

Impact of Video-recorded Debriefing and Neonatal Resuscitation Program Workshops on Short-term Outcomes and Quality of Neonatal Resuscitation

Mohammad Heydarzadeh¹, Akram Mousavi^{2*}, Salimeh Azizi³, Andishe Hamedi², Seyede Sara Alavi⁴

1. Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

2. Faculty Member of Nursing Department, Shirvan Center of Higher Health Education, Imam Khomeini Hospital, North Khorasan University of Medical Sciences, Bojnurd, Iran

3. Faculty Member of Nursing Department, Shirvan Center of Higher Health Education, North Khorasan University of Medical Sciences, Bojnurd, Iran

4. Ommolbanin Hospital, Mashhad, Iran

ABSTRACT

Background: The goal of neonatal resuscitation is to prevent death and further complications, reestablish spontaneous respiration, and achieve sufficient cardiac output. Inappropriate or wrong resuscitation will result in the death of neonates or long-term side effects. The present study was performed to compare the effects of video-recorded debriefing and neonatal resuscitation program (NRP) workshops on the short-term outcomes and quality of neonatal resuscitation.

Methods: In this semi-experimental study with three groups, 90 cases of neonatal resuscitation were videotaped at the delivery and operating rooms of Omolbanin Hospital of Mashhad, Iran. This research was conducted within three periods. In the first stage, 30 resuscitation cases were recorded as the control group. In the second stage, all the members of the resuscitation teams participated in the training workshops, and in the third stage, they participated in the debriefing sessions. The data were analyzed by the Chi-square and one-way analysis of variance using SPSS software (version 16).

Results: The results of this study showed that the debriefing method significantly improved short-term outcomes, such as the length of pulse improvement, and time to breathe spontaneously, returning duration of neonate's color to the natural state, and resuscitation quality ($P < 0.001$). Also, the mean of Apgar scores in 1, 5, and 10 min increased in the debriefing group, compared to those reported for other groups; however, these changes were not statistically significant.

Conclusion: According to the results of this study, despite the fact that educational workshops were held, new methods, such as debriefing, play an important role in improving the knowledge and skills of people who are involved in the resuscitation of newborns.

Keywords: Debriefing, Neonatal resuscitation, NRP workshop, Short-term consequences of resuscitation, Video recording

Introduction

Immediately after birth, significant physiological changes are needed to convert the bloodstream from embryonic to infancy and onset of respiration. Nearly 90% of newborn babies have had this course without any problems, and only 10% of the cases require some degree of help to start breathing (1, 2). Failure to resuscitation or

incorrect resuscitation results in the death of a baby or irreversible complications for life (3). Such studies conducted on term neonates showed that metabolic disorders and respiratory problems increased in infants who received cardiopulmonary resuscitation in the delivery room. These findings indicated a defect in the

* Corresponding author: Akram Mousavi, Shirvan Center of Higher Health Education, North Khorasan University of Medical Sciences, Bojnurd, Iran. Tel: +989151522801; Fax: +985836226623; Email: mousavi_nu50@yahoo.com

Please cite this paper as:

Heydarzadeh M, Mousavi A, Azizi S, Hamedi A, Alavi SS. Impact of Video-recorded Debriefing and Neonatal Resuscitation Program Workshops on Short-term Outcomes and Quality of Neonatal Resuscitation. Iranian Journal of Neonatology. 2020 Jun; 11(2). DOI: [10.22038/ijn.2020.40999.1673](https://doi.org/10.22038/ijn.2020.40999.1673)

process of the resuscitation of newborn babies in the delivery room (4).

According to the World Health Organization, in most cases, the resuscitation of babies has not started or used methods are inadequate or incorrect. This is especially true in developing countries (5). Finer et al. reported that despite the presence of experienced and trained staff in the resuscitation program, many mistakes occurred that are preventable and not recorded in any cases (6). In a survey conducted in Zimbabwe, nurses were using methods completely wrong for respiratory stimulation when they were resuscitated (7).

Obviously, the newborn care which was provided in the first few days after birth will play an important role in reducing mortality and pathogenicity (8). For these reasons, all groups who are involved in childbirth, including physicians, midwives, and nurses, should have the necessary knowledge and skills for resuscitation (3, 9). Many institutions and hospitals use baby resuscitation programs to educate and improve the quality of the resuscitation of newborns. The interventions that improve the workgroup quality and reduce the deviation from the neonatal resuscitation program (NRP) have a significant impact on the quality of care (10).

