

## Evaluation of Neonatal Resuscitation Technique in Benha University Hospital

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**Abstract: Background:** Neonatal resuscitation skills are essential for all health care providers who are involved in the delivery of newborns. The transition from fetus to newborn requires intervention by a skilled individual or team in approximately 10% of all deliveries. **Objective:** Evaluation of neonatal resuscitation measures in Obstetric Department Benha University Hospital. **Methods:** It is an observational study as we watch the resuscitation of 100 cases of newly born infants at delivery room in Benha University Hospital from June 2010 through December 2010 without informing any member of obstetric or neonatal resuscitation team, comparing this with Mega code assessment checklist for year 2005. **Results:** There is a significant difference between practice of neonatal team and other health care givers (Anesthesiologists, house officers, nurses of Obstetric Department). Other health care givers were not skilled or trained on basic neonatal resuscitation techniques or familiar with available equipments, and trained persons like anesthesiologists had unsuitable equipments for dealing with neonates. **Conclusions:** the study indicates that the all medical staff on the delivery room (neonatologists, nurses, midwives, pediatricians, obstetricians, anesthesiologists and general practitioners) must be trained on NRP program which is an effective and practical tool that provides skill-based and evaluation-based instructions. Periodic Re-evaluation of the trained persons is essential to maintain the level of practice & keeping them updated.

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### 1. Introduction

Resuscitation of the newly born infant presents a different set of challenges than resuscitation of the adult or even the older infant or child. The transition from placental gas exchange in a liquid-filled intrauterine environment to spontaneous breathing of air requires dramatic physiological changes in the infant within the first minutes to hours after birth (1).

Approximately 5% to 10% of the newly born populations require some degree of active resuscitation at birth (e.g., stimulation to breath) (2), and approximately 10% of newborns require assistance to begin breathing and about 1% are critically ill and may need lifesaving therapies such as ventilation, chest compression, and medications to support heart rate (3).

More than 5 million neonatal deaths occur worldwide each year. It has been estimated that birth asphyxia accounts for 19% of these deaths, suggesting that the outcome might be improved for more than 1 million infants per year through implementation of simple resuscitative techniques (4).

### Aim of work:

Evaluation of neonatal resuscitation measures in obstetric department in Benha University Hospital.

### 2. Patient & method:

It is an observational study as I watch the resuscitation of 100 case of newly born infants at delivery room in Benha University Hospital from June 2010 through December 2010 without informing any member of obstetric or neonatal resuscitation team, comparing this with Mega code assessment checklist for year 2005. The study included two groups of pregnancy: No Risk Pregnancy & High Risk Pregnancy i.e pregnancy associated with maternal, fetal or placental high risk factors which make the probability of an adverse outcome for the mother or child is increased over and above the baseline risk of that outcome among the general pregnant population (or reference population) by the presence of one or more ascertainable risk factors, or indicators. This classification does not take into consideration the magnitude of risk or the importance of the risk to the health outcome of the pregnant population at large (5).

### 3. Results:

**Table (1) :** Maternal parameters in the studied group (100 cases).

Parameters	Age (year)	%
<i>1-Maternal Age</i>	< 20 years old	22
	> 35 years old	5
	20:35 years old	73
Mean age (years )	25.69 ± 5.16 years (mean ± SD)	
<i>2-Mode of delivery</i>	NO	%
Caesarian section	57	57%
Normal labor	43	43%
<i>3-Pregnancy according to high risk factors</i>	NO	%
High risk pregnancy	69	69%
No risk pregnancy	31	31%

**Table (2) :** Evaluation of technique of Neonatal resuscitation initial steps done to 100 cases.

Initial steps	Done right	Done wrong	Not done
-Provide warmth.	75	10	15
-Clear airway.	78	22	10
-Dryness.	82	18	0
-Positioning	73	27	0
-Stimulation.	47	15	38
-oxygen supplementation.	24	32	48

**Table (3) :** Evaluation of technique of Neonatal resuscitation other steps done to 100 cases.

Other steps	Done right	Done wrong	Not needed
-Positive pressure ventilation.	18	4	78
-Chest compression.	9	6	85
-Epinephrine administration.	4	0	96
-Endotracheal intubation.	18	6	76

**Table (4):** Comparison between practice of neonatal staff & other personnel in Neonatal resuscitation initial steps.

Initial steps	Neonatal staff			Other personnel			Test of significance	
	Done right	Done wrong	Not Need-ed	Done right	Done wrong	Not Needed	$\chi^2$	<i>P</i>
Provide warmth	100%	0%	0%	28.6%	71.4%	0%	61.905	<0.001*
Clear airway	60%	9.2%	30.8%	37.1%	62.9%	0%	36.421	<0.001*
Dryness	93.8%	6.2%	0%	48.6%	51.4%	0%	27.175	<0.001*
Position	92.3%	7.7%	0%	37.1%	62.9%	0%	35.125	<0.001*
Stimulation	69.2%	0%	30.8%	5.7%	42.9%	51.4%	49.940	<0.001*
Oxygen supplementation	36.9%	9.2%	53.8%	0%	62.9%	37.1%	37.611	<0.001*

\* Significant  $P < 0.05$ **Table (5):** Comparison between practice of neonatal staff & other personnel in Neonatal resuscitation other steps

