

Immediate Newborn Care and Associated Outcomes in the Delivery Room: An Observational Study in Rwanda

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ABSTRACT

Background

Neonatal mortality is a worldwide concern, especially in sub-Saharan Africa. Millions of newborn deaths could be prevented with quality care at birth.

Objective

To identify immediate newborn care provided by birth attendants and associated outcomes in the delivery room of a district hospital in Kabgayi, Rwanda.

Methods

This study used a descriptive cross-sectional design and convenience sampling strategy. The sample of 171 newborns and birth attendants were observed in the delivery room using a standardized checklist during April and May 2019. Descriptive statistics were used to analyze data.

Results

The majority (65.5%) of newborns were female, and at term (93.6%). The majority had mouth and nose cleared (60%), dried thoroughly (75.4%), wet cloth removed (57.3%), delayed umbilical cord clamping (67.3%), and immediate skin-to-skin contact (67.3%). Limited interventions included APGAR evaluation (28%) and breastfeeding within the first hour (36.6%). The majority of 135(78.9%) were stable, and none died.

Conclusion

The majority of the study population was stable, though all newborns did not benefit from standard immediate newborn care. To reduce neonatal mortality and morbidity in Rwanda, we need to redouble efforts to strengthen the quality of immediate newborn care. Future research is needed to identify effective training to improve newborn outcomes at birth.

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BACKGROUND

Globally, millions of newborns die of preventable or treatable conditions in the first month due to a lack of quality care at birth, or skilled care and treatment in the first few days following birth.[1] Newborns predominantly die from preterm birth, infections, and intrapartum-related complications such as asphyxia.[2] Newborns in sub-Saharan Africa (SSA) or Southern Asia are ten times more likely to die in the neonatal period (first 28 days) than those born in high-resource countries.[3] The World Health Organization (WHO) recommends newborn care guidelines for birth attendants (BA) to provide quality newborn care immediately after birth.[4]

Newborn care begins before delivery with the preparation of the environment, including the presence of a skilled birth attendant able to provide basic resuscitation to keep the newborn stable the healthy.[5] At birth, the airway, breathing, and circulation are checked. Stimulation and thermoregulation follow and include thoroughly drying the newborn, removing wet cloths, placing the newborn in skin-to-skin contact (SSC) with the mother, and draping a warm towel over the posterior part of the newborn. Other interventions include delayed umbilical cord clamping, initiation of breastfeeding (BF), and, when needed, a clean surface for resuscitation.[3-4]

However, various studies have shown that the WHO recommendations are not adhered to routinely. A study conducted by De Graft-Johnson et al.,[5] in six African countries, including Ethiopia, Kenya, Madagascar, Mozambique, Rwanda, and Tanzania, found severe gaps in the readiness of health facilities to provide quality postnatal care. The findings showed that among the 2377 newborns, 80% were dried immediately after birth, meaning 20% were not, which could lead to hypothermia and less responsiveness to resuscitation if required. Other study findings included 45% for the overall SSC rate, with only 10% country-specific for Kenya. Results further revealed that only 43% initiated BF within the first hour. Early initiation of SSC and early BF significantly contribute to newborn thermal control and infection prevention.[6]

Early BF initiation reduces the risk of neonatal mortality.[7] The findings from research in SSA, including Rwanda [5], demonstrated a critical need for birth attendants to have the necessary knowledge and skills to provide quality newborn care services. Furthermore, health facilities need to be well equipped to enable readiness to save neonatal lives.