The sixth edition of the Neonatal Rehabilitation Program (2011 NRP) emphasizes debriefing (11). Debriefing sessions provide learners with feedback about their behavior during recovery, and watching videos recorded from the performance of individuals is a very useful strategy that allows learners to evaluate their behavior and performance (11, 12). These interventions have a significant impact on the improvement of the workgroup and quality of the newborn resuscitation (13, 14). As no research has been carried out so far to compare the current method of instructing neonatal resuscitation with debriefing method in our country, the researchers decided to conduct a study in order to compare the effect of video-recorded debriefing method and education workshop on the short-term consequences of resuscitation and neonatal resuscitation quality.

Methods

This semi-experimental nonrandomized study was conducted on 90 cases of neonatal resuscitation in the Ommolbabnin Hospital of Mashhad University of Medical Sciences in Mashhad, Iran, within 2014 to 2015. This study was conducted within three periods before the

NRP workshop, after the workshop, and after neonatal resuscitation debriefing sessions. The inclusion criteria were defined as those resuscitations carried out right after delivery in the delivery unit or operation rooms of hospitals, resuscitations conducted by the members of the neonatal resuscitation team, and those resuscitations by the members of the resuscitation team who agreed to take part in the study.

The resuscitations by those who were not the members of the neonatal resuscitation team, resuscitations by those members of the resuscitation team who were not attending debriefing sessions, and resuscitations by those members of the resuscitation team who were not attending the education workshop were excluded from our study. In order to collect data, four cameras were installed on all resuscitation beds of operation and matrimony rooms of hospitals on the cap of radiant warmers. These cameras were used to film all cases of neonatal resuscitation.

First step: Process of resuscitation before neonatal resuscitation program workshop

In this step and all other steps of video recording, 30 cases of neonatal resuscitation were used to observe and assess the quality of resuscitations. The status of these resuscitations was measured using the checklists of neonatal resuscitation skills. This checklist included 9 variables, including the quality of resuscitation based on performance, quality of performance based on the preparation and initial steps of resuscitation, used method to control heartbeat, oxygen prescription, noninvasive positive pressure ventilation, method of insertion of endotracheal tube, bag and tube ventilation, what finally happened to the neonate after birth, and overall quality of resuscitation.

Each step was assigned a score after watching the movie. Two scores were assigned to correct decision-making and correct accomplishment of the task, one score was assigned to faulty or delayed performance, and zero score was assigned to a task not undertaken or poorly accomplished. The total score was then divided to the maximum possible score where the resulting score indicated the quality of resuscitation.

Second step: Process of resuscitation after neonatal resuscitation program workshop

All the members of resuscitation teams participating in the first step, including doctors, midwives, and operation room nurses, underwent

training based upon the workshop on briefing simulation and debriefing method which was described in the instruction manual of NRP 2011 (11). Every workshop was just facilitated for four trainees, and all of the workshops were held by only one neonatologist who had national certification for NRP instruction. Several NRP workshops were held for 2 months for all participants. Then, the second round of video recording of 30 the neonates was conducted.

Third step: Process of resuscitation after debriefing sessions

In the third step, debriefing sessions designed in accordance with the NRP instruction manual 2011 were held for all the members of the resuscitation team. In this step, all the resuscitations recorded during the second step were displayed one by one. In the reaction phase, the members of the team were asked about their idea of the resuscitation process, and they were allowed to express their opinions. In the analysis phase, the recorded resuscitation was displayed, all the phases of resuscitation were reviewed and discussed, and the participants were provided with feedback on their performance.

The sessions were finished by summing up positive points and reviewing debriefing problems. Then, the third round of video recording commenced in order to evaluate the effect of the intervention and quality of these resuscitations. The short-term outcomes, such as the time of pulse improvement, time to breathe spontaneously, returning duration of newborn's color to the natural state, Apgar scores in 1 and 5 min, and duration of resuscitation, were evaluated. The data were analyzed by the Chi-square test and one-way analysis of variance using SPSS software (version 16).

The sampling process began after the study was confirmed by the Ethics committee of Mashhad University of Medical Sciences. Before the meetings, an informed consent form for displaying the video records of resuscitation team members during infant resuscitation was given to people. The necessary information was given about the study, as well as its purpose and importance. Since the identity of the resuscitated infant in the recorded video is unclear, there was no need for parental permission. The videos were deleted after viewing.

Results

In this study, 55 (61.1%) and 35 (38.9%) cases of the restored neonates were male and female, respectively. In addition, 67 (74.4%) neonates were born by natural delivery, and 23 (25.6%) neonates were born by cesarean section. The amniotic fluid color was clear in 84 (93.3%) cases and in 6 cases (7.7% 6%) was impregnated with meconium. Also, 22 (24.4%) of the resuscitations included the resuscitation of premature infants, and 68 (75.6%) cases included newborn resuscitation. In the present study, there was no significant difference between the three groups in terms of underlying variables. The comparison of the three groups in terms of the underlying variables is shown in Table 1.

