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Evaluation of Neonatal Resuscitation Knowledge and Procedures According to the "Helping Babies Breathe" (HBB) Program by Qualified Health Care Staff at the Sikasso Hospital Level in Mali

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Abstract

Introduction: Perinatal asphyxia is one of the leading causes of perinatal death. According to the WHO, two thirds of these deaths can be prevented with simple and effective interventions. The HBB (Helping Babies Breathe) program provides effective care for asphyxiant newborns regardless of the level of care.

Objective: The objective of our work was to assess the knowledge of neonatal resuscitation equipment and procedures according to the HBB program by qualified nursing staff at the level of referral health structures in the Sikasso region of Mali.

Methodology: This is a multicenter cross-sectional survey over a period of 4 months. It was carried out in two maternities and two referral neonatal units in Sikasso. The target population studied was made up of the nursing staff involved in the reception and care of newborns in the delivery room, in postpartum suites and in neonatal departments.

Results: Eighty percent (112/141) of targeted caregivers were interviewed. More than half (44%) had more than 6 years of experience in neonatal care. Only 27% had received training in neonatal resuscitation including HBB. The most cited materials used for resuscitation were the mucus aspirator (82%), the ventilation bag (67%) and the heated table (60%). The best-known resuscitation procedures were airway aspiration (82%), mask ventilation (60%), and hypothermia control (48%).

Conclusion: Knowledge of newborn resuscitation remains very insufficient in the reference structures in Sikasso. It is necessary to implement a strategic plan for continuous training of staff with periodic monitoring in health structures.

Keywords: Newborn; Asphyxiation; HBB; Sikasso; Mali

Abbreviations: LBW: Low Birth Weight; HBB: Helping Babies Breathe; AAP: American Academy of Pediatrics; WHO: World Health Organization; USAID: United States Agency for International Development; NICHD: National Institute of Child Health and Development.

Introduction

In developing countries, neonatal health is a real public health problem. The main causes of neonatal death around the world are represented by low birth weight (LBW) (36%), perinatal asphyxia (23%) and sepsis (15%) [1]. Perinatal asphyxia is thus the second leading cause of death after low birth weight. Although there has been significant progress in reducing the mortality of children under five in the past decade, the reduction in neonatal mortality has been relatively slow, still accounting for 40% of child deaths less than 5 years that occur in the neonatal period [2,3]. A quarter of these deaths are attributed to perinatal asphyxia and almost all occur in low- and middle-income countries [2,4,5]. Among the survivors, a million will develop cerebral palsy, educational difficulties and other forms of disabilities that are very difficult to manage, particularly in developing countries due to the lack of specialized structures [4]. According to WHO, two-thirds of newborn deaths can be prevented with simple and effective interventions for asphyxiant newborns. Indeed, among the 10-20% of babies who do not breathe at birth, many react well after drying, warming, aspiration of the airways and stimulation. Only a small number (around 3-6%) require mask ventilation and less than 1% requires extensive resuscitation such as external cardiac massage, intubation and drug administration [4]. It has thus been shown that the training of health workers in simple procedures as well as the availability of adequate materials for optimal management of perinatal asphyxia could contribute to a considerable reduction in neonatal mortality linked to the latter [6]. For example, WHO, in collaboration with the American Academy of Pediatrics, has set up the "Helping Babies Breathe" (HBB) program in low-income countries since 2010. This program, through a simplified algorithm centered on the start of ventilation before the end of the first minute of life (The Golden Minute), allows adequate and optimal management of asphyxia newborns [7]. This simple, inexpensive strategy accessible to all levels of care has been shown to be effective with a significant reduction in perinatal mortality linked to asphyxia worldwide [7-8]. Ashish KC, et al. [9] in his work on the implementation of the HBB program in a level III hospital in Nepal, demonstrated the effectiveness of this strategy, including at the level of referral structures, on the perinatal survival of asphyxiant newborns [9]. Recognizing the relevance of this intervention, Mali has integrated it into its standards and protocols for resuscitation of the newborn. Thus, the establishment of basic equipment for resuscitation at the level of health structures and the training of health personnel in the management of perinatal asphyxia has been undertaken. The objective of our work was to assess the knowledge of neonatal resuscitation equipment and procedures according to the HBB program by qualified health personnel at the level of referral health structures in the Sikasso region of Mali.

Material and Methods

The concept "Helping Babies Breathe"

"Helping Babies Breathe" is a science-based educational program designed to teach neonatal resuscitation in resource-limited settings. It is an initiative of the American Academy of Pediatrics (AAP) in collaboration with the World Health Organization (WHO), the United States Agency for International Development (USAID), Saving Newborn Lives / Save the Children, the National Institute of Child Health and Development (NICHD), and a number of other stakeholders in global health. The goal of HBB is to train skilled and unskilled health workers in developing countries to have essential newborn resuscitation skills. This initiative should make it possible to have at least. The presence of a person skilled in neonatal resuscitation at the birth of each baby. The key concept of the HBB strategy is The Golden Minute. Indeed, before the end of the first minute after birth, a baby must breathe properly and failing that, must be ventilated by Ambu. Table 1 describes the different skills taught in HBB through its algorithm [7].