The response to reduce neonatal mortality includes the immediate need to “strengthen and invest” in newborn care around the time of birth, and improve the quality and accountability to every newborn.[8] The use of an evidenced-based neonatal protocol helps minimize the neonatal risk of illness and prevention of deaths,[8] and is currently being updated in Rwanda. Despite efforts to reduce neonatal mortality, the 2019 report from the Rwanda Biomedical Centre (RBC) shows a 17% neonatal death rate.[9] However, the Rwanda Demographic Health Survey (RDHS) reports that 71% of neonatal deaths are preventable.[10]

According to Khurmi et al.,[11] findings from a Bottleneck Analysis and projections in key maternal and child mortality rates using Lives Saved Tool (LiST) (2000-2015) indicated the “quality of care at birth, especially in newborn health facilities, was missing” in Rwanda. Half of the perinatal deaths (2012-2013) were potentially preventable, and most were stillbirths and early neonatal deaths.[12] Similarly, findings from a study of the six SSA countries during the 2009-2012 period [5] reported mean scores ranging from 36-62% for health workers' knowledge of immediate newborn care practices. However, health workers in Kenya displayed greater overall knowledge.[5] Since all three studies were conducted during the Millennium Development Goals (MDG) era and included Rwanda, the investigator was curious to determine the current situation in the early years of the Sustainable Development Goals (SDG).

It is vital that we further accelerate progress in newborn health by reducing the neonatal mortality rate to 12 deaths, or less, per 1,000 live births to meet the SDGs by 2030.[13] This study was undertaken to identify immediate newborn care practices provided by birth attendants and associated outcomes in a maternity ward in Rwanda.

METHODS

Design

A descriptive cross-sectional study design was used to identify the immediate newborn care provided and associated outcomes in the delivery room at a Kabgayi District Hospital in Rwanda. Kabgayi is a health institution located in the Southern Province. The study was conducted, from April 1 to May 31, 2019.

Participants' recruitment

The study used a convenience sampling method in order to meet the study objectives. Newborns birthed by spontaneous vaginal deliveries (SVD) in

the maternity ward at Kabgayi District Hospital while the investigator was present were included. Newborn birthed by cesarean section (C/S), outside the maternity ward of Kabgayi District Hospital or when the investigator was absent were excluded. According to the Hospital report, there was 900 SVD over the previous six months, with an average of 150 per month. Since the data collection was conducted over two months, the study population was 300. The sample size of 171 was obtained using the Taro Yamane formula.

$$n = \frac{N}{1 + N(e)^2}$$

$$300:1.75=171$$

Measures

This study used a tool adapted from the WHO guidelines [3] and the current Rwanda neonatal care protocol (2nd edition).[8] Some items were added to the checklist to meet the study objectives and the local context. Added items included socio-demographic characteristics of the newborn; staff readiness and equipment available before birth; and immediate newborn outcome (stable, unstable newborn – hypothermia, respiratory distress, and demise). The checklist comprised of four sections:

Section one: Demographic characteristics (5 items) included gestational age, mode of delivery, time of birth, time of first cry/breathe, and gender.

Section two: Staff readiness and equipment availability before birth included (4 items) delivery pack, suction and resuscitation materials, emergency trolley, and birth attendants physically prepared. All four items were coded as Yes (1 point) or No (0 points).

Section three: Standardized immediate newborn care provision (14 items) included mouth and nose cleared, newborn dried, wet cloths removed, kept warm and second clean/dry/warm cloth applied, placed in SSC, APGAR evaluated, APGAR documented without evaluation, newborn resuscitated, unnecessary suction, resuscitated in one minute (min) for those in need, breathing

checked, and delayed cord clamping (1-3 minutes). Other provisions included BF within 60 min., or BF after 60 min. All 14 items were scored as Yes (1 point) or No (0 points).

Section four: The section on neonatal outcomes was divided into two parts. a). Immediate newborn care outcomes (3 items) included stable, unstable, and demise; b). Signs of an unstable newborn (3 items) included mild respiratory distress, severe respiratory distress, and hypothermia. The items were scored as, Yes, (1 point) or No (0 points).

Data collection

The investigator, a registered midwife with ten years of experience working with mothers and newborns, was oriented to the maternity unit's delivery rooms. The investigator observed vaginal deliveries, starting at the second stage of labor and for one hour following the birth. The investigator was aware of being near enough to observe the details of the birth, yet not too close to interfere with the care of the newborn. The care provided to the newborn by the birth attendants, and the stability of the newborn after birth, were observed and recorded (a tick) on the data collection checklist. The investigator kept the checklists with her in a secured container.