Also, in the present study, the mean of Apgar scores in 1, 5, and 10 min increased in the debriefing group, compared to those reported for the workshop and control groups. In addition, the mean of resuscitation times reduced, but these changes were not statistically significant. However, the present diagnostic method significantly improved the short-term outcomes, such as the duration of respiration, duration of pulse enhancement, and returning duration of the

Table 1. Comparison of three groups in terms of underlying variables

Variables		Debriefing group (mean±standard deviation)	NRP workshop group (mean±standard deviation)	Control group (mean±standard deviation)	P-value
Birth weight (g)		3109±880.7	3035.33±1018.3	2843.33±958.6	0.54
Gestational age (day)		38±3.3	37.2±4.6	36.4±4.7	0.38
Frequency (%)					
Gender	Male	20 (66.7)	17 (56.7)	18 (60)	0.72
	Female	10 (33.3)	13 (43.3)	12 (0)	
Type of delivery	Normal	23 (76.7)	21 (70)	23 (76.7)	0.79
	Cesarean section	7 (23.3)	9 (30)	7 (23.3)	
Amniotic fluid color	Clear	29 (96.7)	26 (86.7)	29 (96.7)	0.22
	Impregnated with meconium	1 (3.3)	4 (13.3)	1 (3.3)	

* Significance level: 0.05

NRP: Neonatal resuscitation program

Table 2. Short-term outcomes and quality of neonatal resuscitation of three groups

Variables	Debriefing group (mean±standard deviation)	NRP workshop group (mean±standard deviation)	Control group (mean±standard deviation)	P-value
Apgar 1 (min)	3.81±1.9	2.81±1.8	3.31±1.6	0.12
Apgar 5 (min)	8.21±1.6	7.32±2.7	7.91±1.9	0.29
Apgar 10 (min)	9.14±1.3	8.29±1.8	8.89±1.2	0.18
Resuscitation times	4±2.9	6.1±4.8	5.4±3.3	0.09
Duration of breathing (min)	80.7±42.2	169.8±136.1	105±61.2	0.001
Pulse improvement (min)	77.5±45	132.3±90.2	93.2±64.4	0.01
Returning duration of neonate's color to normal state	144.8±88.6	256.6±178.5	232.3±128.1	0.004
Resuscitation quality	40.9±12.1	19.6±11.7	14.3±9.9	<0.001

* Significance level: 0.05

NRP: Neonatal resuscitation program

neonate's color to the normal state ($P < 0.05$). The aforementioned items are shown in Table 2.

The results of the Tukey's post hoc test showed that there was a significant difference in the duration of respiration in the comparison between the groups. There was a significant difference between the mean duration of respiration between the debriefing and NRP workshop groups ($P=0.001$), as well as between the workshop and control groups ($P=0.01$). However, there was no significant relationship between the two debriefing and control groups in this regard ($P=0.54$).

The results also showed that there was a significant difference between the three groups in terms of the duration of pulse improvement. The results of Tukey's post hoc test showed that there was a significant difference between the debriefing and workshop groups; however, there was no difference between the debriefing and control groups, as well as between the workshop and control groups.

The results of Tukey's post hoc test showed that there was a significant difference between the groups in terms of returning duration of the neonate's color to the normal state. There was a significant relationship between the two debriefing and workshop groups ($P=0.005$), as well as between the debriefing and control groups ($P=0.03$). Nevertheless, there was no significant difference between the workshop and the control groups in this regard ($P=0.74$). The results showed that the debriefing, unlike the workshop, significantly reduced the returning duration of the neonate's color to the normal state.

Also, the results of Tukey's post hoc test showed that there was a significant difference in the resuscitation quality between the groups. There was a significant relationship between the debriefing and workshop groups ($P < 0.001$), as well as between the debriefing and control groups ($P < 0.001$). However, there was no significant

difference between the workshop and control groups in this regard ($P=0.17$).

Discussion

The present study indicated a statistically significant difference between the groups in terms of resuscitation quality. Also, the video-recorded debriefing method helps significantly reduce the consequences of neonatal resuscitation, such as the length of pulse improvement, spontaneous breathing, and returning duration of neonate's color to the normal state. In this study, there was no significant difference between the mean of Apgar scores in 1, 5, and 10 min among the three groups ($P < 0.05$). Although the mean of Apgar scores in 1, 5, and 10 min was higher in the debriefing group than those reported for other groups, this increase was not statistically significant.

