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Original Research Article

## Clinical audit of neonatal care in Assiut Women's Health Hospital, Egypt

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### ABSTRACT

**Background:** The current study aims to auditing the current care of healthy full term newborns in the delivery room and identify the gap between the current practice and ideal practice in Assiut Women's Health Hospital, Egypt.

**Methods:** The current study was a clinical audit carried out in Assiut Woman Health Hospital, in the period from 1 September 2016 to 28 February 2017. The study included all newborns delivered in the delivery ward of gestational age after 37 week. We excluded all Preterm babies, those with congenital anomalies, pregnant women with medical disorders and multiple pregnancies. In the present work all data was collected prospectively through direct personal patient contact, direct observation of care givers, patient interactions and attitudes, from the clinical records and then recording the data in special check sheet. All basic criteria of the study participants as age, parity, gestational age at delivery and type of delivery were obtained. The neonatal gender, weight, heart rate and respiratory rate were checked. Audit criteria were selected according to the WHO 2015 and AAP 2010-2015 guidelines.

**Results:** The study included 800 women; the mean age of the women was  $26.52 \pm 5.70$  years. The mean parity was  $1.78 \pm 1.85$ . The mean gestational age at delivery was  $38.81 \pm 0.96$  weeks. As regard the type of delivery, 54.1% of women were delivered by cesarean section. Calling neonatologists occurred in 67.9% of deliveries. The mean birth weight was  $3.17 \pm 0.39$  kilograms. Nearly half of them (52%) were males.

**Conclusions:** Application of the guidelines of the neonatal handling is important for optimum care to the neonates. Re-audit the steps of the handling is important to discuss whether practice has improved or not in our tertiary hospital.

**Keywords:** Clinical audit, Neonates, Resuscitation

### INTRODUCTION

The UK's National Institute for Health and Clinical Excellence (NICE) defines clinical audit as: A quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the review of change. Aspects of the structure, process and outcome of care are selected and systematically evaluated against explicit criteria.

Where indicated changes are implemented at an individual, team, or service level and further monitoring is used to confirm improvement in healthcare delivery.<sup>1</sup>

The authors of the Cochrane Review on audit and feedback offer a narrower definition. For them clinical audit is: The provision of any summary of clinical performance over a specified period of time.<sup>2</sup> Medical care of the full-term, healthy newborn in the delivery

room has undergone numerous changes over past few years. One of the purposes being to decrease the excess of interventions performed on the newborn. There are evidences that most of the performed interventions are unnecessary, and some may even be harmful.<sup>3,4</sup>

Variations in practices used for the care of healthy newborns have been addressed in different situations, with different impacts on their health. Published data reports huge discrepancies between the existing scientific evidences and the medical practices. Furthermore, practitioners may not respond to evidences by implementing changes in policies and practices. This may be due to lack of knowledge or disagreement with the recommendations, but particularly due to local barriers for implementation.<sup>5,6</sup>

Approximately 10% of newborns require some assistance to begin breathing at birth. Less than 1% requires extensive resuscitation measures such as cardiac compressions and medications.<sup>7</sup> Although most newly born infants successfully transition from intrauterine to extra uterine life without special help, because of the large total number of births, a significant number will require some degree of resuscitation.<sup>8</sup>

Being prepared is the first and most important step in delivering effective neonatal resuscitation.<sup>9</sup> Neonates requiring resuscitation are inevitably born in locations where resuscitation is uncommon because most newborns are healthy and do not require additional special assistance. In these settings, the need for resuscitation is not anticipated in most infants who require resuscitation.<sup>10</sup> As a result, at every birthing location, personnel who are adequately trained in neonatal resuscitation should be readily available to perform neonatal resuscitation whether or not problems are anticipated.<sup>9</sup>

The current study aims to auditing the current care of healthy full term newborns in the delivery room and identify the gap between the current practice and ideal practice in Assiut Women's Health Hospital, Egypt.

## METHODS

The current study was a clinical audit carried out in Assiut Woman Health Hospital, in the period from 1 September 2016 to 28February 2017. The study included all newborns delivered in the delivery word of gestational age after 37 week.

The Assiut Medical Ethical Review Board approved the study. Informed consent was obtained from all study participants. We excluded all Preterm babies, those with congenital anomalies, pregnant women with medical disorders and multiple pregnancies.

