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NEONATAL RESUSCITATION TRAINING PROGRAMME, ITS EFFICIENCY AT RURAL HOSPITAL

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SUMMARY: Birth asphyxia is one of the commonest causes of neonatal mortality and morbidity. Prompt and proper application of various management strategies as per standard American Academy of Pediatrics (AAP) neonatal resuscitation guidelines will help to prevent birth asphyxia and decrease the consequent/resultant mortality and morbidity.

Neonatal resuscitation is an essential skill in maternal and child health, and every health care personnel should know the basic steps of resuscitation. Thus, the neonatal resuscitation training programmed (NRTP) was conducted based on the latest international 2005 AAP Neonatal Resuscitation guidelines. A set of multiple choice questions for both pre- and post-tests was administered before and after the NRTP to assess the knowledge and skill gained by the participants.

The NRTP was conducted by the Department of Pediatrics, MGIMS, KHS Hospital Sevagram. The participants were undergraduate, postgraduate and nurses. Before starting the lectures, participants were given the pre-test consisting of 35 multiple choice questions covering the entire NR protocol based on AAP Neonatal Resuscitation guidelines. The post-test was administered at the end of the training programmed. The participants' pre- and post-test marks were categorized into very good score (≥80%), good score (60-80%), and unsatisfactory score (<60%). The t-test for paired samples was calculated using SPSS 10 version.

A total of 107 participants who were given pre- and post-tests were included in the study group. Maximum participants were final year undergraduate students (55.14%) followed by B.Sc. nursing students (12.14%) and staff nurses (11.21%). The mean pre-test score was 17.56 (SD ±4.68) that went up to 27.71 (SD ±2.36) as a mean post-test score {p value <0.000; 95% CI -10.92 to -9.37}. The highly significant improvement was observed in the post-test scores of MBBS final year students (p < 0.000; 95% CI -11.28 to -9.73), staff nurses (p < 0.000; 95% CI -11.58 to -8.71), community postgraduates (p < 0.000; 95% CI -8.22 to -5.43), and B.Sc. nursing students (p < 0.000; 95% CI -18.59 to -13.07). Significant improvement was also observed in the post-test scores of anesthesia postgraduates, gynecologist postgraduates, medical officers, and pediatrics postgraduates.

Key Words: Neonatal resuscitation, training, medical student, nurses, postgraduate

INTRODUCTION

Birth asphyxia kills 0.7 to 1.6 million newborns a year globally with 99% of deaths in developing countries. An outcome for newborns can be markedly improved if doctors and nurses have appropriate neonatal resuscitation (NR) skills (1, 2). NR is an essential skill in maternal and child health. The goals of resuscitation are to assist with the initiation and maintenance of adequate ventilation and oxygenation, adequate cardiac output, and

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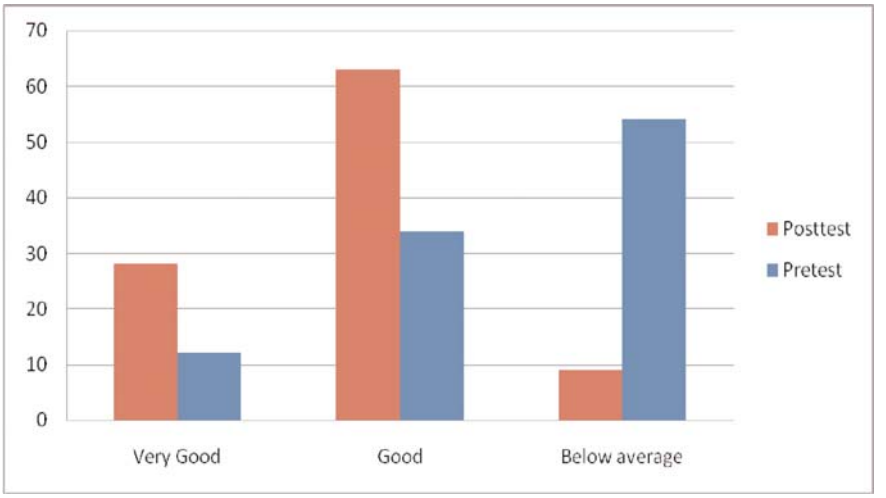

Figure 1: Frequency of the assessment score of pre- and post-neonatal resuscitation tests.

tissue perfusion. Major improvements in Apgar scores and outcomes for neonates, and significant reduction in mortality of term and premature babies have been demonstrated following the implementation of NRTP (3-4).The success of any medical workshop lies in the effective transfer of knowledge from the faculty to the participants. Currently, there is a consensus that teaching of neonatal resuscitation should be part of every institution's curriculum and that all medical schools should have a team responsible for this task. This training should be a fundamental requirement for medical and nursing education, and competence should be expected from students and graduates (4-6). An NRTP was conducted at Kasturba Hospital Sevagram (KHS) based on the latest international 2005 AAP Neonatal Resuscitation guidelines (7). A set of 35 multiple choice questions was administered before and after the NRTP to assess the knowledge and skill gained by the participants.