Other steps	Neonatal staff			Other personnel			Test of significance	
	Done right	Done wrong	Not done	Done right	Done wrong	Not done	$\chi^2$	<i>P</i>
Positive pressure ventilation	27.7%	3.1%	69.2%	0%	5.7%	94.3%	11.919	0.003*
Chest compression.	12.3%	3.1%	84.6%	2.9%	11.4%	85.7%	4.906	0.086
Epinephrine administration	6.2%	0%	93.8%	0%	0%	100%	2.244	0.134
Endotracheal intubation	27.7%	6.2%	66.2%	0%	5.7%	94.3%	12.069	0.002*

\* Significant  $P < 0.05$

Tables 4,5 show high statistically significant difference between practice of Neonatal staff & other personnel in Neonatal resuscitation technique .

#### 4. Discussion:

The results of our study show a significant difference between practice of neonatal team and other health care providers (Anesthesiologists, house officers, nurses of obstetric department). Other health care providers were not skilled or trained on basic neonatal resuscitation techniques or familiar with available equipments, also they had unsuitable equipments for dealing with neonates. These equipments are available only in Neonatal staff bag and not available in delivery rooms. The above reasons lead to deterioration of 8 of already normal cases that were in need only to simple resuscitation & refer them to NICU.

Neonatal staff team intubated 22% of cases which is very high percentage in comparison to international measures ( does not exceed 2%) as team work intubate the case when suspect any respiratory problem without following the order of the steps of 2005 American Heart Association guidelines due to lack of experience.

Further training courses were done under supervision of senior staff of neonatology department in Benha university hospital to assess & evaluate knowledge base, technical proficiency and practice of newborn resuscitation of neonatal resuscitation residents & nurses in Kaliobia governorate & nearby governorates ( e.g. Dakahlia , Menofia , Zagazig...etc). The level of the trainers were measured by pre & post test before & after the course . Training courses already enhance the level of the trainers in practicing NRP . unfortunately these training courses not done to other health care providers( Anesthesiologists, house officers, nurses of obstetric department ) which is recommended.

We found some papers discuss The idea of our study but by much broader measures as in Malawi Africa The WHO estimates that 99% of the 3.8 million neonatal deaths occur in developing countries (6). Neonatal resuscitation training was implemented in Namitete, Malawi. The study's objective was to evaluate the training's impact on hospital staff and neonatal mortality rates by applying Curriculums with components of NRP. Study Design. Pre-/post curricular surveys of trainee attitude, knowledge, and skills were analyzed. An observational, longitudinal study of secondary data assessed neonatal mortality. Result. All trainees' (n=18) outcomes improved ( $p=0.002$ ). Neonatal mortality did not change. There were 3449 births pre intervention, 3515 post intervention. Neonatal mortality was 20.9 deaths per 1000 live births preintervention and 21.9/1000 post

intervention, ( $p=0.86$ ) (7). Conclusion. Short-term pre-/post intervention evaluations frequently reveal positive results. Short-term pre- and post intervention evaluations should be interpreted cautiously. Whenever possible, clinical outcomes such as in-hospital mortality should be additionally assessed. More rigorous evaluation strategies should be applied to training programs requiring longitudinal relationships with international community partners (8).

Our idea was done also in Syria 1999 as Infant mortality in Syria was at 34/1000 live births. and is predominantly due to neonatal mortality and related to birth asphyxia. After the study (was for 6 months) they found that the reason was malpractice of the health care providers (nurses, midwives, pediatricians, obstetricians, anesthesiologists and general practitioners). For that reason Syrian health care providers) were selected through a program initiated by the Syrian Ministry of Health and sponsored by the WHO (EMRO). The 70 member team represented the 14 geographic districts of Syria and included 50 physicians and 23 nurses and midwives. Assessment of provider knowledge base, technical proficiency and practice of newborn resuscitation were conducted by using the NRP program (with an Arabic version) at two separate locations using concurrent Arabic translation by AAP certified US and Syrian instructors. Evaluation and skill assessment were determined by the NRP recommended performance checklists, practice activities, written evaluations, onsite observations and interactive post-test discussions and ongoing peer review programs and follow-up training workshops were developed (9).

Our findings are consistent with a study in Zambia that reports significant improvement in healthcare providers' knowledge and skills following curriculum intervention despite a limited application of curriculum guidelines due to local conditions (10). Although NRP training reduces neonatal mortality in controlled, nonrandomized studies in China, India, and Africa (11), the literature surrounding NRP curriculums' impact is not consistent. Our results contribute to that literature. These findings may have important implications for the children of the developing world born without adequate neonatal resuscitation services because of the complexity and high program cost (12). However, if 90% of asphyxiated newborns require only drying, warming, and stimulation for survival, then an abbreviated NRP-based curriculum could improve outcomes in an affordable way (13).

**Conclusions:**

Training and Periodic reassessment of skills of health care providers (nurses, midwives, pediatricians, neonatologists, obstetricians, anesthesiologists and general practitioners), in practicing Neonatal Resuscitation Program (NRP) by senior staff & evaluation of each step of neonatal resuscitation as Subsequent resuscitation plans are based on these findings.

Provide delivery rooms with sufficient & suitable equipments for neonatal resuscitation.

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