In the present work all data was collected prospectively through direct personal patient contact, direct observation

of care givers, patient interactions and attitudes, from the clinical records and then recording the data in special check sheet. All basic criteria of the study participants as age, parity, gestational age at delivery and type of delivery were obtained. The neonatal gender, weight, heart rate and respiratory rate were checked.

Audit criteria: we selected the criteria according to the WHO 2015 and AAP 2010-2015 guidelines that include the following items<sup>9</sup>

- Routine nasal or oral suction should not be done for babies born through clearamniotic fluid who start breathing on their own after birth.
- Intrapartum suction of mouth and nose at the delivery of head in neonates born through meconium is not recommended.
- Suctioning of mouth or nose is not recommended in neonates born through liquor with meconium who start breathing on their own.
- Tracheal suctioning should not be performed in newly born babies born through meconium who start breathing on their own.
- Late cord clamping (performed after one to three minutes after birth) is recommended for all births while initiating simultaneous essential newborn care.
- Early cord clamping (<1 minute after birth) is not recommended unless the neonate is asphyxiated and needs to be moved immediately for resuscitation.
- Newborns without complications should be kept in skin-to-skin contact with their mothers during the first hour after birth to prevent hypothermia and promote breastfeeding.
- All newborns, including low-birth-weight (LBW) babies who are able to breastfeed, should be put to the breast as soon as possible after birth when they are clinically stable, and the mother and baby are ready
- All newborns should be given 1 mg of vitamin K intramuscularly [IM] after birth [after the first hour during which the infant should be in skin-to-skin contact with the mother and breastfeeding should be initiated].
- Neonates requiring surgical procedures, those with birth trauma, preterm newborns, and those exposed in utero to maternal medication known to interfere with vitamin K are at especially high risk of bleeding and must be given vitamin K 1 mg IM.
- After an uncomplicated vaginal birth in a health facility, healthy mothers and newborns should receive care in the facility for at least 24 hours after birth.

## Statistical analysis

All data were analyzed using SPSS software Chicago, IL, USA, version 21. Categorical variables in both groups were presented as frequency and percentage. Continuous variables were presented as mean and standard deviation.

## RESULTS

Table 1 shows the baseline criteria of the study participants. The study included 800 women; the mean age of the women was  $26.52 \pm 5.70$  years. The mean parity was  $1.78 \pm 1.85$ . The mean gestational age at delivery was  $38.81 \pm 0.96$  weeks. As regard the type of delivery, 54.1% of women were delivered by cesarean section. Calling neonatologists occurred in 67.9% of deliveries.

**Table 1: The baseline criteria of the study participants (n=800).**

Variables	Study participants Mean±SD (Range)
Age (years)	26.52±5.70 (18-45)
Parity	1.78±1.85 (0-8)
Duration of marriage (years)	2.49±1.45 (1-10)
Gestational age (weeks)	38.81±0.96 (37-41)
<b>Type of delivery, n (%)</b>	
Vaginal	367 (45.9)
CS	433 (54.1)
Calling neonatologist, n (%)	543 (67.9)
Respond to call, n (%)	491/543 (90.4)

SD: standard deviation, CS: cesarean section

Table 2 shows the data of the newborns. The mean birth weight was  $3.17 \pm 0.39$  kilograms. Nearly half of them (52%) were males. Tables 3-5 show the clinical audit criteria and the percentage of fulfilling each item.

**Table 2: The neonatal criteria at delivery of the study participants (n=800).**

Variables	Study participants Mean±SD (Range)
Birth weight	3.17±0.39 (2.0 – 5.0)
Heart rate	113.70±11.83 (88.0-150.0)
Respiratory rate	52.28±5.28 (40.0-60.0)
Gender, n (%)	
Male	416 (52)
Female	384 (48)

SD: standard deviation

Table 3 shows the most appropriate criteria regarding the preparedness for birth were presence of cord clamping devices (99.3%), clean birth attendants' gloves (97.1%), and presence of alcoholic solution (95.8%) of cases. On the other hand, the criteria found with substandard care were; appropriate room temperature (82.3%) and presence of a clean and pre-warm surface for resuscitation (87.6%) of cases.

