‡p<0.05.

**Table 5: Association between maternal mistreatment 1 h before birth and selected physical handling of neonate observed after birth (n=1461)**

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 before 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.<sup>4</sup>

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.<sup>30</sup> 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.<sup>31</sup> 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.<sup>2,14,19</sup> 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.<sup>32,33</sup> 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,<sup>4</sup> 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.<sup>34</sup>

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)<sup>4</sup> 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.<sup>14</sup> 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.<sup>15</sup>

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,<sup>35</sup> 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.<sup>36</sup> Promotion of skin-to-skin care and minimising separation of the mother and neonate can promote early and effective breastfeeding, even and especially for low birthweight and preterm neonates.<sup>37</sup> 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.<sup>34</sup> 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.<sup>38</sup>

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.<sup>12</sup> 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,<sup>39</sup> 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.<sup>40</sup> 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 strengths of this study include rigorous data collection methods using standardised measurement tools and direct, continuous observations in multiple facilities. This study presents important multicountry evidence on neonatal care practices in health facilities and is one of the first to document the prevalence of practices that might constitute mistreatment of neonates, and to link these practices with maternal experiences of care. While the extent to which one feels mistreated might be dependent on cultural norms and individual expectations,<sup>41</sup> data presented here are observational and report on recommended and potentially harmful neonatal care practices with known health implications, some of which might be considered mistreatment by women and families. Because this is an observational study, some health-care worker behaviours might have changed in the presence of an observer; however, statistical exploration of potential effects over time by facility, country, and month of recruitment in our study showed no evidence of the presence of the Hawthorne effect.

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,<sup>4</sup> 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 ÖT 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 ÖT 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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