

Opinions and approaches of pediatric surgery specialists and residents about neonatal resuscitation program-NRP: survey study

Yeşim Andıran Şenaylı¹, Rezzan Kaplan Sayar², Sevgi Ulusoy Tangül³

¹Department of Anesthesiology and Reanimation, Faculty of Medicine, Yozgat Bozok University, Yozgat, Türkiye

²Nurse, Pediatric Surgery Clinics, Yozgat Bozok University Hospital, Yozgat, Türkiye

³Department of Pediatric Surgery, Faculty of Medicine, Yozgat Bozok University, Yozgat, Türkiye

Received: 23/02/2024

Accepted: 15/03/2024

Published: 25/03/2024

Cite this article: Andıran Şenaylı Y, Kaplan Sayar R, Ulusoy Tangül S. Opinions and approaches of pediatric surgery specialists and residents about neonatal resuscitation program-NRP: survey study. *Surg Child.* 2024;1(1):1-4.

Corresponding Author: Yeşim Andıran Şenaylı, ysenayli@gmail.com

ABSTRACT

Aims: The Neonatal Resuscitation Program (NRP) is a course for healthcare professionals who can be called “those who touch the baby at the time of birth”. The knowledge and skills obtained through this training program can be used in infant resuscitation at the time of birth and neonatal period resuscitation, which includes the first 30 days of life. It is aimed to evaluate the approaches of pediatric surgeons and residents in terms of their opinions and practices regarding NRP, as there are publications in the literature about the NRP experiences of other healthcare professionals.

Methods: After receiving the approval of the Ethics Committee, the survey was published as a descriptive and cross-sectional study via the Google Docs system, and the participation of pediatric surgeons and residents was requested. Our research was conducted between October 2023 and March 2024 by asking the participants survey form questions via communication tools such as e-mail, telephone, social media, Internet. Data were sent to participants in the form of electronically prepared survey forms via e-mail addresses and social media platforms. It was collected electronically within the date ranges determined for the research.

Results: Thirty-seven participants were male, and 40 participants were female. The average age of 77 pediatric surgeons who participated in the survey was determined to be 43.8 years old. Seventeen of the participants are residents; 24 of them are specialist physicians; 10 of them are Dr. Lecturers; 12 of them are associate professors; 14 of them were professors. It was determined that 48 of 77 physicians took the NRP course. It has been determined that those who took the NRP course can contribute more to resuscitation practices.

Conclusion: It has been stated that pediatric surgeons are familiar with NRP applications and that as clinical experience increases, even among those who have not taken the course, interventions by NRP can be performed. It is seen that pediatric surgeons can effectively participate in NRP courses.

Keywords: Neonatal, resuscitation, program

INTRODUCTION

Neonatal Resuscitation Program (NRP) is a course first launched in 1985 by the American Heart Association (AHA) and the American Academy of Pediatrics (AAP).¹ The program was initiated after studies found that most children requiring neonatal resuscitation did not receive appropriate assistance.² The primary purpose of this training is to prevent deaths and disabilities, mainly due to asphyxia, by training healthcare professionals who can evaluate the newborn at the time of birth and perform resuscitation on babies who have difficulty in transitioning from the womb to extrauterine life.³

10-19% of births in the world require resuscitation procedures at birth.⁴⁻⁶ There may be a need for positive

pressure ventilation (PPV) in 3% and intubation and cardiopulmonary resuscitation in 1%.^{5,6} However, on average, 4 million newborns are affected worldwide yearly.^{3,4} In fact, in some countries, perinatal asphyxia is the leading cause of neonatal death.³ One study determined that, when evaluated in general, 98% of deaths occur in countries with low or medium development levels.⁷ In a study conducted in China, it was determined that the cause of 20.5% of newborn deaths, that is, the deaths of 73,000 babies, was perinatal asphyxia.⁸ This number was determined to be 29,000 annually in Ghana.⁹ When we look at the ratio of the populations of China and Ghana, it can be understood that Ghana's losses are high. If newborn deaths in China were based on the rate



of Ghana's population, it would mean 1 million 400 thousand newborn deaths per year. However, perinatal asphyxia also has the effect of causing cerebral palsy, epilepsy, and chronic neurological diseases in a significant number of newborns.^{4,8}

