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Studying High risk newborn intra-hospital transport in Neonatal Intensive Care Unit (NICU)

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ABSTRACT

Aims: Newborns, who are hospitalized, may need transfer due to different reasons that may happen in inter or intra-hospital form, but what should be noted in transferring a newborn is stabilization of the infant's situation transportationbefore transport and maintaining stability during transportationtransport. So this study had been designed and performed with the aim of "determining intra-hospital neonatal transportation situation".

Methods: In this cross-sectional study, which had been done in selected hospitals of Tehran University of Medical Sciences in 2013, totally 52 intra-hospital neonatal transport transportation had been assessed by using equipment standard checklist of the least transportation, transport team, the questionnaire of the newborn condition and the checklist of performing newborn's stabilization program. Data were analyzed by using SPSS 19 software and descriptive statistic.

Results: Most of the transportations had been done by one single person and by specialist nurses, Most nurses had mean age of 20-29 years old (46.6%) and they were female (72.6%).They had the experience of working ionic (71%). Most of them had not passed the neonatal resuscitation courses, or it was more than six months since their last passed course (61.2%). the majority of the transportations had been done without monitoring blood oxygen (56.6%). There wasn't enough necessary equipment and drugs with the newborn during transportation in most of the transportations (71.8%).

Conclusion: neonatal Intra-hospital transportationtransportation is far from the international standard. Considering these conditions, it is expected that authorities of nursing continue education to hold training and skill courses of newborn's Transportation and highlight the part of emotional support in educational programs. Also paying attention to use special incubators and having necessary equipment and drugs needed for transportationtransportation are essential.

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1. Introduction

A newborn, who is hospitalized, may need transportingdue to different reasons that this transportation can be done in inter or intra-

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hospital form, but what should be noted in transportation of newborn is that the time and the correct method of preparation influence its transportation more than clinical needs [1]. There are several problems in transportation of newbornsbut the evidences indicate specialized centers can improve taking care of the patients in dangerous conditions and also their outcomes by using level models [2], and by their safe transportation to a level 3 intensive care unit by a team that has passed specialized courses can cause improvement of survival rate and also decrease of inappropriate events during their transportation [3].

However, high percentage of the newborns that are referred, without paying attention to their initial clinical situation, their clinical situation deteriorates during transportation and it causes increase of death in these newborns [4].

There are several problems related to intra-hospital transportation of critically ill newborns that these problems are in relationship with patients' demographic features and also its transportation conditions. In a way that it causes increase of clinical complications risk of the newborn that is a reflection of need to special guides for this kind of transportation, appropriate equipment, controlling equipment, expert staff and also patient's permanent monitoring for preventing or decreasing complications in the patient [5].

However, recent studies showed that despite being an expert transportation team and modernity of their equipment, physical stressors that newborns are exposed to them during transportation is worrying and although assessing stress during transportation is a very appropriate work, it needs deeper understanding of pathophysiologic effects of transportation on the newborns and regarding this , efforts should be done permanently, in a way that decrease of physical stressors lead to a safe transportation of the newborn [6].

Actually transportation along with equipment and increase of monitoring during transportation lead to increase of interventions, which can potentially influence patient's outcomes and it indicates that, studies in the future should be designed in a way that equipment optimization, clinical protocols, procedures and interventions are assessed and evaluated in those studies and their aims should be improvement of patient's clinical and functional outcomes[7] , in this regard, education of transportation team for prevention, diagnosis and intervention for alleviating adverse consequences is necessary that one educated transportation team, can provide a safe transport for the newborn and one of the aims of such team should be choosing an appropriate equipment for naonatal transportation and relocation in a way that by maintaining a permanent care; heat, physiologic and evolutionary stresses are decreased and in order to achieve this aim , Radiant Warmer combination and incubator and also other peripherals like chemical blankets can be used[8].

Recent studies showed that safety culture in sick child has developed to the extent that pediatrics epidemiology is stronger and with less problems and we are seeing a deep understanding of safe culture content that is a clear guide for achieving success in this regard.

However, a laboriously effort is necessary in order to induce this content to all the bedside staff and causes special attention to education of the people in bedside in order to consider observing safety culture among their daily work [9] to the extent that neonatal transportation, which is well-established is the aim of all the transportation teams and it is achievable through providing holistic care that is timely, appropriate and based on an organized program, a program that in addition to considering newborn's safety, provides its fast evaluation for transportation team. One of these programs is S.T.A.B.L.E. that has been designed for organizing information related to newborn's stabilization and also improving its safety.

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S.T.A.B.L.E. is the most widely distributed and implemented neonatal education program to focus exclusively on the post-resuscitation/pre-transport stabilization care of sick newborns. Based on a mnemonic to optimize learning, retention and recall of information, S.T.A.B.L.E. stands for six assessment and care. This early transitional care affects not only the newborn's immediate health, but the long-term outcome as well. Education in stabilization beyond resuscitation is critical to the mission of reducing newborn mortality and morbidity.

