



# Participation of Trainees, Trainers, and Program Directors of Anesthetists and Anesthesia Technicians in the Neonatal Resuscitation Program in Türkiye

## Türkiye'deki Yenidoğan Canlandırma Programına Anestezi Uzmanları ve Anestezi Teknisyenlerinin Kursiyerler, Eğitmen ve Program Yöneticileri olarak Katılımı

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### Abstract

**Aim:** The Newborn Resuscitation Program aims to ensure that healthcare professionals prevent complications that may occur in the baby, mainly due to asphyxia. Like some other health providers, anesthesia staffs also participate in this program. We aim to determine the rate of participation and contribution of anesthesiologists and anesthesia technicians to programs. We discussed why participation in this program is essential and what results in it will have when evaluated with the after-effects.

**Material and Method:** After the approval of the Gulhane Scientific Research Ethics Committee, the participant records of the courses, which has been organized since 1998, were examined. The records show the number of anesthesia staff according to the total number of people and their distribution by year. We compared total participants to anesthesia staff with the inclusion of trainees, trainers, and course directors in our country. The distribution of these sums and what these numbers might mean were investigated.

**Results:** Only one anesthetist attended the first course as a trainee in 1998. The highest participation as anesthetist and anesthesia technician was in 2010, with 494 participants, 218 and 276, respectively. Since the beginning of the course, 2392 anesthesiologists and 3124 anesthesia technicians out of 75,256 trainees have received training. The average is 3.57 percent. Sixteen out of 47 anesthesiologists and 7 out of 11 anesthesia technicians actively contribute to the programs as trainers. Only five anesthetists and two technicians determined the course directors. All of those directors are active in the program.

**Conclusion:** The number of trainers and course directors is relatively low compared to the total number of people working in the anesthesia branch nationwide. As anesthesia staff is critical for neonatal resuscitations, increasing anesthesia staff participation can significantly reduce neonatal mortality and morbidity.

**Keywords:** NRP, anesthesia, technician

### Öz

**Amaç:** Yenidoğan Canlandırma Programı, sağlık profesyonellerinin başta asfiksi olmak üzere bebekte oluşabilecek komplikasyonları önlemesini sağlamayı amaçlamaktadır. Diğer bazı sağlık çalışanları gibi anestezi çalışanları da bu programa katılmaktadır. Bu çalışmada anestezi uzmanları ve anestezi teknisyenlerinin programlara katılım ve katkı oranlarını belirlemeyi amaçlıyoruz. Bu programa katılımın neden gerekli olduğunu ve sonrasında etkileri birlikte değerlendirildiğinde ne gibi sonuçlar doğuracağını tartışılmıştır.

**Gereç ve Yöntem:** Gülhane Bilimsel Araştırmalar Etik Kurulu onayı alındıktan sonra 1998 yılından beri düzenlenen kurslara ait katılımcı kayıtları incelenmiştir. Kayıtlar, anestezi personelinin toplam kişi sayısına göre ve yıllara göre dağılımını göstermektedir. Ülkemizdeki stajyerler, eğitmenler ve kurs direktörlerini dahil ederek toplam katılımcıları anestezi personeli ile karşılaştırdık. Bu toplamların dağılımı ve bu sayıların ne anlama gelebileceği araştırıldı.

**Bulgular:** İlk kursa 1998 yılında sadece bir anestezi uzmanı olarak katılmıştır. Anestezi uzmanı ve anestezi teknisyeni olarak en yüksek katılım sırasıyla 218 ve 276 olmak üzere 494 katılımcı ile 2010 yılında olmuştur. Kursun başlangıcından bu yana 75.256 kursiyerden 2392 anestezi uzmanı ve 3124 anestezi teknisyeni eğitim almıştır. Katılı ortalama yüzde 3,57'dir. 47 anestezi uzmanından 16'sı ve 11 anestezi teknisyeninden 7'si programlara eğitmen olarak aktif olarak katkıda bulunmaktadır. Kurs yöneticilerini sadece beş anestezi uzmanı ve iki teknisyen belirledi. Bu yöneticilerin tamamı programda aktiftir.

**Sonuç:** Eğitmen ve kurs yöneticisi sayısı ülke genelinde anestezi branşında çalışan toplam kişi sayısına göre görece düşüktür. Anestezi personeli yenidoğan resüsitasyonları için kritik öneme sahip olduğundan, anestezi personelinin katılımını artırmak yenidoğan ölüm ve hastalık oranlarını önemli ölçüde azaltabilir.

