INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

NEONATAL RESUSCITATION: A SYSTEMATIC REVIEW

Nursing

Ms.Devita Anand Nalawade*	PhD. Scholar, MGM university of health science, Navi Mumbai, Maharashtra, India, Assistant Professor, L.T.College of Nursing, S.N.D.T. Women's University Churchgate *Corresponding author
Dr.N.C.Mohanty	Professor,Dept.of Pediatrics,MGM hospital,,MGM institute of health science,Navi Mumbai,Maharashtra,India
Dr. Mary Mathews	Principal, Navi Mumbai college of nursing, MGM institute of health science, Vashi, Maharashtra, India

ABSTRACT

Background: Of 136 million babies born annually, around 10 million require assistance to breathe. Each year 814,000 deaths result from intrapartum related events in term babies (previously "birth asphyxia") and 103 million from complications of prematurity. Systematic training in resuscitation of the newborn is a cornerstone of modern neonatology.

Aim of the study: To evaluate effectiveness of neonatal resuscitation training

Methods: We conducted systematic reviews of the studies reporting relevant effectiveness of teaching neonatal resuscitation.

Results: We identified 80 studies of neonatal resuscitation program. Studies were excluded due to incomplete information. So finally 10 studies accepted who full filled the inclusion criteria.

Conclusion: Incorporating neonatal resuscitation in continuing education and professional training program at larger scale is recommended. It will help in control over neonatal mortality rate.

KEYWORDS

Neonatal resuscitation, Simulation.

I.INTRODUCTION

Neonatal mortality is a global indicator of the health status of a country (1).The neonatal mortality rate refers to the number of neonates that die before reaching 28 days of life and is calculated per 1,000 live births in a given year (2). Globally, 4 million babies die within the first 28 days of life and of these 4 million, 98% occur in developing countries. Global surveillance of neonatal mortality has helped to track the conditions in which high rates occur.

In countries like United States, neonatal resuscitation is taught and implemented as a way to prevent and reverse the effects of asphyxiation. According to World Bank, only 38% of births are attended by skilled health care staff. Skilled health staff is defined as "personnel trained to give the necessary supervision, care and advice to women during pregnancy, labor and the postpartum period, to conduct deliveries on their own and to care newborns". (3)

Initiation of breathing is critical in the physiologic transition from intra-uterine to extra-uterine life. Between 5-10% of all newborns require assistance to establish breathing at birth (4-9), and simple warming, drying, stimulation and resuscitation may reduce neonatal mortality and morbidity. Each year an estimated 814,000 neonatal deaths (10) are related to intrapartum hypoxic events in term infants, previously termed " birth asphyxia", and over one intrapartum millions stillbirths occure.Especially in under-resourced settings it may be challenging to distinguish a stillborn from a severely depressed newborn. In addition over one million newborns die from complications of preterm birth, such as respiratory distress syndrome (11), and these babies also require assistance to breathe at birth.

Neonatal resuscitation is defined as the set of interventions at the time of birth to support the establishment of breathing and circulation (6). Of 136 million births annually, an estimated 10 million will require some level of intervention (1).Some non-breathing babies with primary apnea will respond to simple stimulation alone, such as drying and rubbing. Basic resuscitation with a bag and mask is required for an estimated 6 million of these babies each year, and is sufficient to resuscitate most neonates with secondary apnea, as their bradycardia primarily results from hypoxemia and respiratory failure(6).More advanced measures, including endotracheal intubation, chest compressions and medications are required in < 1% of births(3), and most of these babies require ongoing intensive care which is not available in most low income country settings.

While systematic training in resuscitation of the newborn is a cornerstone of modern neonatology, there have been few rigorous evaluations of its effectiveness. Neonatal resuscitation is receiving attention especially as a missed opportunity for saving lives for births already in facilities and for improving morbidity outcomes. Several recent reviews of neonatal resuscitation in low-middle income settings have concluded that neonatal resuscitation has the potential planners as to how many lives could be saved by immediate assessment and stimulation, which may be feasible with less skilled workers and no equipment, and additional effect of basic neonatal resuscitation, including airway positioning and clearing and bag –mask resuscitation (10).

II.OBJECTIVES

1.To assess the effect of training program of neonatal resuscitation on the knowledge and performance of the sample

III.METHODS

We undertook a systematic review of literature from 2009 until 2016.The following databases were searched without language restrictions but limited to "human": Pubmed,Google, biomedcentral.The search term included " Newborn/neonatal resuscitation", "teaching/training","Simulation".Snowball searching added literature referenced in key papers.

