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Auditing Nursing cares Regarding Neonate of diabetic mothers

Majedeh Nabavian[1], Manijhe Nourian[*1], Maryam Rasouli [1], Fareed Zayeri [2]

**1. Department of Pediatrics, School of Medicine and Nursing, Shahid Beheshti University of Medical Sciences, Tehran, Iran*

2. Department of Biostatistics, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

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ABSTRACT

Aims: Nursing care for the neonates of mothers who suffer from diabetes mellitus is among the key factors in improving neonates' survival. However, nurses face many challenges while providing care to these neonates. Therefore, this study was conducted "to compare the current situation of care delivery to these neonates with the optimum situation and standards for clinical practice".

Methods: In this descriptive study, 400 cases of nursing care delivery to neonates were observed in 2014. The study population and sample was comprised of all care services provided to the neonates of diabetic mothers in morning, evening, and night working shifts. The study setting was the operating rooms, delivery rooms, neonatal care wards, and neonatal intensive care units of three hospitals affiliated to Babol University of Medical Sciences, Babol, Iran. The data collection method was observation by using checklists. All observations were made by a single observer. Sampling was performed by using the event and the time sampling techniques. Three checklists were developed through literature review for assessing the accordance of nursing care services with existing standards. The validity of the checklists was confirmed through content validity assessment. Moreover, the inter-rater interclass correlation coefficient of the delivery room checklist and the checklists for the other three units was respectively 0.98 and 0.95.

Results: The accordance of nursing care services with the available standards in the neonatal care wards and intensive care units, delivery rooms, and operating rooms was 85.1%, 79%, and 62.2%, respectively.

Conclusions: The nursing care provided to the neonates of diabetic mothers in delivery and operating rooms was way below the optimum situation and standards. This finding can be attributed to factors such as insufficiencies in nursing education as well as nurses' lack of knowledge about the standards for clinical practice.

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*Correspondence Author: Manijhe Nourian
Department of Pediatrics, School of Medicine and Nursing, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
Tel:+989125446122
Email: manighea@yahoo.com

1. Introduction

One of the indicators of development for each country is neonatal mortality rate. Such rate is two per 1000 live birth in Scandinavian

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countries [1] and was fourteen per 1000 in our country, Iran, in 2012 [2].

Gestational diabetes mellitus (GDM) can increase neonatal mortality rate by five times [1]. Neonates of mothers who suffer from GDM (henceforth referred simply to as diabetic mothers) are at risk for different complications such as macrosomia, asphyxia, hypoglycemia, hyperbilirubinemia, hypocalcemia, and preterm birth [3].

Accordingly, effective GDM management and provision of standardized care to the neonates of diabetic mothers can reduce the incidence of complications, bed occupancy rate, and healthcare costs [4].

Providing effective, quality care and discovering reasons behind neonatal hypoglycemia and respiratory distress are necessary for preventing neonatal complications [5].

However, in Iran, there are no clear clinical guidelines for preventing neonatal complications and death. Moreover, higher rates of neonatal mortality and complications denote healthcare professionals' lack of knowledge regarding the effective management of diabetic mothers' neonates.

As nurses are in the front line of care delivery to these neonates, they need to carefully monitor neonates' hardly detectable responses to stimuli.

Understanding the importance of accurate and efficient care delivery to these neonates' health can enhance the quality of nursing care [6]. Consequently, auditing nursing care provided to them seems essential.

Auditing is a process for quality improvement in which the optimum situation is determined and compared with the immediate situation. Then, discrepancies between the two situations are determined and minimized through adopting relevant measures and finally, re-auditing is performed [7].

Our literature review revealed that most studies conducted in Iran dealt mainly with assessing the prevalence, risk factors, and mortality rate of GDM-induced neonatal complications [2]. In other words, we could not find any studies regarding auditing care delivery to diabetic mothers' neonates in Iran.

Therefore, this study was conducted to compare the current situation of care delivery with the optimum situation and standards for clinical practice.

2. Methods

This was a descriptive study whose population and sample was comprised of all care services provided to the neonates of diabetic mothers in operating rooms, delivery rooms, neonatal care wards, and neonatal intensive care units (NICU) of Ayatollah Rohani, Yahyanejhad, and Shafizadeh hospitals.