The results of a study conducted by Patel et al. (15) showed that the NRP training courses reduced the percentage of newborns with a low Apgar score in the first minute (less than 7). Also, in high-risk newborns with a low Apgar score in the first minute, the fifth-minute Apgar score increased after training. In fact, a study performed by Patel et al. proved that the NRP training course has dramatically increased the Apgar score. Patel et al. demonstrated in similar studies that NRP training courses promote the Apgar score in infants with low birth weight. Also, after training, 81% of infants with a low Apgar score in the first minute had a higher increase in the fifth minute Apgar score, which is in contrast with the results of our study (16).

The results of a study carried out by Duran et al. in Turkey showed that after the second training period, the number of newborns with asphyxia and length of hospitalization significantly decreased, and Apgar scores significantly increased in the first minute, compared to Apgar scores in the pretraining stage (17). Also, the Apgar score

increased in the fifth minute, but this increase was not statistically significant. The results of the above-mentioned studies are in agreement with the findings of the present study regarding the effect of the intervention on the Apgar scores but different in terms of the intervention type.

The individuals who participated in debriefing sessions, observing their recorded performance and others' during the resuscitation of the infant, which could lead to improved measures taken during the resuscitation of the infant and consequently increase the Apgar score in the resuscitation of debriefing group, compared to other groups in this study. So the researcher in this study used the observed Apgar score to examine the effect of interventions and response to resuscitation, which could be a sign of the contradiction between the results of this study and findings of other studies (8, 12).

In the present study, the mean of resuscitation times was different in three groups, which was lower in the debriefing group and higher in the workshop group, but these results were not statistically significant. Many factors can have an effect on resuscitation times, such as the complexity of resuscitation, taken actions during the resuscitation, such as long and deep suction, excessive and aggressive stimulation, and delay in conditioning, especially during the resuscitation of the control and workshop groups, that caused the lack of the response of the neonate to the resuscitation and its prolonged process. However, debriefing sessions with the screening of the recorded resuscitation could diminish the unnecessary actions of the resuscitation period, and this change was not statistically significant.

A review of the results leads us to conclude that video-recorded debriefing can improve the quality of resuscitation performance in a more favorable way, compared to other methods. Debriefing is a team-based phenomenon that seeks to bring about discussion among group members. In this method, team members analyze themselves as independent entities (18). Debriefing is rooted in the experimental learning theory of Kelb (19). This theory is in line with the results of the current study. According to this theory, taking part in a simulated or real experience can arouse different feelings in participants (20, 21). Several studies with similar goals had been conducted so far.

For instance, the results of a study carried out by Nadler et al. showed that observing the recorded film of neonatal resuscitation in debriefing sessions had no major influence on the

performance of employees and their obedience to guidelines; however, it can significantly improve team performance (11). The results of the present study are in line with the findings of a study conducted by Nadler et al. in terms of improving team performance quality in resuscitating neonates through video-recorded debriefing; however, these results are not in line with the findings of a study conducted by Taylor et al. in terms of improving the total quality of neonatal resuscitation (22).

It was shown that debriefing through video recording had no advantage to debriefing without it, and this study failed to show the educational influence of debriefing through videos. The results of a study conducted by Taylor et al. are in line with the findings of the present study in terms of the structure of debriefing sessions using video recording, but it revealed different results. This is probably due to the different method used for designing and conducting it in a simulated environment (not a real one) on a small sample size.

In this study, the video-debriefing method helps significantly reduce the consequences of neonatal resuscitation. The improvement of each of these factors enhances resuscitation quality. However, we did not find a study that was conducted on the outcomes, such as pulse improvement, spontaneous breathing, and returning duration of neonate's color to the normal state, and compared them on debriefing or workshop group that is the strength of our study.

Debriefing sessions with video recording of the performance during the resuscitation due to providing feedback and training opportunities can lead to the improved performance of the resuscitation team and quality of the baby recovery. It can also be used as a new and effective way to identify the weaknesses of medical staff performance not only in the field of resuscitation but also in other fields. It is recommended to carry out future studies over a longer period to investigate the effect of advanced resuscitation.

Conclusion

The results of this study showed that debriefing improves some of the short-term effects of neonatal resuscitation. Although this effect was not significant on some variables, such as the Apgar scores of 1, 5, and 10 min, and resuscitation times, it needs to be more explored and studied. The results of the present study showed that although there were several educational workshops on the NRP, the revisions

had a great deviation from the resuscitation guidelines of the newborn. Therefore, in line with the recent recommendations of the NRP 2011 in the use of modern methods, such as debriefing on neonatal resuscitation, this study was able to use this new educational strategy. This educational method plays an important role in improving the knowledge and skills of people who are involved in the resuscitation of the newborn baby.