Skills taught in « Helping Babies Breathe » (HBB)
Preparing for birth
Identify help and revise the action plan
Prepare the area for childbirth
Wash one's hands
Identify an area for ventilation and verify the equipment
Routine care
Temperature maintenance (drying, hat)
Scream evaluation
Breath check
Delayed clamping and clean cord care
Golden minute
No breathing
Head positioning
Airway clearance
Stimulation of breathing (gentle back friction and soles of the feet)
Initiation of ventilation (mask and Ambu)
After the first minute, if no improvement
Continue and readjust the ventilation technique
Assess heart rate
Activate the emergency plan (higher level call, transfer preparation)
Support the family

Table 1: Skills taught in Helping Babies Breathe (HBB).

Description of the Health Pyramid of Mali

In Mali, the health system is in pyramidal form with a division of the national territory into Health District comprising several health centers. The first level is the Community Health Center, the second level is the Reference Health Center, the third and fourth level is respectively regional and national hospitals. The districts are the administrative centers of the health region; they ensure the supervision of the Community Health Centers. Regional hospitals are the referral structures for patients coming from health centers. The university hospital centers correspond to the last referral establishments for the previous levels. They are divided into specialized services and are directed by full professors.

Study Frame

This is a multicenter survey that was carried out in two (2) large maternities and the reference neonatal unit in Sikasso, therefore a level 2 and a level 3 on the health pyramid of Mali. They all include a mother-child center with a neonatal service. These are the Sikasso Reference Health Center and the Sikasso Regional Hospital.

Type of Survey

This is a multicenter cross-sectional survey over a period of 4 months from January 2015 to February 2016. During the period of the survey, we interviewed 114 nursing staff practicing newborn care at the level of the two aforementioned reference health structures.

Study Population

The target population studied was made up of the nursing staff involved in the reception and care given to newborns in the delivery room, in the aftermath and in the neonatal departments at the level of the 2 reference structures that served as a framework for our investigation.

Inclusion Criteria: The structures: these are level II and III centers providing basic and specific obstetric and neonatal care, administering newborn care and belonging to the public health system. We selected these 2 centers in the Sikasso region because of their representativeness in terms of recruitment and their recognized role in the management of severe obstetric and neonatal pathologies.

Staff Surveyed: we only retained qualified nursing staff (nurses and midwives) in service in the selected structures.

Non-Inclusion Criteria: Centers and staff that do not meet these criteria are not included. For caregivers, these were those who did not want to participate in the study, trainee or permanent caregivers who did not care for newborns, and those who were absent from the service during the period of the survey.

Parameters Studied

General data on the personnel surveyed: exercise structure, type of service, number of years of experience in health, training in emergency obstetric and neonatal care. General data on knowledge of neonatal resuscitation equipment and procedures.

Survey Methodology and Data Collection

The questionnaire developed was tested at the level of each health structure, on a limited number of qualified providers selected at random to assess the level of difficulty of its use and any adjustments to be made. The final questionnaire was administered directly, face-to-face at the targeted centers to the staff included in the study by the investigator. It was a questionnaire with open and closed responses administered directly. The data was her.

Results

Out of a total of 141 caregivers targeted at the level of the various structures, we were able to interview 112 of them distributed more or less equitably at the level of the two centers, i.e. eighty percent (80%) of the targeted personnel who were interviewed. General characteristics of the study population Half of the staff surveyed (50%) practiced in the delivery room, 32% in the neonatal unit and 18% in the postpartum suites (Table 2). More than half of the staff surveyed (59%) had more than 6 years of experience in health. Only 27% of the caregivers surveyed had received training in emergency obstetric and neonatal care.

Characteristics	Effective (= 112)	Percentage
Type of Sructure		
Neonatal Service	37	32
Delivery room	55	50
Diaper suites	20	18
Years of Experience in Health		
< 1 an	8	7
2 - 5 ans	39	34
≥ 6 ans	65	59
Years of Experience in Neonatal Care		
< 1 an	13	12
2 - 5 ans	49	43
≥ 6 ans	50	45

Table 2: General characteristics of nursing staff.

Knowledge of Resuscitation Equipment

Table 3 represents the distribution of the personnel surveyed according to their knowledge of resuscitation equipment. The best-known materials for resuscitation of newborns were the mucus aspirator (82%), the newborn ventilation bag (67%) and the industrial or home-made heating table (60%). None had cited the stopwatch.

Materials Used for Resuscitation Percentage %	Effective
Industrial or artisanal heating table	68
60	
Two clean, dry cloths	21
18	
Mucus aspirator	93
82	
Suction probe No. 6	63
55	
Suction probe No. 8	18
16	
Suction probe No.10	3
3	
Newborn ventilation bag	76
67	
Ventilation mask no. 0	37
32	
Ventilation mask no. 1	5
4	
Stopwatch	0
0	
Stethoscope	3
3	

Table 3: Distribution of providers according to their knowledge of resuscitation equipment.