S.T.A.B.L.E. stands for the 6 assessment parameters covered in the program: Sugar, Temperature, Airway, Blood pressure, Lab work, and Emotional support for the family.

The design of this program is for all Healthcare Providers whose practice setting involves exposure to newborns, other than NICU providers [10].

Considering that, there is no study about intra-hospital transportation of the hospitalized newborns in ICU in Iran, and also there is no systematic and designed program for intra-hospital transportation and also the importance of newborn's safe transportation, the present study had been done with the aim of determining the situation of high risk neonatal intra-hospital transport

2. Method

This cross-sectional study had been done simultaneously in three hospitals of Tehran university of Medical Sciences. hospitals that have level 3 N ICU, after approving the plan in University research deputy and achieving ethics committee approval.

All the intra-hospital transportation cases of the newborns hospitalized in NICU that needed intra-hospital transportation in 2013 included in the study. Vital signs, pain status, relaxation techniques, general appearance, ventilation and nutritional status of the newborn had been documented immediately before its exclusion from the unit. Respiratory rate had been documented and measured by a nurse for one minute. Temperature had been measured and documented by a thermometer, which is under newborn's armpits for three minutes, heartbeat and percentage of oxygen saturation had been measured by using pulse- oximetry machine and blood pressure had been measured by using central monitor and also pain had been measured by using Neonatal Infant Pain Scale (NIPS) and also the way of performing S.T.A.B.L.E had been observed and documented at the time of newborn's transport by the members of transportation team.

In this study three checklist had been used that includes; features of the newborn, features of transportation team and the equipment and features of the least of the drugs and suggested equipment for transportation. For determining validity, professors' views and for determining reliability of the checklists simultaneous observation had been used.

All these checklists were completed exactly before beginning of the newborn's transportation by the help of coresearcher. In this study three assist-researchers helped in completing checklists. Before collecting data, researcher taught the correct way of completing checklists to colleague them.

In addition to that, in this study, before completing checklists, written and informed consent had been taken from the transporters. Data were analyzed by descriptive statistic and the SPSS19 software.

3. Results

In 2013, 52 intra-hospital transportations had been done from 6 a.m. to 19 p.m. the average age of the transported newborns was 5.91±6.02 days with the average weight of 29333±892. 69.8 of the newborns were girl and the most reason of transportation had been for surgery and then for brain MRI and solography.

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Table 1: frequency distribution of the transferor team characteristics in the selected hospitals of Tehran Medical Sciences University in 2013

Statistic Features			Frequency	Percent
Number of the people	One person		42	80.4
	Two persons		10	19.6
Age	20-29		29	46.8
	30-39		28	45.2
	Higher than 39		5	8
Gender	Female		45	72.6
	Male		17	27.4
History of work in NICU	Has		44	71
	Doesn't have		18	29
Passing infant's resuscitation period	Yes	Less than 6 months	23	37.1
		More than 6 months	11	17.7
	No		27	43.5
Education	Diploma		17	27.4
	B.A		40	65
	intern		5	8.1
transportation time	6-12		32	58.2
	13-19		20	41.8

Table 1 shows that most of the transportations has been done by one person and it has not been done by the expert nurses, most of these people were in the age range of 20-29 years old and they were females with the experience of working in ICU.

Most of them did not pass newborn's resuscitation course or it was more than six months since their last course.

Table 2 shows that most of the transportation had been done without blood oxygen monitoring. In most of the cases Ambo beg and oxygen were with the newborn and only 34% of the newborns had full coverage.

In most of the transportations necessary and enough equipment and drugs were not with newborn during transportation.

4. Discussions

Results of the present study showed that in most of the cases, newborns are transported into the hospital with an expert nurse.

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Table 2: frequency distribution of the equipment and drugs that are with the newborn during transportation from the selected hospitals of Tehran Medical Sciences University in 2013

Statistic / Features		frequency	percent
Pulse oximetry	Has	23	43.4
	Doesn't have	30	56.6
Ambo beg	Has	39	73.6
	Doesn't have	14	26.4
Oxygen	Has	35	66
	Doesn't have	18	34
Portable ventilator	Has	1	1.6
	Doesn't have	52	98.4
newborn's coverage	Without coverage	3	5.7
	Blanket	11	17.7
	Clothe and blanket	20	37.7
	Hat, clothe and blanket	18	34
Standard transportation drugs	Less than 25%	22	41.5
	Between 25 and 50 %	20	37.7
	Between 50 to 75%	11	20.8
Standard transportation equipment	Less than 25%	38	71.8
	Between 25 to 50%	10	18.9
	Between 50 to 75%	5	9.4

While, according to intra-hospital transportation clinical guide, it is strongly recommended that at least two people should accompany the patient that one of them should be an experienced nurse in taking care of critically ill patient , who passed special resuscitation course [11,12], Also Fentone and Leslie believe that transportation team lineup depends on several and interlocking factors, but it is necessary that member of the team have enough and update knowledge in taking care of the newborn during transportation [13].