Data analysis

Descriptive statistics were used to calculate frequency distribution and the chi-square (X^2) test for relationships among variables. A p-value ≤ 0.05 was considered as having a statistical significance. Data were analyzed using SPSS version 21.

Ethical considerations

Approval of the research was obtained from the University of Rwanda, College of Medicine and Health Sciences Institutional Review Board, and the Director-General of the Kabgayi District Hospital. Informed written consent was obtained from all birth attendant participants, and verbal consent to observe the birth was obtained from the mothers.

RESULTS

A cross-sectional study design was used to identify the immediate newborn care provided to 171 newborns in the delivery room at Kabgayi District Hospital. The study was conducted from April 1 to May 31, 2019.

Demographic characteristics of newborns

Table 1. Demographic characteristics of newborns (n=171)

Variables	n (%)
Mode of delivery	
SVD	171 (100.0)
Gestation age	
Preterm	11 (6.4)
Term	160 (93.6)
Time of delivery	
AM	95 (55.6)
PM	76 (44.4)
First cry	
< 5 min	113 (66.1)
>5 min	58 (33.9)
Gender	
Female	111 (65.5)
Male	59 (34.5)

The demographic characteristics of newborns are presented in Table 1. The majority of newborns were at term (93.6%), and female (65.5%). The majority (55.6%) was born before noon (AM) and had their first cry in less than 5 minutes after birth (66.1%).

Immediate Newborn Care in the Delivery Room

Table 2. Availability of Materials and Readiness

Preparation for newborn care	Yes n (%)	No n (%)
Delivery pack	155 (90.6)	16 (9.4)
BA prepared physical environment	94 (55.0)	77 (45.0)
Suction and resuscitation materials	16 (9.4)	155 (90.6)
Emergency trolley	5 (2.9)	166 (97.1)

BA Birth Attendant

Readiness and availability of resuscitation equipment were observed before the birth, and the results are presented in Table 2. The majority of births had a delivery pack available (90.6%), and birth attendants had prepared the physical environment (55.0%). However, there were limited suction and resuscitation materials (9.4%), and emergency trolley (2.9%).

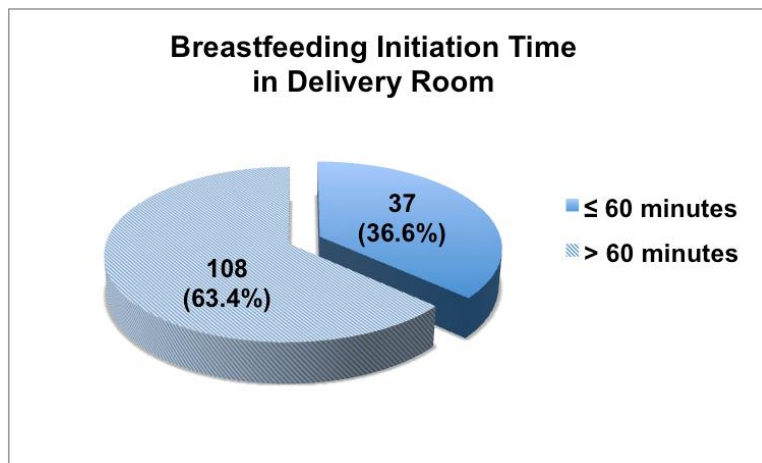
Table 3. Provided immediate newborn care in the delivery room

Interventions	Yes n (%)	No n (%)
Dried thoroughly	129 (75.4)	42 (24.6)
Mouth and nose cleared	118 (69)	53 (31)
Wet cloth removed	98 (57.3)	73 (42.7)
APGAR evaluated	49 (28.7)	122 (71.3)
APGAR documented, not evaluated	122 (71.3)	49 (28.7)
Skin to skin contact	115 (67.3)	56 (32.7)
Dry cloth applied	88 (51.5)	83 (48.5)
Cap applied	35 (20.5)	136 (79.5)
Delayed cord clamping	115 (67.3)	56 (32.7)
BA continued checking	74 (43.3)	94 (56.7)
Unnecessary suctioning	123 (71.9)	48 (28.1)
Bag and mask resuscitation	10 (5.8)	161 (94.2)