MATERIALS AND METHODS

The NR training was conducted by the department of Pediatrics, MGIMS, KHS. The participants were undergraduates, postgraduates and nurses. Before starting the lectures, participants were given the pre-test consisting of 35 multiple choice questions covering the entire NR protocol. After the pre-test, NR multimedia lecture sessions on physiology of asphyxia, initial steps of resuscitation, bag and mask, chest compression, endotracheal intubation, medication, and ethical consideration were delivered by the expert faculty based on 2005 American Academy of Pediatrics NR guidelines. The skill on mannequins was demonstrated and hands -on training was done by the participant after the session. The post-test was administered at the end of the training program. The participants pre- and pos-test marks were categorized into very good score (80%), good score (60-80%), and unsatisfactory score (<60%). The pre- and post-answer sets were evaluated, marked, and compared. SPSS 10 version was used for the statistical purpose. Numerical data were expressed as mean ± SD and categorical data as frequencies. The mean pre- and post-test scores were compared using paired sample t-test. Chi-square was used to compare the frequencies. A p value <0.05 was considered significant.

RESULTS

NRT program was conducted by the Dept. of Pediatrics, MGIMS Sevagram. A total of 115 participants were registered but only 107 given pre- and post-tests were included in the study group. A total of 62 were female and 45 were male. The participants were undergraduates, post-graduates, and nurses. Maximum participants were final year undergraduate students (55.14%) followed by B.Sc. nursing students (12.14%), and staff nurses (11.21%). Before the NRTP, 12% of the participants got very good scores, 34% got good, and 54% got unsatisfactory. The lowest pre-test score was 7 out of 35 (20%) while the highest was 28 (88.57%). The lowest post-test score was 15 out of 35 (42.85%) while the highest was 35 (100.0%). Immediately after the NRTP, 28% of the participants got very good scores, 63% got good, and 9% got unsatisfac-

Table 1: Pre and post-neonatal resuscitation test score.

Participant	Number	%	Pre-NRT Mean (±SD)	Post–NRT Mean (±SD)	P value	95% CI
Postgraduate student						
• Pediatric	5	4.67	28.4 ± 3.20	31.8 ± 2.68	0.01	-4.51 to -2.28
• Community Medicine	6	5.60	23.33 ± 3.77	30.16 ± 3.12	0.000	-8.22 to -5.43
• Anesthesia	4	3.73	19 ± 2.58	27.5 ± 3.41	0.01	-13.23 to -3.72
• Gynecology	5	4.67	24.2 ± 0.86	28.1 ± 2.60	0.02	-7.41 to -0.98
Medical officer	3	2.80	16.66 ± 2.08	27.33 ± 0.57	0.02	-17.5 to 3.16
MBBS final year	59	55.41	17.03 ± 3.88	27.54 ± 1.91	0.000	-11.28 to -9.73
Nurses						
• B.Sc nursing student	13	12.14	11.58 ± 2.99	24.25 ± 1.71	0.000	-18.59 to -13.07
• Staff nurses	12	11.21	15.84 ± 1.62	26 ± 1.41	0.000	-11.58 to -8.71

tory (figure1). The mean pre-test score was 17.56 (SD ± 4.68) that went up to 27.71 (SD ± 2.36) as a mean of the post-test score. The calculated two-tailed p value suggested the improvement in the post-workshop score, which was highly significant (p value <0.000; 95% CI -10.92 to -9.37). The result also suggested that the NRTP significantly improved the NR theoretical knowledge of the trainees. Table 1 shows the distribution of undergraduates, postgraduates, and nurses participants of the pre- and post-test scores and also reveals the highly significant improvement in the post-test scores of MBBS final year students ($p < 0.000$; 95% CI -11.28 to -9.73), staff nurses ($p < 0.000$; 95% CI -11.58 to -8.71), community postgraduates ($p < 0.000$; 95% CI -8.22 to -5.43), and B.Sc. nursing students ($p < 0.000$; 95% CI -18.59 to -13.07). Statistically significant improvement was also observed in the post-test scores of anesthesia postgraduates, gynecologist postgraduates, medical officers, and pediatrics postgraduates.

