



Neonatal Resuscitation Knowledge and Practices of Moroccan Midwives and Nurses at a Tertiary Hospital: A Cross-sectional Study

Sara Alaoui^{1,*}, Kamal Takhdar², Mohamed Loukid¹, Widad Lhmini³, Saloua Lamtali²

¹ Pharmacology, Neurobiology, Anthropobiology and Environment Laboratory, Faculty of Sciences Semlalia, Cadi Ayyad University, Marrakesh, Morocco

² Higher Institute of Nursing Professions and Health Techniques of Marrakesh, Marrakesh, Morocco

³ Faculty of Medicine and Pharmacy, Cadi Ayyad University, Marrakech Morocco

*Corresponding Author: Faculty of Sciences Semlalia, Cadi Ayyad University, Marrakech Morocco. Email: s.alaoui.ced@uca.ac.ma

Received: 25 March, 2026; Revised: 12 July, 2026; Accepted: 18 July, 2026

Abstract

Context: Neonatal resuscitation (NR) is a critical competency for midwives and nurses. Gaps in knowledge and practice contribute to neonatal mortality, particularly in low- and middle-income countries.

Objectives: This study aimed to assess NR knowledge and self-reported practices among midwives and nurses working in the delivery room and the pediatric emergency department.

Evidence Acquisition: A descriptive cross-sectional study was conducted in 2024 at a public university hospital in central Morocco. A total of 46 eligible nurses and midwives were recruited using convenience sampling. Data were collected using a structured, self-administered questionnaire assessing participants' demographic characteristics, knowledge, and practice. Data were analyzed using descriptive statistics, independent-samples t tests, and chi-square tests.

Results: Only 13.0% of participants demonstrated good NR knowledge, whereas 50.0% had moderate knowledge and 36.9% had low knowledge. Participants who received continuous training had significantly higher knowledge and practice scores than those who did not (mean difference = 10.6%, $P = 0.008$; and mean difference = 9.4%, $P = 0.016$, respectively). Important practice gaps were identified in thermoregulation (22.0% correct), compression depth (52.2% correct), and adrenaline administration via the umbilical vein (37.0% correct).

Conclusions: NR knowledge and self-reported practices among Moroccan midwives and nurses were suboptimal. Continuous training was associated with greater competency, supporting the implementation of regular simulation-based training and standardized NR education programs.

Keywords: Neonatal Resuscitation, Midwives, Nurses, Knowledge, Practice, Morocco

1. Background

The neonatal period, defined as the first 28 days of life, is the most vulnerable phase for newborn survival (1). Approximately 2.3 million neonatal deaths occur globally each year, with the highest burden in sub-Saharan Africa and South Asia (2). In Morocco, the neonatal mortality rate was 11.1 deaths per 1,000 live births in 2021 (1).

Neonatal resuscitation (NR) is a critical intervention for reducing neonatal mortality. The International Liaison Committee on Resuscitation (ILCOR) emphasizes

evidence-based guidelines, effective provider training, and regular skills practice as essential components of high-quality resuscitation (2). Nevertheless, substantial gaps in NR knowledge and practice persist among healthcare providers, particularly in low- and middle-income countries (3).

Studies from Africa have reported inadequate NR competency among midwives and nurses despite existing training programs (3, 4). In Morocco, however, data on NR knowledge and practices remain scarce, limiting the development of evidence-based educational strategies.

2. Objectives

In this context, the aim of the present study was to assess NR knowledge and self-reported practices among midwives and nurses at a public university hospital in central Morocco.

3. Methods

3.1. Study Design and Setting

This descriptive cross-sectional study was conducted at the Mother and Child Hospital of a public university in central Morocco between March and May 2024.

3.2. Participants and Sampling

The study population comprised midwives and nurses working in the delivery room and the pediatric emergency department. The inclusion criteria were: 1) current employment in the relevant department; 2) direct involvement in neonatal care; and 3) provision of written informed consent. Administrative staff without clinical duties were excluded. All eligible healthcare providers who met the inclusion criteria were invited to participate, and 46 consented.

3.3. Data Collection Instrument

Data were collected using a structured, self-administered questionnaire adapted from a previously validated instrument used in Egypt (3) and based on the latest American Heart Association (AHA) and American Academy of Pediatrics (AAP) Neonatal Resuscitation Program (NRP) guidelines. The content and face validity of the French version were confirmed. Internal consistency reliability was acceptable (Cronbach's alpha = 0.78 for the knowledge subscale and 0.74 for the practice subscale).

The final instrument consisted of 39 items covering sociodemographic characteristics, NR knowledge, and self-reported practices. Knowledge and practice were scored separately. Each correct response received 1 point, and incorrect or uncertain responses received 0 points. Scores were converted to percentages and categorized as low (< 60%), moderate (60% - 80%), or good (> 80%).

3.4. Data Collection Procedure

The principal investigator distributed anonymous questionnaires during scheduled shifts. Completed questionnaires were returned directly to the investigator to ensure confidentiality.

3.5. Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 25.0. Analyses included frequencies, means, standard deviations, independent-samples t tests, and chi-square tests. Statistical significance was set at $P < 0.05$.

3.6. Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee (Approval No. 103/2024). Written informed consent was obtained from all participants. All data were anonymized and handled confidentially.

4. Results

4.1. Participants' Characteristics

A total of 46 midwives and nurses participated in this study. Participants' sociodemographic and professional characteristics are presented in Table 1.