BA Birth attendant

Results of immediate newborn care interventions provided in the delivery room are presented in Table 3. The majority of newborns were dried thoroughly (75.4%), mouth and nose cleared (69%), wet cloth removed (57.3%), immediate SSC with mother (63.7%), covered with a dry cloth (51.5%), and had 1-3 min delayed umbilical cord clamping (67.3%). A limited number were resuscitated with bag and mask (5.8%). Also, the majority of newborns had the Apgar score estimated and not evaluated (71.3%), received unnecessary airway clearing (71.9%), no cap applied to keep the head warm (79.5%), and the BA did not continue to check breathing (56.7%).

Breastfeeding initiation time in delivery room

**Figure 1. Initial time of breastfeeding in delivery room**

The majority of newborns received their initial BF experience in the delivery room, and results are presented in Figure 1. Approximately one third (36.6%) of newborns initiated BF within 60 min after birth, and two thirds (63.4%) initiated BF after 60 minutes.

Newborn outcome in delivery room

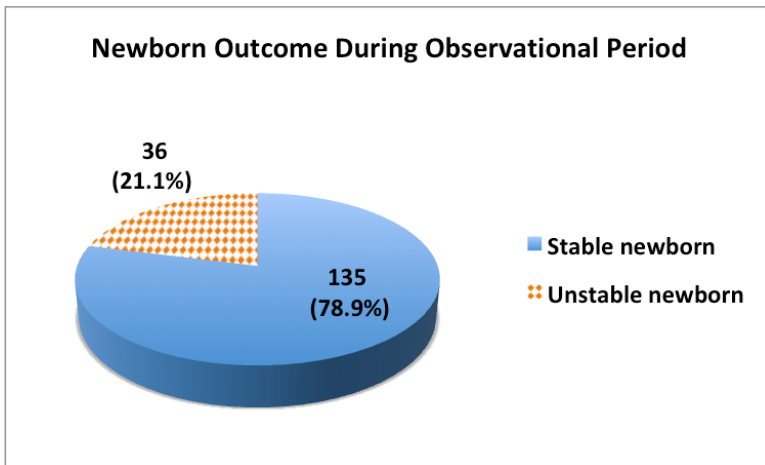


Figure 2. Newborn outcome in delivery room

The newborn care and associated immediate outcomes are presented in Figure 2. The majority (78.9%) of newborns were stable after birth, whereas nearly a quarter (21.1%) was unstable in the hour post-delivery. There was no demise.