**Anahtar Kelimeler:** NRP, anesthesia, technician

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## INTRODUCTION

Neonates, especially preterm, are vulnerable to oxidative stress. Since their defense mechanisms against asphyxia are weak, they often need resuscitation with oxygen support during delivery.<sup>[1]</sup> Up to 10% of newborns (4-7 million/year) at birth require resuscitation assistance.<sup>[2,3]</sup> A study in the USA determined that 10% of 4 million babies born each year need various levels of resuscitation and 1% needs advanced resuscitation applications.<sup>[4]</sup> Congenital asphyxia is responsible for 19% of neonatal deaths worldwide yearly.<sup>[2]</sup> Even if death does not occur in asphyxia, it may have effects such as cognitive impairment, epilepsy, cerebral palsy, and other chronic diseases.<sup>[2]</sup>

Neonatal resuscitation can be very stressful due to inappropriate or insufficient heart rate and the color of the baby in the delivery room.<sup>[5]</sup> Recent studies, up to 10 years ago, show that young doctors are insufficient to provide ventilation with masks while standing at the head of babies and to simultaneously provide appropriate mobility of the chest wall.<sup>[5]</sup> It has also been observed that young doctors in this situation often do positive pressure breathing (PPV).<sup>[5]</sup> Despite ongoing studies and training, it is stated that there are significant difficulties in managing acute neonatal emergencies and especially intubation skills.<sup>[6]</sup> However, there is also a need for more literature that can provide information about the intubation of newborns.<sup>[6]</sup>

The Neonatal Resuscitation Program (NRP), which was initiated based on all these problems, was first established in 1987 by the American Academy of Pediatrics and the American Heart Association, many countries started the same program quickly.<sup>[7]</sup> More than 2 million healthcare professionals worldwide received this training in 2019.<sup>[7]</sup> The result significantly improved neonatal survival.<sup>[7]</sup> Worldwide neonatal deaths decreased from 2.9% to 0.9%.<sup>[8]</sup> For instance, the NRP examination conducted in Lithuania determined that the rate of perinatal asphyxia decreased significantly.<sup>[9]</sup> Hypoxic-ischemic encephalopathy also showed a 3-fold reduction.<sup>[9]</sup>

NRP is connected with disciplines such as anesthesiology, maternal-fetal medicine, and neonatology. It has the effect of providing communication with each other by acting as a bridge between multiple disciplines.<sup>[10]</sup> In the first period when anesthesiologists started to deal with newborns, topics such as anesthesia-related airway complications, maternal aspiration and aspiration pneumonitis were primarily emphasized.<sup>[10]</sup> In addition, more attention has been paid to the adverse effects of anesthesia on lactation, maternal fever, neonatal acid-base imbalance, and its impact on cognitive functions.<sup>[10]</sup> When the American Society of Anesthesiology (ASA) evaluated how anesthetists should approach the newborn, ASA decided "An anesthetist who takes care of the mother during birth should also be able to take care of the newborn after birth."<sup>[11]</sup> Although this decision was interpreted as the necessity of other health

professionals, such as neonatologists and pediatricians, to deal with the newborn first, ASA also stated that anesthetists may be involved in neonatal resuscitation in the first place and made it a priority for anesthesiologists.<sup>[11]</sup> However, in a study conducted in the USA, it has been shown that the experience of participating in neonatal resuscitations of anesthetists is less than 20%, which can be expressed by this definition.<sup>[11]</sup> It has been determined that current resuscitation practices are mostly unstructured procedures.<sup>[11]</sup> Moreover, it has been stated that most anesthetists performing these procedures are not resuscitation certified.<sup>[11]</sup>

There are few studies on NRP in Türkiye that did not consist of anesthesia. A survey conducted in Izmir examined whether pediatric residents could benefit from NRP applications.<sup>[12]</sup> This study stated that the mortality could increase from 0.5% to 4.5% in cases where the experienced neonatal resuscitation practitioner did not perform the procedure.<sup>[12]</sup> In the international literature, the situation of anesthetists and anesthesia technicians in NRP has been examined in a few articles. Our study aims to explain the importance of the subject by revealing the NRP participation and contributions of these anesthetists and anesthesia technicians in Türkiye.

## MATERIAL AND METHOD

After the approval of the Gulhane Scientific Research Ethics Committee dated 29.12.2020 and numbered 2020-516, the participant, trainers and course director data of the NRP, which has been organized regularly by the Ministry of Health since 1998, were examined. NRP organizations are carried out in our country under the responsibility of the Department of Child and Adolescent Health, General Directorate of Public Health of the Ministry of Health. It has been carried out regularly in all provinces of our country since 1998, and in some regions, this practice can be done once a month or even periodically once in 1-2 weeks. Who will be the participant is selected from the health branches in the delivery room according to the demand, that is, voluntarily. Since the administrative units of the hospitals are responsible for ensuring that at least 1 NRP-certified health personnel is present in each birth, they can make choices about the participant where necessary. However, since volunteering constitutes the majority of participation, participation rates are essential in terms of the interest shown in the subject.