Table 1. Sociodemographic and Professional Characteristics of Midwives and Nurses (N = 46)^a

Variables and Categories	No. (%)
Professional categories	
Midwife	26 (56.5)
Generalist nurse	17 (36.6)
Emergency nurse	3 (6.5)
Gender	
Female	40 (87.0)
Male	6 (13.0)
Age (y)	
< 25	21 (45.7)
25 - 30	19 (41.3)
> 30	6 (13.0)
Neonatology experience (y)	
< 2	5 (10.9)
2 - 5	20 (43.5)
5 - 10	13 (28.3)
> 10	8 (17.3)
Initial NR training	
Yes	34 (73.9)
No	12 (26.1)
Continuous NR training	
Yes	21 (45.7)
No	25 (54.3)
NR use (last 3 months)	
0 - 5 times	12 (26.1)
6 - 10 times	13 (28.3)
> 10 times	21 (45.7)

^a Abbreviation: NR, neonatal resuscitation.

Table 2. Knowledge Level of Neonatal Resuscitation Among Midwives and Nurses (N = 46)

Knowledge level	No. (%)
Low (< 60%)	17 (36.9)
Moderate (60% - 80%)	23 (50.0)
Good (> 80%)	6 (13.0)

Table 3. Self-Reported Neonatal Resuscitation (NR) Practices Among Midwives and Nurses ^a

Practice item	Correct response	No. (%)
Preparation		
Equipment for every birth	All items listed	28 (60.9)
Staff in delivery room	At least 1 qualified provider	36 (78.3)
NR team for critical birth	At least 2 qualified providers	35 (76.1)
Warming method < 32 weeks	Polyethylene bag	10 (22.0)
Initial steps		
Correct NR sequence	Warm-dry-stimulate-position-PPV	43 (93.5)
Good adaptation: color	Pink	46 (100.0)
Good adaptation: tone	Tonic, limbs flexed	43 (93.5)
Preterm infant not breathing	Place on radiant warmer	20 (43.5)
Correct head position	Neutral/sniffing	25 (54.3)
Suction technique	Mouth then nose	32 (69.6)
Stimulation method	Gentle tactile stimulation	32 (69.6)
If no breathing after stimulation	Start PPV	42 (91.3)
PPV		
PPV indications	Apnea/gasping or HR < 100 bpm	36 (78.3)
PPV preparation	All steps correct	41 (89.1)
Mask fitting precautions	Avoid pressure on eyes/neck	29 (63.0)
Appropriate mask size	Correct mask	40 (87.0)
CC		
Initiate chest compressions	HR < 60 bpm	42 (91.3)
Compression depth	One-third AP diameter	24 (52.2)
CC:PPV ratio	3:1	31 (67.4)
Adrenaline route	Umbilical vein	17 (37.0)

^a Abbreviations: PPV, positive pressure ventilation; HR, heart rate; CC, chest compression.

4.2. Knowledge of Neonatal Resuscitation

Overall NR knowledge was suboptimal (Table 2). Participants who had received continuous training (n = 21) had a significantly higher mean knowledge score (72.4%, SD = 11.2) than those without continuous training (n = 25; mean = 61.8%, SD = 13.5; P = 0.008).

4.3. Self-reported Practices

Self-reported NR practices varied across domains (Table 3). Similarly, participants with continuous training had significantly higher practice scores (70.1%,

SD = 10.8) than those without continuous training (60.7%, SD = 12.3; t = 2.51; P = 0.016; Cohen's d = 0.76).

5. Discussion

This study evaluated neonatal resuscitation (NR) knowledge and self-reported practices among midwives and nurses in a tertiary hospital in Morocco. The findings revealed important gaps in both knowledge and practice, particularly in advanced resuscitation procedures, consistent with reports from other low- and middle-income countries (3, 4).

Participants who had received continuous training demonstrated significantly better knowledge and

practices, consistent with findings from other studies and supporting international recommendations for regular refresher training to maintain NR competency (2, 5). Similarly, as reported in other studies, the identified deficiencies in thermoregulation, chest compressions, and medication administration highlight the need for simulation-based education that combines theoretical instruction with repeated hands-on practice (4, 6, 7).

This study is limited by its single-center design, relatively small sample size, and reliance on self-reported practices. Nevertheless, it provides valuable baseline evidence on NR competency among Moroccan midwives and nurses and underscores the need to strengthen both pre-service and continuing education programs.

5.1. Conclusions

This study demonstrated suboptimal neonatal resuscitation (NR) knowledge and self-reported practices among midwives and nurses in a Moroccan tertiary hospital, with notable deficiencies in thermoregulation, chest compressions, and medication administration. Continuous training was associated with significantly better competency, highlighting the importance of ongoing education.

These findings support the implementation of regular simulation-based NR training and the integration of standardized NR education into pre-service and continuing professional development programs. Further multicenter studies are needed to generate nationally representative evidence and inform neonatal care policies in Morocco.

Footnotes

AI Use Disclosure: The authors declare that no generative AI tools were used in the creation of this article.

Authors' Contribution: Study concept and design: S. A. and S. L. Analysis and interpretation of data: S. A. and K. T. Drafting of the manuscript: M. L. Critical revision of the manuscript for important intellectual content: W. L., S. L., and M. L. Statistical analysis: K. T. All authors reviewed and approved the final manuscript.

Conflict of Interests Statement: The authors have no conflict of interest.

Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available due to privacy and ethical restrictions concerning participant confidentiality.

Ethical Approval: The study was approved by the Ethics Committee (N° 103/2024) and authorized by the university hospital administration.

Funding/Support: This research received no external funding.

Informed Consent: Written informed consent was obtained from all participants prior to their inclusion in the study. Participation was voluntary, anonymous, and participants were free to withdraw at any time without justification.

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