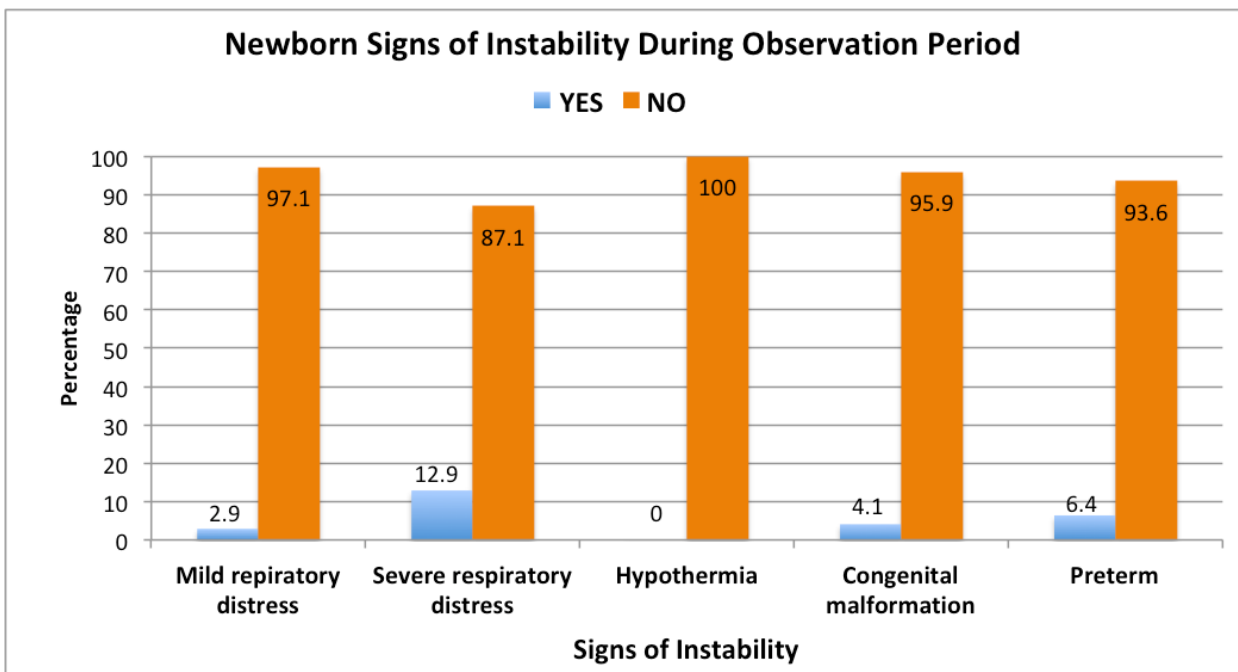


Figure 3. Signs of instability of newborns

Signs of newborn instability are presented in Figure 3. The newborns that were unstable after birth included a limited number (2.9%) who showed signs of mild respiratory distress or severe respiratory distress (12.9%). There were no newborns with hypothermia.

Association between immediate newborn care and immediate outcome**Table 4. Association between immediate newborn care provided and immediate outcome**

Immediate newborn care	Immediate outcome		X ²	p-value
	Stable n (%)	Unstable n (%)		
SSC immediate				
No	41 (73.2)	15 (26.8)	1.647	0.232
Yes	94 (81.7)	21 (18.3)		
APGAR score evaluated				
No	94 (77.7)	27 (22.3)	0.396	0.548
Yes	41 (82.0)	9 (18.0)		
APGAR documented without evaluation				
No	39 (79.6)	10 (20.4)	0.017	0.537
Yes	96 (78.7)	26 (21.3)		
Newborn dried thoroughly				
No	39 (92.9)	3 (7.1)	6.481	0.007*
Yes	96 (74.4)	33 (25.6)		
Wet cloths removed				
No	52 (71.2)	21 (28.8)	4.561	0.026*
Yes	83 (84.7)	15 (15.3)		
Newborn with 2nd dry cloth				
No	64 (77.1)	19 (22.9)	0.328	0.350
Yes	71 (80.7)	17 (19.3)		
Newborn kept warm with cap				
No	104 (76.5)	32 (23.5)	2.452	0.087
Yes	31 (88.6)	4 (11.4)		
Mouth and nose cleared, if meconium				
No	49 (92.5)	4 (7.5)	8.429	0.002*
Yes	86 (72.9)	32 (27.1)		
Airway had unnecessary suctioning				
No	46 (95.8)	2 (4.2)	11.448	<0.00*
Yes	89 (72.4)	34 (27.6)		
Timely newborn resuscitation				
No	127 (78.9)	34 (21.1)	0.007	0.647
Yes	8 (80.05)	2 (20.0)		
BA continued to check breathing				
No	85 (87.6)	12 (12.4)	10.164	0.001*
Yes	50 (67.6)	24 (32.4)		
Delayed cord clamping				
No	43 (76.8)	13 (23.3)	0.234	0.628
Yes	92 (80.0)	23 (20.0)		
BR within 60 min				
No	75 (72.1)	29 (27.9)	7.454	0.006*
Yes	60 (89.6)	7 (10.4)		
BR beyond 60 min				
No	84 (82.4)	18 (17.6)	1.764	0.128
Yes	51 (73.9)	18 (26.1)		

BA Birth Attendant, BR Breastfeeding

There was statistical significance between six immediate newborn care interventions and immediate newborn outcomes, as presented in Table 4. The significant associations included newborn dried thoroughly ($p = 0.007$), wet cloths removed ($p = 0.026$); mouth and nose cleared if meconium ($p = 0.002$); airway had unnecessary suctioning ($p = <0.001$), BA continued to check breathing ($p = 0.001$); and BF within 60 min ($p = 0.006$).