Inclusion/exclusion criteria for abstraction

Data from studies meeting the inclusion criteria were extracted using a standard form and re-checked. We abstracted information on study identifiers, context, design limitations, and intervention. We considered the following study designs: observational before and after, Quasi – experimental. Studies reporting a control group were excluded.
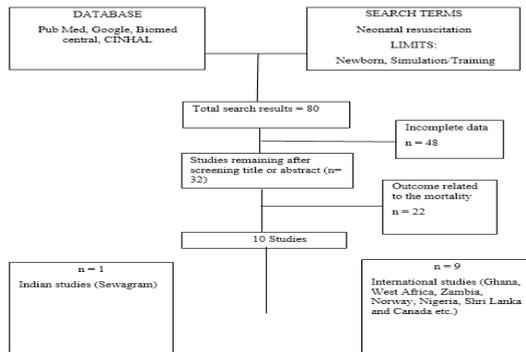
Interventions

We estimate:
1. Routine care(warming, drying and rubbing the back/sole of the feet)
2. Basic neonatal resuscitation defined as airway clearing (suctioning), head positioning, positive pressure ventilation, and chest compression.

The aim of this review was to estimate the effect of neonatal resuscitation

Searches and screening

DATABASE
Pub Med, Google, Biomed central, CINHAL

SEARCH TERMS
Neonatal resuscitation
LIMITS:
Newborn, Simulation/Training

Total search results = 80

Incomplete data
n = 48

Studies remaining after screening title or abstract (n= 32)

Outcome related to the mortality
n = 22

10 Studies

n = 1
Indian studies (Sewagram)

n = 9
International studies (Ghana, West Africa, Zambia, Norway, Nigeria, Shri Lanka and Canada etc.)

Fig. 1 Search, Screening and selection of studies reporting effect of neonatal resuscitation training program

IV. RESULTS

In the literature review, we identified 80 titles (Figure 1), and after initial screening of titles and abstracts, we retrieved 32 papers, we located 10 studies that reported the effectiveness of neonatal resuscitation program/simulation on the knowledge and performance of the samples.

Intervention descriptions in identified studies

The content and context of the resuscitation training for all facility are shown in Table 1.Evidenced based neonatal resuscitation training significantly improved cognitive knowledge of health professionals. In one study helping babies breathe is a simulation based one day training helped to improve performance in easy resuscitation. In another study simulation training increased performance, confidence of health team members. Above studies revealed that, after

Table 1: Knowledge and performance evaluation of neonatal resuscitation training program

Author	Setting/ Country	Design	Intervention	List of items	Pre-training SD	Post training SD	6-month mean SD	p
Carlo, et al 2009	18 Urban low-risk delivery centers, Zambia	Quasi experi-mental	Knowledge as well as skills: Initial steps, ventilation and chest compression	Knowledge: a. Overview b. Initial steps c. Ventilation d. Chest compression Performance: a. Overview b. Initial steps c. Ventilation d. Chest compression	58(22) 56(21) 60(17) 65(17) 55(21) 66(20) 50(25) 43(36)	84(13) 87(13) 87(12) 91(10) 90(08) 88(11) 89(11) 95(10)	62(16) 65(24) 58(18) 68(18) 80(19) 83(15) 75(25) 82(23)	Significant at < 0.05 level Significant at < 0.05 level
Mohd S., Ahmed H. Oct 2016	Pediatric nursing skill laboratory, Benha University	Pretest post test	Initial steps, ventilation and chest compression	Performance: a. Overview b. Initial steps c. Ventilation d. Chest compression	r 4.06	r 4.02	-	Significant at < 0.05 level
Bookman L. et al 2010	Labor ward at ridge hospital, Ghana	Pretest post test	Knowledge as well as skills: Initial steps, ventilation and chest compression	Knowledge: a. Overview b. Initial steps c. Ventilation d. Chest compression Performance: a. Overview b. Initial steps c. Ventilation d. Chest compression	% 56 56	% 71 81	% 79 85	P 0.68 Significant at < 0.05 level 0.18 Significant at
Laryea C,et al 2009	Korle Bu Teaching hospital, West Africa	Pretest post test	Initial steps, ventilation ,chest compression, Intubation and. Medication	Performance: a. Overview b. Initial steps c. Ventilation d. Chest compression e. Intubation f.Medication	% 43	% 81	% 89	Significant at < 0.001 level
Ersdal H. et al 2013	Haydom Lutheran Hospital ,Northen Tanzania	Pretest post test	Initial steps, ventilation and chest compression	Performance: a. Overview b. Initial steps c. Ventilation d. Chest compression	% 15	% 77	-	0.219
Uwakah U., Smee N. 2015	Three clinical site in rural Nigeria	Pretest post test	Knowledge as well as skills: Initial steps, ventilation and chest compression	Knowledge: a. Overview b. Initial steps c. Ventilation d. Chest compression Performance: a. Overview b. Initial steps c. Ventilation d. Chest compression	M 12.43 21.87	M 14.74 34.67	--	<0.0001
Rajapakase B.et al 2013	Rural hospital, Shri Lanka	Pretest post test	Knowledge as well as skills: Initial steps, ventilation and chest compression	Knowledge Performance	M 52 4.6	M 68 5.2	M 76 3.3	p <0.0001 <0.213

Surcouf J. et al	Children's Hospital of New Orleans, Louisiana	Pretest post test	Knowledge as well as skills: Initial steps, ventilation and chest compression	Knowledge Performance	SD 2.29 3.39	SD 2.66 3.69	- -	p <0.030 <0.080
Wang H, Ye H, Niermeyer S	China	Pretest post test	Performance: drying,stimulation,mouth to mouth ventilation	Performance	% 0	% 72	-	-
Taksande A, Vilhekr KY.	MGIMS, Sevagram,Vardha	Pretest post test	Knowledge as well as skills: Initial steps, ventilation and chest compression	Knowledge Performance	M 11.58 15.84	M 24.25 26	-	0.000 0.000

implementation of a neonatal resuscitation training program, health team members showed improvement in knowledge about neonatal resuscitation, as well as improvement in neonatal resuscitation skill ability. The studies highlights the importance of culturally and regionally relevant training in improving the knowledge and performance of health team members.