While, in the present study most of the people did not pass newborn's resuscitation course or it was more than six months since their last course. While, researchers state that; since nurses are encountered with unique challenges, they should see special trainings and skill courses regarding this issue, also because they have to take decision in critical conditions, they have to have strong critical thinking skill [14].

Another strict recommendation of intra-hospital transportation clinical guide is based on this issue that the second person of the team should be a physician familiar with intensive care and cardiopulmonary resuscitation (CPR) [11].

It is while in double team of the present study, the second person in most of the cases had

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Diploma or they were interne and did not have the experience of passing resuscitation course or working in that.

Newborn's transportation clinical guide provided the least required equipment and drugs checklist.

In compare with this standard in the present study, in most of the cases drugs and equipment that are with the newoborn only cover 25% of this standard, this can make potential dangers for the newoborn.

Also this guide recommends that the newborn has to have at least two open intravenous routes [15], which has not been seen in none of the transportations and it can be probably due to the newoborn's vessel taking problems.

Results of the study showed that in most of the cases, vital signs, specially newborn's temperature and oxygen saturation situation is in normal range, which can indicate that newborn's situation stabilization program before transportation had been done effectively. Considering the importance of this subject, it is counted as a positive point in newborn's intra-hospital transportation.

Since 1996 that legal and ethical aspects of newborns' situation stabilization has been designed, global attention to this point is increased [16] also study of Roy and Bowman showed that newborn's temperature stabilization process before transportation in compare with the recent year has remarkably improved.

Also researchers emphasized that new problem is probably increase of hypothermia cases due to fear of hypothermia emergence, which should be taken into consideration by team [17].

Results of the study indicate that in most of the cases, newborns need oxygen and required equipment like oxygen capsule was with the newborn, but in most of the cases, arterial blood oxygen monitoring has not been done.

Although most of the transportation had been done with incubator, these incubators were usual and vibrations due to them and sound influence into them according to the study of Browing et.al, was more than newborn's tolerance and comfort and it can have negative effect on its body different systems such as; heart system, central nervous, metabolic, digestion, etc [18].

Number of the transportations, which had been done by cut or arms is also notable.

Since according to safe transportation standard, newborn's transportation into the cut because of lack of possibility of setting the temperatures stabilization, vibration and sound transportation is counted as unsafe transportation.

Also transportation with arms is counted as an uncertain method for transportation because of high risk of falling [8].

About S.T.A.B.L.E program performance approach by transportation team at the moment of newborns' intra-hospital transportation, results indicated that in most of the cases, stabilizing blood sugar and temperature and airway have been done completely. But maintaining this stable position depends on cares during transportation.

About newborn' clothe, considering that covering cap for a newborn causes remarkable decrease of losing body heat in the newborn [19], it had been done only in 36% of the cases. But about newborn's blood pressure, only measuring systolic blood pressure was enough, only in 17% of cases blood pressure stabilization had been done, and there was no arrangement for its monitoring during newborn's transportation, while researchers believe that vital signs monitoring during transportation improves newborn's final outcome [20].

Also newborn and its family's emotional support was completely ignored and there was no special action in this regard.

However last studies showed that transportation process is stressful [21], but ignoring this aspect is important in the present study and it needs future programs.

Most of the parents consider transportationof the newborn as a negative experience [22].

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Cornett believes that safe transportation principles, without considering transportation distance aspect should be observed, whether it is inter or intra-hospital transportation. This researcher believes that nurse's duty is maintaining and strengthening relationship of parents and newborn [23].

Other criterion of safe transportation is paying attention to newborn's pain.

Results of the present study showed that most of the newborns did not experience pain during transportation, and in other situations, some actions such as; pacifier, changing situation and wrapping the newborn were used for calming it. Harrison and Mckenchine suggest that in order to promote newborns' comfort and calm during transportation, developing more care programs is needed [21].

5. Conclusions

Results of this study showed that intra-hospital position of newborns is far from global standard.

In a way that none of the teams are according to the standard from number and scientific and skill qualifications approach.

Also the equipment with the newborn was not according to the standard in none of the cases. Although newborns' stabilization position has been done very well before transportation, monitoring equipment during transportation was not appropriate and parents and newborns' emotional support was completely ignored. Considering these conditions, it is expected that nursing permanent education authorities try to hold newborn's transportation skill and educational courses and highlight educational programs of emotional support part.

Nursing managers should make it obligatory for the nurses to attend these courses and also provide required equipment regarding this issue.

Considering the risk of transportation process, it is expected that nursing managers to provide regulatory system, in this way, transportation basic principles are prepared in all the transportations.

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