**Table 3: Neonatal care at the birth and in the first 2 hours of life according the preparedness for the birth of 800 newborns which enrolled in the study.**

Items	Yes		No	
	n	%	n	%
The room temperature was appropriate (25°C)	658	82.3	142	17.8
The birth attendant's gloves (or hands if appropriate) were clean	777	97.1	23	2.9
An alcoholic solution was available for cleaning hands quickly	766	95.8	34	4.3
Sterile instruments were ready for use	755	94.4	45	5.6
Cloths to dry and warm blankets to cover the infant were ready	743	92.9	57	7.1
A clean and pre-warm surface was provided for resuscitation	701	87.6	99	12.4
Resuscitation kit and suctioning device were clean, complete and ready to be used	744	93.0	56	7.0
Cord clamping devices were present	794	99.3	6	0.8
Eye prophylaxis ointment and intramuscular Vitamin K were available	766	95.8	34	4.3

**Table 4: Clinical data of the 800 newborns regarding the assessment and immediate care.**

Items	Yes		No	
	n	%	n	%
The newborn was immediately dried after birth	684	85.5	116	14.5
Newborn was placed on mother's abdomen or chest in skin to skin contact	422	52.8	378	47.3
The baby was assessed in the first 30 seconds after birth: start of breathing, tone and reactivity, gestational age, presence of major malformations	751	93.9	49	6.1
Appropriate actions were started, if needed, according to the clinical evaluation	719	89.9	81	10.1
Umbilical cord was clamped after at least one minute unless there is an immediate clinical need to clamp early	141	17.6	659	82.4
Stump of the umbilical cord was left without dressing	524	65.5	276	34.5
Routine mouth and nose suctioning were done if indicated	357	44.6	443	55.4
Routine catheterization to check patency of the esophagus was done	356	44.5	444	55.5
Mother and baby were covered together with a pre-warmed blanket, with the infant head turn to the side	361	45.1	439	54.9
A warm cap was put on the baby's head	255	31.9	545	68.1

Table 4 shows the most appropriate criteria regarding the assessment and immediate care was assessment of the baby in the first 30 seconds after birth (93.9%). While,

delayed umbilical cord clamping after at least one minute was only practiced among 17.6% of cases, and a warm cap around the baby's head in less than one third of cases.

**Table 5: Data of the 800 neonates as regarding neonatal resuscitation.**

Items	Yes		No	
	n	%	n	%
Written guidelines for resuscitation and care of the newborn were available, clearly visible in the delivery room and implemented	708	88.5	92	11.5
There was a resuscitation bed with a heating source and a suction equipment ready to use	664	83.0	136	17.0
A functioning self-inflating bag with relief valve was available	507	63.4	293	36.6
Term and premature size masks were available	617	77.1	183	22.9
Suctioning device were available, in good working conditions and are adequately used	712	89.0	88	11.0
If a newborn infant was not breathing, resuscitation is initiated according to WHO guidelines	676	84.5	124	15.5
There was a written procedure to have a senior health professional present or immediately available for resuscitation in case of deliveries at risk of neonatal asphyxia	716	89.5	84	10.5
Trained and skilled personnel (at least one professional) was available at every birth	649	81.1	151	18.9
Sequence, time and interventions performed during a resuscitation were recorded in newborn profile	505	63.1	295	36.9
The infant was in skin contact with the mother immediately after birth and remains in skin contact for at least 60 minutes (irrespective of feeding decision) and until after the first breastfeed	465	58.1	335	41.9
Bathing and weighing were informed to the parents	277	34.6	523	65.4

In Table 5, the most appropriate criteria regarding neonatal resuscitation was presence of written procedure to have a senior health professional present or immediately available for resuscitation in case of deliveries at risk of neonatal asphyxia in 89.5% of cases. On the opposite side, Bathing and weighing of the baby were informed to the parents in 34.6% of cases only

## DISCUSSION

Every year, more than a million of the world's newborns die on their first day of life.<sup>11</sup> According to van den Broek and Graham, the provision of quality care should be the central focus of efforts to achieve millennium development goals (MDG) targets for maternal and newborn health.<sup>12</sup> Recent findings by Ajaari et al confirm that newborns delivered outside a health facility are more likely to die compared to newborns delivering in health facilities.<sup>13</sup>

In the present study, we selected the topic of auditing neonatal care because it is a hot subject in which the medical care of the full-term, healthy newborn in the delivery room has undergone numerous changes, and most of the performed interventions are unnecessary, and some may even harmful. The main strengths of present study that it is a clinical audit with accurate collection of data not depending on routine records. We used the most recent international guidelines (WHO 2015 and AAP 2010-2015).<sup>9</sup> Sufficient number of cases (800) enrolled in our study over reasonable period of time. The criteria and

standards chosen were clear and measurable. A number of suggested recommendations were stetted to improve the quality of care and outcome. The main limitation of the present clinical audit that the loop of audit cycle is still open, there was no re-audit to evaluate if significant improvement in the quality of the service provided occurred or not.