The certificate period of the trainee who has received the certificate is limited to 5 years. The participation numbers of anesthetists and anesthesia technicians were examined in 4-year intervals. Since the data for 2022, which should be read in the last tranche, is not precise, the values are the sum of the three years. The results obtained are proportional to the total participation. In addition, we also examined the rate of trainers and course directors of the anesthetists and anesthesia technicians and whether they actively perform these duties.

**Data Availability Statement**

Data could be share if needed.

**RESULTS**

**Table 1** shows the number of anesthetists and anesthesia technicians who had attended the courses since 1998, when NRP courses started in Turkiye, in 4-year intervals. In addition, the total number of trainees and the percentage of anesthesia technicians according to these numbers are given in **Table 1**. According to this, it is seen that there is an increase in the participation of both anesthetists and anesthesia technicians in the other 4-year periods, except for the last tranche. Anesthesia technicians participated more than experts. In the last tranche, it was decided that the low was due to the pandemic process.

**Table 1: Number of Anesthetists and technicians compared to total NRP trainees.**

Years/NRP Trainee	Anesthetists	Technicians	Total Trainee	Anesthetist %	Technicians %
1998-2003	168	435	7357	2.28%	5.9%
2004-2008	533	805	15572	3.42%	5.16%
2009-2013	718	812	24006	2.99%	3.38%
2014-2018	657	701	25502	2.57%	2.74%
2019-2022	316	371	14346	2.20%	2.58%
Total	2392	3124	81600	2.93%	3.82%

The number of anesthetists and technicians authorized to participate in NRP activities as trainers and course directors is given in **Table 2**. It was also examined whether these people actively contributed despite their certification. The total number of trainers and course directors is also provided in **Table 2**. It is seen that anesthesiologists are authorized to take charge as trainers and course directors. However, according to experts, although the number of anesthesia technicians is very few, it is seen that all of them take an active role.

**Table 2: Registered numbers of Anesthetists and Technicians as trainer or director who are active or passive in NRP course programs.**

	Total	Active	Passive	Total anesthetists	Active in course	Passive	Total technicians	Active in charge	Passive
nRP Trainer	1101	554	547	47	16	31	11	7	4
Course Director	218	145	73	5	5		2	2	

**DISCUSSION**

Neonatal resuscitation is an inevitable practice that should be known by professional groups such as midwives, nurses, pediatrics, anesthesia, obstetrics, and gynecologists working in delivery rooms.<sup>[13]</sup> For this reason, anesthetists dealing with obstetrics can work in neonatal intensive care units and are also involved in NRP training.<sup>[14]</sup> It has been shown that 65% of obstetric anesthetists perform neonatal resuscitations.<sup>[14]</sup>

However, although it is known that anesthetists are active in practical applications, a study conducted in 2001 determined that only 16% of anesthesiologists and technicians were trained in NRP.<sup>[14]</sup> However, it has been stated that anesthetists are highly valuable practitioners in delivery and influential NRP group members in dire situations.<sup>[14]</sup> The data obtained from another study determined that the knowledge level of anesthetists was good in 2022. However, they could not act comfortably as practitioners.<sup>[14]</sup> It has been shown that the reason for this is that they do not practice regularly in newborns and, therefore, cannot reach practical comfort because they cannot increase their practice skills with their efforts.<sup>[14]</sup> Interrupted practice is a problem not only for anesthesia workers but also for other healthcare professionals. In a study conducted in India with the participation of 669 pediatricians, it was concluded that knowledge and skills should be followed continuously.<sup>[2]</sup> This study concluded that there is no uniformity in practice among pediatricians and that care is not taken.<sup>[2]</sup> Another study conducted in the USA revealed that NRP training and skill development were challenging to implement in real life. The learned information was used for 6-12 months.<sup>[4,8]</sup> It is stated that to benefit from NRP; it is necessary to apply what is learned routinely in the clinical process.<sup>[4]</sup>

Even though interventions for neonates are essential for the institution and anesthetists can do this best, active NRP training is necessary for appropriate information and application comfort.<sup>[14]</sup> However, another point that needs to be examined is that the training given to health workers who can be NRP practitioners is very different.<sup>[13]</sup> It is known that information about the quality of education of the participants is lacking.<sup>[13]</sup> However, few studies have evaluated this situation.<sup>[2,3,13]</sup> The most important reason for this is the unique difficulties of evaluating effective education.<sup>[4]</sup> Because such training sessions are held in multiple institutions at a time, also, there is no control group. However, it is possible to evaluate the training as pre- and post-education.<sup>[15]</sup> There are doubts in the studies that the NRP program gives the desired results.<sup>[15]</sup> Among the observed nonconformities were errors in self-efficacy, knowledge, and skills practices.<sup>[15]</sup> The generally accepted situation is that NRP knowledge and skills are limited.<sup>[4]</sup> A study determined that the information developed after the NRP course could have been used more effectively.<sup>[13]</sup> In addition, it was understood from the training that pediatricians, anesthetists, and obstetricians showed the most improvement.<sup>[13]</sup> It was even stated that it would be better for NRP practitioners, including anesthetists, to take NRP courses before their specialization, mainly due to their practical contributions.<sup>[8]</sup> In an event evaluation conducted at the University of Padova, Italy, in 2005, the efficiency of the NRP course was examined according to the knowledge and satisfaction levels of the participants.<sup>[3]</sup> In this study, it has been stated that the effect of the training done for up to 6 months.<sup>[3]</sup> It has been noted that this finding is consistent with the result in other studies.<sup>[3]</sup> Our study was not aimed at evaluating the quality of education, but the main reason is that it is tough to make a nutritional assessment, as stated above.