Knowledge of Resuscitation Procedures

Table 4 shows the distribution of providers according to their knowledge of resuscitation procedures. The most well-known newborn resuscitation procedures among caregivers were aspiration of the airways if necessary (82%), mask ventilation if necessary (60%), and control of hypothermia (48%).

Newborn Resuscitation Procedures	Effective	%
Fight hypothermia	55	48
Assess the newborn	11	10
Aspirate the airways if necessary	94	82
Aspirate the oral cavity several times	5	4
Aspirate the nasal cavity only once	7	6
Stimulate the soles of the feet or rub the back	8	7
Ventilate with a mask if necessary	68	60
Give cardiac massage if necessary	32	28
Combine cardiac massage and balloon ventilation	3	3
Insufflation for three cardiac massages	2	2

Table 4: Distribution of caregivers according to their knowledge of resuscitation procedures.

Discussion

At birth, about 5-10% of newborns do not have the ability to initiate effective autonomous breathing in the absence of interventions that help them breathe better. This situation of neonatal asphyxia is thought to be responsible for 20% of neonatal deaths. In the delivery room, the difficulties of adapting the newborn to extrauterine life are not uncommon. Their management sometimes requires precise actions and requires suitable resuscitation equipment and a correct mastery of the techniques described in consensual protocols for good efficiency [10]. The HBB program, based on a pictorial algorithm, simple and applicable to all levels of care, including at the level of reference structures, has proved its effectiveness with a significant reduction in perinatal mortality linked to asphyxia in the world [7-9]. In Tanzania, its implantation was associated with a significant decrease in neonatal mortality within the first 24 hours and stillbirth [11]. Goudar SS, et al. [12] in a prospective study comparing respectively 4,187 and 5,411 newborns born before and after the implantation of the HBB program, noted a significant decrease in stillbirth without an increase in neonatal mortality. In Mali, as in other developing countries, there is a significant deficit in the quantity and quality of personnel qualified in neonatal care. In our work, only 27% of the staff had received training in emergency obstetric and neonatal care. Furthermore, Murila F, et al [13] in Kenya reported 12% caregivers trained in neonatal resuscitation. This deficit noted in our countries is partly responsible for the high neonatal mortality. Better training of staff in the use of the equipment should allow a significant reduction in perinatal mortality in our facilities. Ninety-eight percent (98%) of

these deaths are in fact explained by a lack of adequate care and two-thirds of these deaths could be avoided by coverage in essential maternal and neonatal health care [14]. Some authors, in particular Azoumah KD, et al. [15] in Togo and Sylla A, et al. [16] in Senegal, had identified an essential or even essential material for neonatal resuscitation. These were the warming table, the phlegm vacuum cleaner and ventilation bags suitable for the newborn. This material was globally known by our caregivers to varying degrees. Furthermore, the stopwatch was not mentioned by any of the caregivers interviewed in our work, yet it is a necessary and essential element for respecting the golden minute. This is certainly related to the fact that most structures use homemade heating tables. Any training program on neonatal resuscitation should emphasize the equipment of structures with a stopwatch and its effective use during the resuscitation of asphyxiant newborns.

The prognosis of newborns with asphyxia can only be improved in our regions through better practice and generalization of resuscitation care in the birth room in our maternities. Indeed, Ashish KC, et al. [9] in his work shows that before staff training no newborn was ventilated at 1 minute of life, compared to 83.9% who were after training which indicates under-use of the equipment made available to service providers by lack of expertise. This fact is confirmed in Senegal by Sylla A, et al. [16] in his work on the assessment of the condition and fate of basic equipment intended for the care of newborns at birth in peripheral health structures in Senegal.

In our study, resuscitation procedures were not well mastered other than airway suction (82%) and mask ventilation (60%). Elsewhere, Murila F, et al [13], made the same observation, reporting a rate of 70% of providers who did not have enough knowledge about neonatal resuscitation. As for Jyoti S, et al. [10] in India, his study found that 67.7% performed aspiration of the oral cavity, 32.3% with aspiration of the airways, and 90.32% fought against hypothermia. . The same trend was reported by Francisca [17] with only 24% of care providers having knowledge about neonatal resuscitation. These results reflect the difficulties of the health system in our countries and show that very few health facilities currently provide optimal care for neonatal health.

Our study has certain limitations. First, the limited size of our sample. Secondly, the fact of having limited it to the region of Sikasso and to the level of reference structures which do not necessarily reflect the level of training of qualified personnel at the national level. Finally, we were not able to assess the practice of neonatal resuscitation by nursing staff.

Conclusion

The knowledge of the paramedical nursing staff at the level of the reference structures in Sikasso on the equipment and the procedures of neonatal care varied from one structure to another. However, it is clear that they remain very insufficient in all the health facilities targeted for our survey, as our results have shown. Thus, the national staff training program on the resuscitation of newborns in the delivery room by the HBB method seems imperative for better care of newborns. This program must necessarily include a plan for monitoring and evaluating the skills taught.

Declaration of Links of Interest

The authors declare that they have no competing interest.

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