These three hospitals were affiliated to Babol University of Medical Sciences, Babol, Iran. The study was conducted in 2014. As no studies had been previously conducted in Iran on auditing of nursing care provided to neonates of diabetic mothers, the samples size of the current study was calculated at a confidence level of 0.95 and a maximum error of estimate of 0.05.

Consequently, the results of the sample size calculation formula (n = ⟦(Z_((1-α⁄2) √(p(1-p)))⁄E) ⟧ ^2) demonstrated that 384 observations were needed which was rounded to 400. Given the birth rate value and the number of hospitalized neonates in each of the three hospitals, a proportionate number of observations was allocated to each hospital by using the following formula, n=∑_(i=1)^3▒Ni. Accordingly, the number of observation in Ayatollah Rohani, Yahyanejhad, and Shafizadeh hospitals was determined to be respectively equal to 237, 27, and 136. In Ayatollah Rohani hospital, ten observations were made in operating room, 43 observations in delivery room, and 184 observations in neonatal care ward and NICU.

The number of observations in the Yahyanejhad hospital was equal to 27 which was

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proportionately allocated to delivery room (sixteen observations) and operating room (eleven observations).

Finally, 136 observations were determined to be made in the neonatal care ward (95 observations) and NICU (41 observations) of Shafizadeh hospital.

The checklists contained items about the process of care delivery for preventing and managing GDM-related neonatal complications.

Each checklist was developed independently for each of the intended care units.

The items were scored on a three-point scale

Table 1: The frequency distribution of applying the standards for care provision to diabetic mothers' neonates in neonatal care wards and NICUs

Nursing care services provided to diabetic mothers' neonates	Number	Percent
Performed correctly	6983	71.6
Performed incorrectly	2656	27.24
Not performed at all	111	1.16
Sum	9750	100
Score (%)	85.1	

Table 2: The frequency distribution of applying the standards for care provision to diabetic mothers' neonates in delivery rooms

Nursing care services provided to diabetic mothers' neonates	Number	Percent
Performed correctly	1948	77.30
Performed incorrectly	88	3.49
Not performed at all	484	19.21
Sum	2520	100
Score (%)	79	

Table 3: The frequency distribution of applying the standards for care provision to diabetic mothers' neonates in operating rooms

Nursing care services provided to diabetic mothers' neonates	Number	Percent
Performed correctly	300	63.69
Performed incorrectly	81	3.57
Not performed at all	165	32.74
Sum	546	100
Score (%)	62.2	

Three checklists, a demographic questionnaire for nurses, and a demographic questionnaire for neonates were used for data collection.

including 'Not performed', 'Performed incorrectly', and 'Performed correctly'. The

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scores of these three points were respectively equal to 0, 1, and 2.

The items of the nurses' demographic questionnaire were age, work experience in nursing and in intensive care units, educational status, and field of study, working shift, and participation in neonatal care courses.

On the other hand, the neonates' demographic questionnaire included items such as gestational age, postnatal age, birth weight, gender, and route of delivery.

Sampling in neonatal care wards and NICUs was performed through time sampling.

In other words, we attended these units in the morning, evening, and night working shifts and assessed nursing care services provided to neonates of diabetic mothers by using the checklists.

However, in operating and delivery rooms, we used event sampling technique. In other words, we attended these two settings only at the time of childbirth and did assessments from childbirth until neonate's discharge from these rooms.

The validity of the checklists was evaluated through calculating Content Validity Index (CVI) and assessing their face validity.

Initially, the items of the questionnaires and the checklists were developed through reviewing textbooks, articles, as well as protocols and standards for neonatal care.

Then, eighteen neonatologists, nursing faculty members, and neonatal care head-nurses commented on the clarity, simplicity, and relevance of the items.

The minimum CVI values for each of the three criteria of clarity, simplicity, and relevance was 75% [8].

The reliability of the checklists was assessed through the inter-rater reliability assessment method. The interclass correlation coefficients between the observations of two raters for the checklists used in neonatal care wards and NICUs, operating rooms, and delivery rooms were respectively equal to 0.95, 0.95, and 0.98.