## CONCLUSION

For a successful neonatal resuscitation, there is a need for a defined leader who knows the procedures to be done, can communicate effectively, can enable the team to work together, and is defined. A group of healthcare professionals in a position to lead is those who work on obstetric anesthesia. Such training is valuable in terms of strengthening clinical decision-making mechanisms. It will increase skills, decrease medical errors, increase the self-confidence of the team leader and strengthen teamwork. It can also help with overlooked and hidden problems, for example, locating necessary material. In our country, anesthesia staff seems to be performing their best as trainees, but it is evident that trainers and directors among anesthesia staff are less which means that they must be more motivated in taking part in NRP courses.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** The study protocol was approved by the Gülhane Scientific Research Ethics Committee (Date: 29.12.2020, Decision No: 2020-516)

**Informed Consent:** Because the study was designed retrospectively, no written informed consent form was obtained from patients.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

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## REFERENCES

1. Kapadia VS, La CV, Kakkilaya V, et al. Impact of the Neonatal Resuscitation Program-Recommended Low Oxygen Strategy on Outcomes of Infants Born Preterm. *J Pediatr* 2017;191:35-41.
2. Bansal SC, Nimbalkar AS, Patel DV, et al. Current Neonatal Resuscitation Practices among Paediatricians in Gujarat, India. *Int J Pediatr* 2014;676374:7
3. Trevisanuto D, Ferrarese P, Cavicchioli P, et al. Knowledge gained by pediatric residents after neonatal resuscitation program courses. *Pediatr Anesth* 2005;15:944-7.
4. Surcouf JW, Chauvin SW, Ferry J, et al. Enhancing residents' neonatal resuscitation competency through unannounced simulation-based training. *Med Edu Online* 2013;18:18726.
5. Poulton DA, Schmölzer GM, Morley CJ, et al. Assessment of chest rise during mask ventilation of preterm infants in the delivery room. *Resuscitation* 2011;82:175-9.
6. Bismilla Z, Finan E, McNamara PJ, et al. Failure of pediatric and neonatal trainees to meet Canadian Neonatal Resuscitation Program standards for neonatal intubation. *J Perinat* 2010;30:182-7.
7. Khoo EJ, Chua SH, Kutzsche S. Applying educational theories into planning a psychomotor learning activity: An undergraduate Neonatal Resuscitation Program experience. *Arch Argent Pediatr* 2019;117(2):181-7
8. Tezel B, İlhan M, Günay I et al. Neonatal resuscitation program provider courses in Turkey. *J Dr Behcet Uz Child Hosp* 2015;5(2):101-8.
9. Ribeliene J, Kudreviciene A, Kregzdiene R et al. National neonatal resuscitation training program in Lithuania (2003-2013). *Abstracts / Resuscitation* 96S 2015;43:157.
10. Lim G , Facco FL, Nathan N, et al. A Review of the Impact of Obstetric Anesthesia on Maternal and Neonatal Outcomes. *Anesthesiology*. 2018;129(1):192-215.
11. Gaiser R, Lewin SB, Cheek TG, et al. Anesthesiologists' Interest in Neonatal Resuscitation Certification. *J Clin Anesth* 2001;13:374-6.
12. Gunay I, Agin H, Devrim I, et al. Resuscitation skills of pediatric residents and effects of Neonatal Resuscitation Program training. *Pediatr Int* 2013;55:477-80.
13. Doglioni N, Micaglio M, Zanardo V. Efficacy of the neonatal resuscitation program (NRP) course on knowledge retained by residents: Comparison among pediatrics, anesthesia and gynecology. *Resuscitation* 2010;81:1741-2.
14. Drzymalski DM, Gao W, Moss DR, et al. Factors associated with neonatal resuscitation knowledge and comfort across academic anesthesia institutions. *J Matern Fetal Neo M* 2020;35:20, 3891-7.
15. Singhal N, Lockyer J, Fidler H et al. Helping Babies Breathe: Global neonatal resuscitation program development and formative educational evaluation. *Resuscitation* 2012;83:90-6.