There was no statistical association with other variables, including SSC ($p = 0.232$), Apgar score evaluated ($p = 0.548$); APGAR documented without evaluation ($p = 0.537$), newborn with second dry cloth ($p = 0.350$), newborn

kept warm with cap ($p = 0.087$), newborn resuscitated on time ($p = 0.647$); delayed cord clamping ($p = 0.628$), and BF beyond 60 min ($p = 0.128$).

DISCUSSION

The study aimed to identify immediate newborn care provided by birth attendants and associated outcomes in the delivery room at a district hospital in Rwanda. Of the 171 newborns that were observed during the first hour, the majority was at term (93.6%), female (65.5%), and all were SVD (Table 1). Similarly, a study to improve immediate newborn care practices in hospitals in the Philippines [14], found the majority was at term (98%), female (66.9%), and SVD (99%).

Readiness and availability of materials

The findings show that the majority of deliveries (90.6%) had the delivery pack and the physical environment (55%) prepared for birth (Table 2). This result is similar to the DeGraf-Johnson study conducted in SSA, whereby 95.4% had the delivery pack prepared.[5]

Findings in our study that were not so favorable included limited availability of suction and resuscitation materials (9.4%) and lack of an emergency trolley (2.9%). In contrast, suction devices were readily available in 90.7% of births in DeGraf-Johnson's study in the six-country SSA,[5] and the emergency trolley was ready to roll in 98.7% of births at the Liverpool Women's Hospital in the UK.[15] In addition to the availability of supplies, other considerations in preparation for every birth include at least one skilled BA in basic resuscitation. A need for resuscitation cannot always be predicted, but a glance at the women's antenatal and labor risk factors could provide some anticipatory guidance for potential resuscitation.[16]

Other studies indicated deficits in essential newborn care supplies. A secondary analysis of the Emergency Obstetric and Newborn Care Assessment in Ethiopia in 2016 found that a quarter of the 3,804 facilities did not have masks in size 0 or 1 in the resuscitation kits.[17] In the six-country SSA study, sometimes only a quarter of the needed supplies for immediate newborn care were available. The most significant gaps were in necessary supplies such as towels and blankets, which are essential to dry and drape the newborn to maintain thermoregulation.[5] In Kenya, only 11% reported all essential equipment was available, which was the highest proportion among the six countries in the SSA study.[5] To prepare for

delivery, it is essential to verify that the materials and equipment are intact and functioning well.

Immediate newborn care provided in the delivery room

Airway and breathing

Our findings show that the majority of newborns (69%) had their mouth and nose cleared if meconium was present, though the majority (71.9%) received unnecessary suctioning of the airway (Table 3). Also, less than half (43.3%) of BAs continuously checked the newborn's breathing. The study conducted in SSA revealed that only 40% of newborns with meconium received the correct care.[5] A study in Kenya,[18] found that vital steps in NR were poorly performed, including airway maintenance in the presence of meconium, and ventilation.

In this study, two thirds (66.1%) had a first cry within five minutes of birth, and of the limited proportion (5.8%) of newborns who did not initiate spontaneous breathing, all (100%) were well resuscitated on time. In contrast to our findings, on the assessment of immediate newborn care, only 42% of asphyxiated newborns were well resuscitated on time. Findings from a recent retrospective study at a busy district hospital in Rwanda [19] discovered a 39.7% birth asphyxia rate among NICU admissions. A secondary analysis of national data in Ethiopia [17] found that the newborn survival of asphyxia was increased eightfold with resuscitation, compared to newborns not resuscitated. In the DeGraf-Johnson's six-country SSA study, 89% of newborns that did not cry at birth recovered on their own or through resuscitation.[5]