The Neonatal Resuscitation Program includes general practitioners, pediatricians, emergency medicine, family physicians, anesthesiology and reanimation, gynecology and obstetrics, pediatric surgery doctors, as well as midwives, nurses, anesthesia technicians and technicians, and medical officers, whom we can call "those who touch the baby at the time of birth". It is aimed at allied healthcare professionals such as emergency medical technicians and paramedics. The knowledge and skills obtained through this training program are used not only in the resuscitation of babies at the time of birth but also in neonatal resuscitation, which includes the first 30 days of life.

Regardless of the branch, the most critical factor that affects the quality of education of healthcare providers who will take the NRP course is that they have knowledge and skill training that can be compatible with the NRP course in their training curriculum.¹⁰ In a study, the conditions of pediatricians, anesthesiologists, and gynecologists during the course were compared, and it was understood that although pediatricians and anesthesiologists showed similar characteristics, gynecologists differed.¹⁰

There may be differences in the procedure levels of physicians working in pediatric surgery, but pediatric surgeons have almost no NRP training, skills, or knowledge of the literature. Therefore, in our study, we aimed to analyze, through a survey, the approaches and opinions of pediatric surgeons who have to perform neonatal resuscitation in their professional lives regarding NRP training and practices.

METHODS

Two studies can be done regarding NRP activity.¹¹ The first is to measure the successful effects of neonatal resuscitation practices after training.¹¹ The second is to evaluate the course participants in terms of their knowledge level and skill confidence after the course.¹¹ In our study, evaluation was made using the second method.

After receiving the approval of the Yozgat Bozok University Social and Human Sciences Ethics Committee (Date: 20.09.2023, Decision No: 06/17), our research was conducted between October 2023 and March 2024 by asking participants survey-form questions via communication tools such as e-mail, telephone, social media, and the internet. The research population comprises pediatric surgeons and pediatric surgery assistants receiving pediatric surgery specialty training in Yozgat Bozok University. All pediatric surgery doctors in the country will be included in the study through associations, academic platforms (congresses, seminars, etc.), and social media, and the analysis of the data obtained from the study will be based on these data. Data were sent to participants in the form of electronically prepared survey forms via e-mail addresses and social media platforms. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

RESULTS

According to the survey results, the numerical distribution of the opinions of pediatric surgeons at various levels who have

taken the NRP course and those who have not taken the NRP course, and their knowledge, skills, and self-confidence are shown in Table. The average age of 77 pediatric surgeons who participated in the survey was determined to be 43.⁸ years old. Thirty-seven participants were male, and 40 participants were female. Seventeen participants are residents in their first five years of education. Fifteen participants were 6-10 years in profession, 8 participants were 11-15 years in profession, 12 participants had been in pediatric surgery for 16-20 years, and 30 participants had been in pediatric surgery for 21 years or more.

Five participants answered the survey in Ministry of Health hospitals, 27 in state universities, 23 in Ministry of Health training hospitals, 9 in affiliated university hospitals, 4 in private hospitals, 7 in new model city hospitals, and 2 in foundation universities.

Seventeen participants are residents; twenty-four are specialist physicians; ten are Dr. Lecturer; twelve are associate professors; fourteen were professors.

Forty-eight participants took the NRP course. Twenty-nine participants still need to take a course. It has been determined that there are births and neonatal units in hospitals where the majority of course participants are. However, it has been understood that the cases in which physicians perform neonatal resuscitations are rare. It has been observed that the number of people who give positive answers increases as academic seniority increases regarding knowledge and, skills and self-confidence regarding NRP.