V. CONCLUSION

The use of simulation as an educational tool provides a risk-free environment for both neonates and health team members to address pertinent issues related to resuscitation training. Training program for health team members who are in close contact with neonates, once in 2 months with reevaluation and feedback after each update is very much needed.

REFERENCES

1. Centers for Disease Control and Prevention (CDC) 2015.Infant mortality. Retrieved from http://www.cdc.gov/ reproductivehealth/maternalinfanthealth/infantmortality. htm
2. United Nations Children's Fund (2015).Levels and trends in child mortality. Retrieved from http://www.childmor tality.org/files_ v20dowloads/IGME% 20report% 202015%20child%mortality% 20final.pdf
3. Msemo G. et al: Newborn mortality and fresh stillbirth's rates in Tanzania after helping babies breathe training. Official journal of the American Academy of Pediatrics, 131(2), e353-60.doi:10.1542/peds.2012-1795
4. Wall SN, et al.: Neonatal resuscitation in low-resource settings: what, who, and how to overcome challenges to scale up? Int.J.Gynaecol Obster 2009, 107(Suppl 1): S47-62- S63-44
5. Deorari AK,Paul VK,Singh M,Vidyasagar D.: Impact of education and training on neonatal resuscitation practices in 14 teaching hospitals in India.Ann Trop Paediatr2001,21 (1):29-33
6. Zhu XY, Fang HQ, Zeng SP, Li YM, Lin HL, Shi SZ: The impact of the neonatal resuscitation program guidelines (NRPG) on the neonatal mortality in a hospital in Zhuhai, China. Singapore Med J.1997
7. Organization WH: The World Health Report 2005-make every mother and child count. Geneva, Switzerland: World Health Organization, 2005
8. Bang AT, Bang RA,Baitule SB,Reddy HM,Deshmukh MD: Management of birth asphyxia in home deliveries in rural Gadchilori: the effect of two types of birth attendants and of resuscitating with mouth to mouth, tube mask or bag mask.J.Perinatal 2005,25(Suppl 1): S82-91
9. Textbook of Neonatal resuscitation. American Academy of Pediatrics, 5, 2009
10. Lawn JE, et al: Two million intrapartum-related stillbirths and neonatal deaths: where, why, and what can be done?Int J.Gynaecol Obstet 2009,107 (Suppl 1): S5-18-S19
11. Tan A, Schulze A, O'Donnell CP, Davis PG: Air versus oxygen for resuscitation of infants at birth. Cochrane Database Syst. Rev 2005, 2:CD002273
12. Carlo WA, W L, Chomba McClure EM, Carlo ME, Bann CM, Collins M, Harris H.: Educational impact of the neonatal resuscitation program in low-risk delivery centers in a developing country.J.Pediatr 2009.154: 504-508
13. Bookman L.et al: Educational impact of a hospital-based neonatal resuscitation program in Ghana.j.resuscitation.2010.04.034
14. Laryea C, Engmann C., Osafo A. Bose C.: Evaluating the effectiveness of a strategy for teaching neonatal resuscitation in West Africa.J.resuscitation.2009.08.005
15. Ersdal HL.,Vossius C.,Bayo E.,Mduma E.,Perlman J.et al: A one day- "Helping Babies " course improves simulated performance but not clinical management of neonates.j.resuscitation. 2013.04.005
16. Uwakah U., Smee N.: Providing neonatal resuscitation training in rural Eastern, Nigeria, Journal of nursing and health care Vol.4 No.1, October 2016
17. Rajapakse BN, Neeman T, Dawson AH (2013) The Effectiveness of a 'Train the Trainer' Model of Resuscitation Education for Rural Peripheral Hospital Doctors in Sri Lanka. PLoS ONE 8(11): e79491. doi:10.1371/journal.pone.0079491
18. Surcouf J. et al, Enhancing residents' neonatal resuscitation competency through unannounced simulation-based training, Med Educ Online 2013, 18: 18726
19. Wang H, Ye H, Niermeyer S. Asphyxia decreases in 10 Provinces of the People's Republic of China after training with the Neonatal Resuscitation Program. Pediatric Academic Societies; Honolulu, Hi: 2008. 5-4-2008
20. Taksande A, Vilhekar KY.Neonatal resuscitation training programme, its efficiency at rural hospital. Medical jouranal of Islamic world academy of sciences 20:1, 6-9, 2012