3. Results

Study findings revealed that in the neonatal care wards and NICUs, the total rate of care delivery according to the standards was 85.1%.

In these units, 71.6% of the assessed care services were performed correctly, 27.24% of them were performed incorrectly, and 1.16% of them were not performed at all.

These four values in the studied delivery rooms were respectively equal to 79%, 77.30%, 3.49%, and 19.21%. Finally, in the operating rooms, these values were 62.2%, 63.69%, 3.57%, and 32.74, respectively.

4. Discussion

The nursing care provided to the neonates of diabetic mothers in neonatal care wards and NICUs acceptably accorded with the optimum situation and standards for clinical practice. However, it was way below the optimum situation and standards in delivery and operating rooms.

Jalou (2008) conducted a study to audit nursing care provided to neonates with respiratory distress syndrome who were hospitalized in NICUs and found that the accordance of nursing care services with the available standards was acceptable only in 6.2% of cases, moderate in 54.9% of cases, and poor in 39% of cases.

The poor quality of care services was attributed by Jalou (2008) to care providers' indifference towards care quality as well as educational insufficiencies [9].

In the present study, only 29.8% of nurses in neonatal care wards and NICUs did not wash their hands correctly prior to touching neonates.

In the delivery room, the proportion of nurses who did not wash their hands at all or washed their hands incorrectly was respectively equal to 15% and 58.3%.

Such unsound practice can negatively affect neonates' health.

Nazari and Ahmadi (2011) also found that nurses' hand hygiene practice was below

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expectations due to factors such as their limited access to hand sanitization equipments, their routine-centered practice, and their unawareness of the importance of hand hygiene [10].

Study findings also showed that in neonatal care wards and NICUs, communication with parents was established mainly incorrectly. In fact, one of the main reasons behind parents-neonates ineffective communication is nurses' inattention to the importance of family-centered care.

Salehi (2012) also conducted a study to identify the barriers to parents' bedside attendance while invasive procedures are being performed on their neonates from the perspectives of nurses, physicians, and parents and found that their participating nurses mostly disagreed with family-centered care.

In other words, nurses did not rightly value family-centered care [2].

We also found that the blood sugar of neonates was not monitored correctly. This finding may be due to nurses' lack of knowledge regarding the negative consequences of poor blood sugar monitoring.

And Mohsenzade (2001) conducted a study to identify the causes of hyperbilirubinemia among diabetic mothers' neonates and reported that neonates' blood sugar was not monitored correctly and regularly [11].

Our findings also indicated that in delivery and operating rooms, blood testing for assessing polycythemia, hypocalcemia, and hypomagnesemia was not performed for all neonates who showed abnormal clinical manifestations such as hypotony and convulsion. Kalhor et al. (2012) also found that blood testing was not made for diabetic mothers' neonates who had manifestations such as lethargy and hypotony [12].

The findings of the present study also revealed that in delivery and operating rooms, blood sugar analysis was performed in all cases by using a glucometer device instead of sending blood samples to laboratory setting.

Moreover, in 14.3% of cases, the proper function of glucometer was not assessed before using it. Nouripoor et al. (2011) also found that despite a significant difference between the blood sugar levels measured by glucometer and laboratory techniques, neonates' blood samples were not sent to laboratory setting for blood sugar analysis.

Moreover, the proper function of glucometer devices was not checked before performing blood sugar analysis.

They reported these two factors as the important reasons behind imprecise blood sugar measurement and subsequent complications such as hypoglycemia [13].

We found that in delivery rooms, most parents were not educated at the time of hospital discharge about the routine vaccination schedule. Moreover, post-education evaluation was also not performed in most cases and was performed incorrectly in 16.7% of cases.

Arzani et al. (2009) reported that pre-discharge education increases the rate of parents' attendance at clinical settings for follow-up examinations [14].

We also found that in neonatal care wards and NICUs, hyperbilirubinemia management techniques such as phototherapy, adequate hydration during phototherapy, and regular monitoring of serum levels of bilirubin were not applied correctly.

Imani et al. (2004) found that using clinical guidelines and timely phototherapy help effectively manage neonates' hyperbilirubinemia, shorten their hospital stay, and decrease the number of unnecessary hospitalizations [15].