Sixteen of those took the NRP course within five years; 20 of them were 6-10 years ago; 7 of them were 11-15 years ago; Three of them were found to have taken the NRP course 16-20 years ago, and three more than 21 years ago. It turned out that there were no repeat courses.

The group that gave the least positive answers in terms of practice is seen as residents. This may be because they are at the beginning of their education process. However, it the lack of births and neonatal units in the institutions where they receive training may be practical, based on the response given by this group.

DISCUSSION

Evaluation of the condition of newborns after birth started with the assessment scoring of Virginia Apgar, identified with her surname.¹² Nowadays, it has become mandatory to evaluate babies, whether mature or premature, at the time of birth and to understand that their vital functions are expected, in order to minimize the morbidity and mortality of babies. The level of knowledge about NRP at the physician level and ensuring that one person, whether a physician or not, is present in the team as an NRP trained person during birth is essential in terms of reducing morbidity and mortality.⁴ Studies have been carried out on the knowledge and skills of this group, mainly due to the expectation that relevant physicians have mastery of the subject. In our study, it is pleasing that branches such as pediatric surgery, where the possibility of intrapartum work is relatively low, show interest in NRP programs and constitute the majority of survey participants.

In the study conducted in China, it was determined that with the introduction of NRP applications, the time to start initial

**Table. Distributions of without NRP and with NRP residents and specialist for knowledge and training abilities**

No./Appl	Without NRP	With NRP	Without NRP	With NRP	Without NRP	With NRP	Without NRP	With NRP	Without NRP	With NRP
	Resident	Resident	Spec	Spec	Assist. Prof	Assist. Prof	Assoc. Prof	Assoc. Prof	Prof.	Prof.
Number	12	5	8	16	1	9	3	9	5	9
Age (years)	39.8	31.6	41.6	59.3	52	48.7	46.2	47.8	55.5	49.4
Birth in inst	12	5	7	15	1	8	3	9	5	9
NICU in inst	12	5	7	14	1	7	2	9	5	9
Neonate resuscita	5	3	2	3	1	4	1	5	3	3
Ped surge need NRP?	10	4	7	14	1	7	3	9	4	9
Is vent. support most important?	8	5	5	11	0	8	3	9	3	9
T piece system appl	1	1	1	6	0	3	1	3	1	4
Affect vent appl	5	3	4	9	0	6	1	6	3	9
MR SOPA appl	1	0	1	5	0	2	1	1	1	4
PPV appl	3	2	4	13	0	6	1	6	5	9
Early stage appl	4	2	3	11	0	6	1	5	4	8
CPAP appl	3	2	4	13	0	6	1	6	5	9
Umb cord cath appl	5	3	5	12	0	8	1	7	5	9
L mask insert appl	7	3	4	12	0	8	1	6	4	8
Pleural drain appl	7	4	7	13	0	8	2	7	5	9
Mild extantion appl	6	3	4	11	0	7	1	6	5	9

No: Number of patients, Inst.: Institution, PPV: Positive Pressure Ventilation; CPAP: Continious Positive Airway Pressure; MR SOPA: Mask ventilation correction steps acronym (M: Mask adjustment, R: Repositioning of head and neck, S: Suction mouth and nose, O: Open mouth, P: Pressure increase, A: Alternative airway), L. Mask: Laryngeal Mask

stage applications for asphyctic newborns was shortened. This, valuable time was used well for diagnosis, and, in this case, it made a significant contribution to preventing asphyxia problems in newborns.⁸ In our study, the number of people who answered “I can perform initial practices when needed” for resuscitation after the evaluation of the newborn constituted more than 50% of the survey participants. 75% of those who could apply the initial step consisted of the group that had received NRP. It was evaluated as significant in terms of the effect of NRP.