Acknowledgments

We are grateful to the medical, nursing, and midwifery staff of Omolbanin Hospital of Mashhad for their support and patience.

Conflicts of interest

None of the authors declare any conflicts of interest.

References

- Mousavi A, Behnam Vashani H, Heydarzadeh M, Malekzadeh J. Comparison of the effects of video-assisted debriefing and educational workshops on the quality of neonatal resuscitation. *Evid Based Care*. 2015; 5(3):29-38.
- Kattwinkel J, Perlman JM, Aziz K, Colby C, Fairchild K, Gallagher J, et al. Part 15: neonatal resuscitation: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*. 2010; 122(18 Suppl 3):S909-19.
- Bijari BB, Niknafs P, Alavi SA. The role of education methods, on knowledge and skills of neonatal resuscitation in nursing students. *Iran J Pediatr*. 2006; 16(4):467-75.
- Frazier MD, Werthammer J. Post-resuscitation complications in term neonates. *J Perinatol*. 2007; 27(2):82-4.
- Carlo WA, Wright LL, Chomba E, McClure EM, Carlo ME, Bann CM, et al. Educational impact of the neonatal resuscitation program in low-risk delivery centers in a developing country. *J Pediatr*. 2009; 154(4):504-8.e5.
- Finer NN, Rich W. Neonatal resuscitation: toward improved performance. *Resuscitation*. 2002; 53(1):47-51.
- Kambarami R, Chirenje M, Rusakaniko S. Perinatal practices in two rural districts of Zimbabwe: a community perspective. *Cent Afr J Med*. 2000; 46(4):96-100.
- Duran R, Aladağ N, Vatanserver Ü, Süt N, Acunaş B. The impact of neonatal resuscitation program courses on mortality and morbidity of newborn infants with perinatal asphyxia. *Brain Dev*. 2008; 30(1):43-6.
- Niknafs N, Niknafs P, Bahman-Bijari B. Effective factors on maintaining neonatal resuscitation skills among the nurses and midwives in kerman province hospitals. *Strid Dev Med Educ*. 2009; 6(1):66-73.
- Thomas EJ, Williams AL, Reichman EF, Lasky RE, Crandell S, Taggart WR. Team training in the neonatal resuscitation program for interns: teamwork and quality of resuscitations. *Pediatrics*. 2010; 125(3):539-46.
- Nadler I, Sanderson PM, Van Dyken CR, Davis PG, Liley HG. Presenting video recordings of newborn resuscitations in debriefings for teamwork training. *BMJ Qual Saf*. 2011; 20(2):163-9.
- Schilleman K, Siew ML, Lopriore E, Morley CJ, Walther FJ, Te Pas AB. Auditing resuscitation of preterm infants at birth by recording video and physiological parameters. *Resuscitation*. 2012; 83(9):1135-9.
- Carbine DN, Finer NN, Knodel E, Rich W. Video recording as a means of evaluating neonatal resuscitation performance. *Pediatrics*. 2000; 106(4):654-8.
- Gelbart B, Hiscock R, Barfield C. Assessment of neonatal resuscitation performance using video recording in a perinatal centre. *J Paediatr Child Health*. 2010; 46(7-8):378-83.
- 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.
- 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.
- Duran R, Görker I, Küçükğürloğlu Y, Aladağ Çiftdemir N, Özbek ÜV, Acunaş B. Effect of neonatal resuscitation courses on long-term neurodevelopmental outcomes of newborn infants with perinatal asphyxia. *Pediatr Int*. 2012; 54(1):56-9.
- Zaichkin J, Weiner GM. Neonatal resuscitation program (NRP) 2011: new science, new strategies. *Neonatal Netw*. 2011; 30(1):5-13.
- Gardner R. Introduction to debriefing. *Sem Perinatol*. 2013; 37(3):166-74.
- Kaufman DM. Applying educational theory in practice. *BMJ*. 2003; 326(7382):213-6.
- Rudolph JW, Taylor SS, Foldy EG. Collaborative off-line reflection: a way to develop skill in action science and action inquiry. California: Sage Publications; 2006.
- Taylor K, Mayell A, VanDenberg S, Blanchard N, Parshuram CS. Prevalence and indications for video recording in the health care setting in North American and British paediatric hospitals. *Paediatr Child Health*. 2011; 16(7):e57-60.