Delayed cord clamping and cutting

Our findings showed that over two thirds (67.3%) of newborns had delayed cord clamping and cutting at 1-3 minutes, allowing for improved neonatal hemoglobin and hematocrit levels. This finding, therefore, indicates that a third (32.7%) had the cord immediately clamped and cut within one minute of birth, which is not the WHO recommendation for best care practice for a stable newborn,[3] though essential for a compromised newborn when resuscitation becomes the priority.[16] A study in a Philippino hospital showed a more favorable rate of 78% delayed cord clamping.[14]

A cross-sectional study in Oman of 175 experienced HCPs, including 31% midwives and 61% obstetricians found that up to 89.6% had clamped the cord within one minute of birth for both term and pre-term newborns.[20] Interestingly, 45.7% of the HCPs were concerned with the risk of polycythemia and jaundice of delayed cord care. However, the study also reported the benefits of delayed cord care, namely, allowing the newborn more time for physiological transition to extrauterine life, reduced risk of anemia and increased ferritin, and reduced need for blood transfusions. Moreover, only 11% of HCPs stated that the timing of cord clamping is guided by hospital policy.[20]

Thermoregulation

The majority of newborns in our study were dried thoroughly (75.4%) to prevent heat loss as the newborn transitions to extrauterine life. Our findings are similar to a study in the Philippines [14] where 80.2% were dried thoroughly, and the six-country SSA study,[5] whereby 79% of newborns received immediate drying with a cloth or towel. However, many of the newborns with initial breathing difficulties that needed resuscitation were not dried immediately after birth, which increased the risk of hypothermia and decreased the response to resuscitation.[5]

A second systematic review in SSA [21] that involved five countries (Ethiopia, Ghana, Malawi, Tanzania, and Uganda) reported that BAs delayed drying and wrapping the newborn to focus on the mother. The authors of the review reported that this finding was related to the BAs lack of knowledge and practice of routine newborn care, especially immediate SSC with the mother.[5] Thermoregulation is "critical" at birth, as a newborn who is not in SSC with mother or under the warmer can quickly lose heat and spiral downwards, leading to hypoglycemia, acidosis, and potential mortality.[16]

The majority (67.3%) of newborns in our study were placed in immediate SSC with the mother to minimize heat loss via conduction. Skin-to-skin contact with the mother leads to improved short-term temperature stability and is better for the newborn than being wrapped in a blanket or placed under the warmer.[22] In contrast, a study conducted in Nigeria,[23] found that only 10-59% of newborns were placed in SSC immediately after birth. Immediate SSC with the mother is the WHO recommendation for initial thermoregulation that is an affordable and high-quality alternative to technology.[24] Furthermore, if the newborn does develop hypothermia, the first line of treatment is to place the newborn in SSC with the warm mother.[22]

The majority (57.3%) of newborns in our study had the wet cloth removed, and over half (51.5%) were then covered with a second dry cloth. A small proportion (20.5%) of newborns had a cap placed on their heads to reduce heat loss. In the SSA study,[5] the wet cloth was removed 57.5% of the time, while 41% received a second dry cloth. The systematic review in SSA [21] reported that it was well known that newborns needed to be kept warm, though thermoregulation practice was considered inadequate.

Breastfeeding

The majority of newborns did not BF within the first hour after birth (63.4%), though about a third (36.6%) did breastfeed in the first hour (Figure 1). These findings may be influenced by the shortage of BAs where the pregnant woman is assisted by one midwife and spends more time caring for the mother, or other mothers, than assisting the newborn to breastfeed. A study found that within the first hour after birth, 43% of all mothers (19% - 79%) received assistance to initiate BF, and 42% of mothers in Nigeria and Bangladesh.[23] The SSA study [5] reported that delayed initiation of BF was related to the BA's lack of knowledge and practice. Other barriers include mothers' perception of inadequate milk, newborn not indicating hunger signs, and the newborn needing to sleep.[21]