Our findings revealed that in delivery rooms, if neonates were unable to be breastfed, mothers' breast milk was not sucked and provided to neonates.

On the other hand, in operating rooms, neither breastfeeding was started during the first 30 minutes after childbirth nor mothers' breast milk was sucked and provided to neonates if

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they were unable to be breastfed in about half of the cases.

Wemhoner et al. (2011) noted that a great amount of calorie loss happens during the first hours of life and hence, neonates need to be fed as early as possible in order to prevent their hypoglycemia [16].

In the neonatal care wards and the NICUs which were studied, neither partial blood exchange through umbilical cord nor vital signs monitoring were performed correctly and thoroughly for neonates who developed polycythemia.

Samaee (1996) reported that timely blood testing, blood exchange, and vital signs monitoring during blood exchange every fifteen hours prevent complications and death among neonates with polycythemia [17].

We also found that in delivery and operating rooms, neonates' post-delivery vital signs were not controlled and documented in most cases. Palizban et al. (2004) noted that monitoring neonates' vital signs, particularly body temperature, is essential because hypothermia can cause problems such as respiratory distress, hypoglycemia, and death [18].

Moreover, the findings of the present study revealed that in neonatal care wards and NICUs, neonates' vital signs were not monitored after surfactant injection.

The results of a study performed by Megan Brocks et al. (2013) illustrated that after surfactant injection, neonates' vital signs need to be monitored continuously in order to prevent injection-related complications and death [19].

Another finding of the present study was that in delivery rooms, parental consent at the time of admitting neonates was not obtained in most cases.

Given the consequences and the outcomes of treatment measures, patients' consent is a key component of medical ethics and hence, parental consent should be obtained for treating neonates' problems [20].

Study findings also showed that in operating rooms, fetal heart sounds during delivery was either not monitored at all (in most cases) or was monitored incorrectly (in 14.3% of cases). Martin and Fanroff (2014) noted that diabetic mothers' fetuses should be monitored during pregnancy and delivery for heart sounds in order to adopt appropriate measures in case of any cardiac abnormalities [21].

Another finding of the study was that in about half of the studied cases, physicians' written order was not checked precisely and correctly. The findings reported by Kaushal et al. (2001) showed that as a significant cause of death, most medication errors happen due to lack of checking physicians' orders correctly [22].

Moreover, we found that in 19% of cases, the manifestations of neonatal convulsion were not checked after birth.

Afkhami-Ardakani and Rashidi (2009) also noted that diabetic mothers' neonates should be monitored for hypocalcemia, polycythemia, and hypoglycemia because these problems can cause convulsion and irreversible brain damage [23].

Finally, the study findings indicated that in 9.8% of cases of calcium supplementation, vital signs were not monitored once every fifteen hours and that in most cases, they were monitored incorrectly.

Imani et al. (2004) highlighted that vital signs should be monitored continuously during calcium supplementation [15].

One of the study limitations was that our presence in the study setting could have affected healthcare providers' practice. Accordingly, while we felt such change in healthcare providers' practice, we avoided documenting observations and collecting data. Moreover, we attempted to manage this limitation by frequently attending the study setting.

5. Conclusions

The nursing care services provided to diabetic mothers' neonates in delivery and operating

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rooms are much below the optimum situation and standards for clinical practice.

The main reasons behind this finding are insufficiencies in nursing education, lack of in-service educational programs, nurses' lack of knowledge and expertise regarding sound care practice, and their heavy workload.

Our recommendations for further studies include assessing the causes for poor accordance with the standards for care provision to diabetic mothers' neonates in delivery and operating rooms, evaluating the effects of educational programs on nurses' accordance with the standards for clinical practice, and assessing the effects of accordance with the standards on patient outcomes such as length of hospital stay and healthcare costs.