DISCUSSION

Infant mortality rate (IMR) in India is 63 since the last 1-2 year, and two-third of IMR comprises neonatal mortality. It is very important that medical students and nurses are well equipped with adequate theoretical and practical knowledge required to reduce the neonatal death. With this aim, the department of pediatrics, MGIMS, Sevagram, has been conducting NRTP every year. Most individuals can successfully learn and qualify resuscitation courses, but knowledge, skill acquisition, and retention have been shown to vary (8). Some authors reported that after 4 to 6 months, the acquired skills and knowledge of resuscitation significantly reduced (9). Almeida et al. (10) reported that 23.5% candidates correctly answered the theory question on NR, suggesting that NRTP has not been properly emphasized in medical schools. The simplest method of testing effectiveness of training at a workshop is to administer the same set of objectively structured questions before and after the session and to analyze the difference. Halder *et al.* (11) reported that their training in infant feeding practices improved the knowledge of the participants and that repeat sessions were very useful. However, in our study, knowledge was assessed after an NRTP event in all health care workers, and a significant difference was found in the post-test scores.

The use of audiovisual aid increases the transfer of knowledge. Microteaching is yet another technique that could be exploited in peer groups or small batches to develop teaching and learning skills under the guidance of a supervisor. The assessment of training needs, communication needs, and managerial training needs can become a core content of developing appropriate activities for skill enhancement, and important exercises or stimulus can be used for further action. In our study too, multimedia presentations used for the lecture sessions probably helped in

better transfer of knowledge. Agarwal *et al.* (12) reported that the pre-test score of undergraduate medical students on 20 questions averaged at 25% and improved to 87% post-workshop. The same result was found in our study also. Despite of mixed group of population from undergraduates, postgraduates, B.Sc nursing students, staff nurses, our result showed a significant increase in the post-test score, indicating effective transfer of knowledge by delivering good audiovisual lectures (13). In conclusion, the entire health care person gained the knowledge and skills regarding neonatal resuscitation after effective NRT programmed by expert faculty.

REFERENCES

1. Kaye W, Mancini ME. Retention of cardiopulmonary resuscitation skills by physicians, registered nurses, and the general public. Crit Care Med 1986;14:620- 2.

2. WHO: The world health report: 2005: make every mother and child count, 2005.

3. Patel D, Piotrowski ZH, Nelson MR, Sabich R. Effect of a statewide neonatal resuscitation training program on Apgar scores among high-risk neonates in Illinois. Pediatrics 2001;107(4):648-55.

4. Singh J, Santosh S, Wyllie JP, Mellon A. Effects of a course in neonatal resuscitation–evaluation of an educational intervention on the standard of neonatal resuscitation. Resuscitation 2006;68(3):385-9.

5. Patel D, Piotrowski ZH. Positive changes among very low birth weight infant Apgar scores that are associated with the Neonatal Resuscitation Program in Illinois. J Perinatol 2002;22(5):386-90.

6. Rangaraj S, Rangaraj J, Scholler I, Buss P. A survey of neonatal resuscitation training provided to general professional trainees at neonatal units in England and Wales. Arch Dis Child Fetal Neonatal Ed 2001;85(3):F225.

7. 2005 American Heart Association Guidelines for cardiopulmonary resuscitation and emergency cardiovascular care of pediatrics and neonatal patients: Neonatal resuscitation guidelines. Pediatrics 2006;117(5):e1029-1038.

8. Wynne G. Training and retention of skills. BMJ 1986; 293:29-31.

9. Curry L, Gass D. Retention of knowledge and skill after training in CPR. CMAJ 1987;128:550-551.

10. Halder A, Ray S, Biswas R, Biswas B, Mukherjee D. Effectiveness of training on infant feeding practices among community influencers in a rural area of West Bengal. Indian J Public Health 2001;45:51-6.

11. Almeida MFB, Guinsburg R, Costa JO, Anchieta LM, Freire LMS. Ensino da reanimação neonatal em maternidades públicas das capitais brasileiras. [Teaching neonatal resuscitation at public hospitals in Brazilian state capitals]. J Pediatr (Rio de J) 2005;81(3):233-9.

12. Agarwal R, Deorari AK, Singhal T, Jatana V, Lodha R, Paul VK. Retention of Neonatal Resuscitation Programmed (NRP) skills and knowledge by undergraduate, medical students. Proceedings of the XXth Annual Convention of National Neonatology Forum, Nov 3-5; Mumbai, 2000.

13. Narayan S, Mathai SS, Adhikari K, Bhandari A, Bawa KS. Effectiveness of Teaching of Neonatal Resuscitation Programmed at a Workshop for a Mixed Population of Medical Personnel. MJAFI 2004;60:244-246.

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