Early initiation of BF within the first hour after birth has been shown to have positive effects on the newborn, particularly with thermoregulation and infection prevention.[6] All newborns, including preterm who are clinically stable, should be able to BF as soon as possible after birth if the mother and newborn are willing.[3,16] Breastfeeding significantly decreases infant morbidity and mortality rates, including respiratory diseases, otitis media, gastroenteritis, and diarrhea disorders.[22] All women and their families in low-resource areas need to be given adequate knowledge to understand the many benefits of beginning breastfeeding within the first hour of birth.[20]

Outcome of immediate newborn care

This study's findings show that nearly a quarter (21.1%) of newborns were unstable within the first-hour post-delivery (Figure 2). The signs of instability were associated with mild respiratory distress (2.9%), severe respiratory distress (12.9%), preterm (6.4%), and congenital malformations (4.1%) (Figure 3). These findings might be related to the lack of readiness before birth, compared to the WHO recommendations, and that immediate newborn care was started a bit late in some cases.

A pre-test post-test interventional study conducted by Tran in a tertiary hospital in Da Nang, Viet Nam, revealed the many benefits of implementation of an immediate newborn care program.[25] The interventions demonstrated NICU admissions fell by one third (from 18.3% to 12.3%), hypothermia cases on NICU admissions fell by one quarter (from 5.4% to 3.9%), and sepsis cases in the hospital fell by two thirds (from 3.2% to 0.9%). The intervention in Vietnam,[25] demonstrated that the Early Essential Newborn Care (EENC) initiative included staff training, quality improvement assessments, and changes in the hospital environment and protocols. The results demonstrated improved clinical practices, reduced NICU admissions, reduced newborns with hypothermia and sepsis, and increased exclusive breastfeeding and Kangaroo Mother Care (KMC) in the NICU. If a newborn's temperature is normal (higher than 36.5°C) at the time of admission to the NICU, the duration of mechanical ventilation, length of hospital stay, and mortality rates are decreased.[16] The WHO states that hospitals can reduce life-threatening infections in newborns by over two-thirds and admissions to the NICU by one third by implementing similar initiatives.[26]

Association between immediate newborn outcome and provided care.

Chi-square analysis showed eight significant associations between immediate care provided to the newborn and immediate newborn outcome (stable or unstable) (Table 4). There was a significant association between immediate newborn outcome and the following interventions: baby dried thoroughly ($p = 0.007$), wet clothes removed ($p = 0.026$); mouth and nose cleared if meconium ($p = 0.002$); continued to check breathing ($p = 0.001$), and unnecessary cleaning and suctioning of the airway ($p = <0.001$). Further statistical associations with newborn outcome and breastfeeding included initiation within 60 minutes ($p = 0.006$) of birth. There were no statistical associations ($p = >0.05$) with delayed cord clamping, Apgar score evaluated and documented, newborn resuscitated on time, SSC, wrapped in a second dry cloth, head cap, and breastfeeding beyond 60 minutes.

Limitations

Data were collected from only one hospital; therefore, the results cannot be generalized to other hospitals in Rwanda. Factors contributing to the provision of immediate newborn care were not studied. Thus, a study is needed to identify challenges associated with immediate newborn care provision by health care providers from the current study setting.

Recommendations

The BAs in maternity wards need the essential knowledge and skills of immediate newborn care to reduce neonatal morbidity and mortality. Continuous training and updates on standardized immediate newborn care can improve the quality of newborn care in all healthcare facilities. Faculty and students from the University of Rwanda, MScN Neonatal Program, could conduct pre-test and post-test interventional studies similar to the one in Vietnam [25] to assess sustained knowledge and assist with updating the WHO protocols and policies at selected hospitals.

CONCLUSION

The study was conducted with BAs and 171 newborns at a district hospital in Rwanda. Birth preparedness was associated with the stability of the newborn. Though a significant number of newborns in the study population were stable within the first hour after birth, a gap was identified in the provision of immediate newborn care per the current WHO protocol. To achieve the SDGs targets for ending preventable newborn and maternal deaths, BAs must have the competencies, supplies, and equipment to provide immediate newborn care interventions to enable implementation and sustain quality.

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