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References

1. Opara PI, Jaja T, Onubogu UC. Morbidity and mortality amongst infants of diabetic mothers admitted into a special care baby unit in Port Harcourt, Nigeria. Ital J Pediatr. 2010;36(1):77.
2. Salehi M. Analogical assessing problems of parents presentation while invasive procedures is being done on neonates from the nurse point view in hospitals affiliated gonabad medical science university in 2012. Msc thesis in nursing, Shahid Beheshti Medical Science University.Tehran, Iran. 2012.
3. Iafusco D, Stoppoloni F, Salvia G, Vernetti G, Passaro P, Petrovski G, et al. Use of real time continuous glucose monitoring and intravenous insulin in type 1 diabetic mothers to prevent respiratory distress and hypoglycaemia in infants. BMC pregnancy and childbirth. 2008;8(1):23.
4. Hawdon JM. NICE guidance for neonatal care after diabetes in pregnancy. Infant. 2013.
5. Maternity Q. Neonatal Clinical Guidelines Program. Clinical Guideline: Obesity. Australia: State of Queensland (Queensland Health). 2015.
6. Hervabadi SH, Marbaghi A. Management in nursing and midwifery. 2 th ed .Tehran Iran University. 2008.
7. Umami H, Ravaghi H. Familiar with clinical governance. 1st ed .Tehran (tandis). 2014.
8. Polit DF, Beck CT. Essentials of nursing research: Appraising evidence for nursing practice, Lippincott Williams & Wilkins. 2013.
9. Jalou Z. Auditing nursing cares regards neonates who have respiratory distress syndrome in NICU at hospitals affiliated to Tehran and shahid beheshti medical university in 2008, Msc thesis in nursing. Shahid Beheshti Medical Science University , Tehran. Iran. 2008.
10. Nazari R, Ahmadi M. Studying nurses wright hand washing in intensive care units. Journal of Critical Care. 2011;93(3):94-6.
11. Javadi T, Mohsenzadeh M. Assessing cause of hyperbillirobinemia in neonates who admitted in Shahid Madani Khorramabad Hospital in 2001. Yafteh. 2001.
12. Kalhor M, Gharshasbi M, Babooee M, Shirazee M. Assessing the relationship between diabetes in pregnancy and its bad effect on neonate at Kousar hospital in 2012. Diabet Congress.Tehran, Iran. 2012.
13. Nouripoor SH, Ghorbani R, Azizzadeh F, Danaee N, Yazdi. Assessing blood sugar with glucometer in diagnosing neonatal hypoglycemia. Kumesh. 2011;444(2):440-13.
14. Arzani A, Kermanshahi S, Zahedpasha Y, Mohammadzadeh I. Assessing the effect of parents education before discharging neonates to follow up their visual and brain examination. Journal of Hormozghan Medical Science. 2009;122:115-13.
15. Imani M, Rafighdoust H, Mohammadi M. Effect of calcium injection in exchanging neonates blood. Journal of Tabibe Shargh. 2004;36:31-1.
16. Wemhöner A, Ortner D, Tschirch E, Strasak A, Rüdiger M. Nutrition of preterm infants in relation to bronchopulmonary dysplasia. BMC Pulm Med. 2011 Feb 3;11:7. doi: 10.1186/1471-2466-11-7.
17. Samaee H. Assessing signs and prevention of polycythemia in neonates. Journal of Raze Medical Science.1996; 247:243 -2.
18. Palizban P et al. The rate of hypothermia in neonates. Hayat.2004; 5:12-10.
19. Megan B. Using less invasive procedure in treatment very low birth weight neonates with respiratory dysorders. 2013. Available from: http://bit.ly/GRsDnd. 2013.
20. Arzamani M, Abad D. Legal aspects of satisfactory: Abstract articles of international congress in experiences and initial health care giving in Iran. 2012(1).
21. Martin RJ, Fanroff AA, Walsh MC. Neonatal-perinatal medicine: Diseases of the Fetus and Infant-10th Edition: Saunders, an imprint of Elsevier. Inc. 2015; ISBN: 978-1-4557-5617-9.
22. Kaushal R, Bates DW, Landrigan C, McKenna KJ, Clapp MD, Federico F, et al. Medication errors and

[Downloaded from mail.jccnursing.com on 2026-11-14]

adverse drug events in pediatric inpatients. Jama. 2001;285(16):2114-20.

23. Ardakani A, Rashidi M. Diabetes in pregnancy (Review Article). Hormozgan Medical Journal. 2009.

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