### *There are items presented with nearly optimal care in newborn care at our hospital*

According to the preparedness for the birth: The room temperature was appropriate (25c) in 82.3% of cases, the birth attendants' gloves were clean in 97.1% of cases, an alcoholic solution was available for cleaning hands quickly in 95.8% of cases, sterile instruments were ready for use in 94.4% of cases, clothes to dry and warm blankets to cover the infant were ready in 92.9% of cases, a clean and pre-warm surface was provided for resuscitation in 87.6% of cases, resuscitation kit and suctioning device were clean, complete and ready to be used in 93% of cases, cord clamping device were present in 99.3% of cases, and finally intra muscular Vitamin K was available in 95.8% of cases.

According to the newborn assessment and immediate care: The newborn was immediately dried after birth in 85.5% of cases, the baby was assessed in the first 30 seconds after birth: start of breathing, tone and reactivity, gestational age, presence of major malformation in 93.9%

of cases, appropriate actions were started, if needed according to the clinical evaluation in 89.9% of cases.

According to neonatal resuscitation: Written guidelines for resuscitation and care of the newborn were available, clearly visible in the delivery room and implemented in 88.5% of cases, a resuscitation bed with a heating source and suction equipment ready to use in 83.0% of cases, suctioning device was available, in good working conditions and is adequately used in 89.0% of cases, if newborn infant was not breathing, resuscitation was initiated according to guidelines in 84.5% of cases. Additionally, there was a written procedure to have a senior health professional present or immediately available for resuscitation in case of deliveries at risk of neonatal Asphyxia in 89.5% of cases, lastly, trained and skilled personnel (at least one professional) were available at every birth in 81.1% of cases.

#### ***Items with sub-standard care in newborn care at our hospital***

Lack the knowledge of skin to skin contact through placing the newborn on mother's abdomen or chest, missing delay cord clamping after one minute in case there is no clinical need to clamp early, lack of the care of the stump of the umbilical cord was not left without dressing, the routine mouth and nose suctioning done for most newborns and this intervention should not be done except for the indicated cases, missing routine catheterization to check the patency of the esophagus, lack the knowledge about covering the mother and her newborn's together with a pre-warmed blankets, missing putting a warm cap on the baby's head, deficient sources in a functioning self-inflating bag with relief valve, term and preterm size masks. Also, inaccuracy in recording the sequence, time and interventions performed during resuscitation and finally, absence of counseling the parents about the bathing and weighing for the newborn.

Most causes of newborn mortality are preventable or treatable. Evidence-based interventions for prevention and treatment of the major causes of newborn mortality—prematurity, birth asphyxia, and infections—are well established and as well, studies have shown that use of quality improvement initiatives can be effective in applying these interventions to cause moderate reduction in the newborn mortality.<sup>14-17</sup>

#### ***Recommendations***

Suggested recommendations for filling the gap to improve the newborn care and minimize complications:

- Training the residents and paramedical about the importance of skin to skin contact between the mother and her infant.
- Training the residents about the importance of delay cord clamping at least for one minute.

- Training the paramedical how to care the stump of the umbilical cord
- Training the residents, the need for neonatal resuscitation and admission to NICU.
- Training our residents and paramedical about the indications for suctioning the mouth and nose.
- Training our residents that routine catheterization to check patency of the esophagus is important and should be done.
- Identify the importance of covering the mother and the newborn together with a pre-warmed blanket.
- Identify the importance of putting a warm cap on the baby's head.
- Provide more functioning self-inflating bag with relief valve.
- Provide more term and preterm size masks.
- Recording the sequence, time and interventions performed during resuscitation in the infant profile.
- Counseling the parents about the bathing and weighing for the newborn.
- Counseling the parents about the importance of breastfeeding immediately after birth and early skin to skin contact.
- Good counseling for the parents about the symptoms of hyperbilirubinemia.
- Counseling the parents about the importance of follow-up visit. The most important recommendation is to re-audit to discuss whether practice has improved or not.

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