When respiratory weakness is detected in premature babies, the decision to apply positive pressure ventilation (PPV) may be indicated.¹³ In our study, it was stated that PPV could be performed at a rate of 63%. A study conducted in India found that only 18% of patients applied CPAP in the delivery room.⁴

It has been stated that in Kenya and Pakistan, training has been organized, especially on the use of balloons and masks, and that this is due to the conditions of the countries.⁷ It was determined that skill levels in this training remained at low levels of 31% in Kenya and 46% in Pakistan.⁷ It has also been stated that this may be not being accustomed to the OSCE training method.⁷ There is no need for such separation in our country because standard facilities are provided for NRP applications in the country, and deficiencies are quickly reinforced. A benefit of NRP courses is the awareness of the intertwined obstetric and neonatal partnership during birth.³ It is also an optimized program in that people who may not be able to intubate the patient indirectly can intervene in the newborn without the need for this procedure.³ In a study conducted in Canada, considering only the intubation

procedure among NRP procedures, it was determined that the success of the first practitioner was 73%. In comparison, the success of the residents was 63% and was described as failure.¹⁴ The same study also stated that these rates were between 50-62% for the USA.¹⁴ In the study in India, it was understood that most physicians were optimistic about the endotracheal aspiration procedure.⁴ The survey showed that pediatric surgeons in our country determined that respiratory support for the newborn is essential. Unlike India, in our country, the majority (70%) stated that laryngeal mask application, not endotracheal tube, could be applied. The study conducted in India determined that 63.5% of the physicians started giving oxygen from the beginning and did not prefer room air.⁴ It has been stated that this rate is approximately 15% in the United Kingdom.⁴ This rate was 97% in Canada and 71.7% in the United Kingdom.⁴ It has been stated that pediatric surgeons, especially those who take the NRP course in our country, have knowledge and skills regarding laryngeal mask insertion, oxygen and respiratory support. It is understood that residents need more awareness of this. Considering that the number of NRP course recipients for residents is limited, it was thought that an NRP course for respiratory support would be meaningful.

In the study conducted in India, it was observed that 54% of the participating physicians worked in neonatal intensive care units and provided variable information about umbilical cord clamping.⁴ The cord was clamped and cut immediately in 61.9% of the cases, while the rest waited 1 minute.⁴ In our survey, pediatric surgeons were not asked about clamping the umbilical cord during birth, as pediatric surgeons almost



never perform it, that is, it has no practical meaning. The ability to insert an umbilical cord catheter when necessary was significant.

It has been determined that there are significant differences between the training received in countries such as Canada, Oman, Poland, Spain, Nepal, and the United Kingdom and the use of these trainings as standard. Studies show that NRP training is forgotten within 6-12 months if not used effectively.¹ For this reason, more frequent rotations in neonatal care units are envisaged.¹ Simulation training has been developed in case there are problems in achieving this due to technical and process problems.¹ It was understood in our study that pediatric surgeons and residents constitute the minority of those who have taken the course less than five years ago. We thought that the course is not taken regularly because it seems to have low priority for pediatric surgeons to take it.

During NRP implementations, it has been determined that, 30% of the steps are skipped.¹⁵ There is an opinion that this situation is related to not showing teamwork activity.¹⁵ The study suggested that the application could be more effective if teamwork were carried out.¹⁵ It has been reported that this aspect of the role-play process could be stronger due to the lack of teamwork training in the NRP course.¹⁵ Although there will be little need for pediatric surgeons to apply NRP in our country, it is understood that they want to take part in teamwork by attending courses. Not taking repeat courses suggests that there will be deficiencies in practice. No questions were asked about this in our study.

CONCLUSION

This study would fill a gap in the literature in evaluating the participation, perspective, and opinions of pediatric surgery researchers and specialists in NRP courses. The fact that the majority of studies in the literature concluded that nurses, midwives, pediatricians, and anesthesia, indirectly, prevents other branches from emerging to contribute intrapartum applications. It is understood from this study that pediatric surgeons can be quickly adapted to NRP practices and take an active role.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Yozgat Bozok University Social and Human Sciences Ethics Committee (Date: 20.09.2023, Decision No: 06/17).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Surcouf JW, Chauvin SW, Ferry J, Yang T, Barkemeyer B. Enhancing residents' neonatal resuscitation competency through unannounced simulation-based training. *Med Educ Online*. 2013;18(1):18726. doi: 10.3402/meo.v18i0.18726
2. Tezel B, İlhan M, Günay İ, Özbaş S. Neonatal resuscitation program provider courses in Turkey. *İzmir Dr Behçet Uz Çocuk Hast Derg*. 2015;5(2):101-108. doi: 10.5222/buchd.2015.101
3. Enweronu-Laryeaa C, Engmann C, Osafo A, Bose C. Evaluating the effectiveness of a strategy for teaching neonatal resuscitation in West Africa. *Resuscitation*. 2009;80(11):1308-1311.
4. Bansal SC, Nimbalkar AS, Patel DV, Sethi AR, Phatak AJ, Nimbalkar SM. Current neonatal resuscitation practices among paediatricians in Gujarat, India. *Int J Pediatr*. 2014;2014:676374. doi: 10.1155/2014/676374
5. De Bernardo G, Sordino D, Cavallin F, et al. Performances of low level hospital health caregivers after a neonatal resuscitation course. *Ital J Pediatr*. 2016;42(1):100. doi: 10.1186/s13052-016-0313-0
6. Weldearegay HG, Abrha MW, Hilawe EH, Gebrekidan BA, Mehanyie AA. Quality of neonatal resuscitation in Ethiopia: implications for the survival of neonates. *BMC Pediatr*. 2020;20(1):129. doi: 10.1186/s12887-020-02029-5
7. Singhal N, Lockyer J, Fidler H, et al. Helping babies breathe: global neonatal resuscitation program development and formative educational evaluation. *Resuscitation*. 2012;83(1):90-96.
8. Xu T, Wang HS, Ye HM, et al. Impact of a nationwide training program for neonatal resuscitation in China. *Chin Med J*. 2012;125(8):1448-1456.
9. Bookman L, Engmann C, Srofenyoh E, et al. Educational impact of a hospital-based neonatal resuscitation program in Ghana. *Resuscitation*. 2010;81(9):1180-1182.
10. Parotto M, Doglioni N, Micaglio M, Zanardo V, Perilongo G, Trevisanuto D. Efficacy of the neonatal resuscitation program (NRP) course on knowledge retained by residents: Comparison among pediatrics, anesthesia and gynecology. *Resuscitation*. 2010;81(12):1741-1742.
11. Trevisanuto D, Ferrarese P, Cavicchioli P, Fasson A, Zanardo V, Zaccello F. Knowledge gained by pediatric residents after neonatal resuscitation program courses. *Pediatr Anesth*. 2005;15:944-947. doi: 10.1111/j.1460-9592.2005.01589.x
12. Lim G, Facco FL, Nathan N, Waters JH, Wong CA, Eltzschig HK. A review of the impact of obstetric anesthesia on maternal and neonatal outcomes. *Anesthesiol*. 2018;129(1):192-215. doi: 10.1097/ALN.0000000000002182
13. Poulton DA, Schmölzer GM, Morley CJ, Davis PG. Assessment of chest rise during mask ventilation of preterm infants in the delivery room. *Resuscitation*. 2011;82(2):175-179.
14. Bismilla Z, Finan E, McNamara PJ, LeBlanc V, Jefferies A, Whyte H. Failure of pediatric and neonatal trainees to meet Canadian Neonatal Resuscitation Program standards for neonatal intubation. *J Perinatol*. 2010;30(3):182-187.
15. Thomas EJ, Taggart BG, Crandell S, et al. Teaching teamwork during the Neonatal Resuscitation Program: a randomized trial. *J Perinatol*. 2007;27(7):409-414.