Prevalence and risk factors associated with preterm births in Neyshabur hospitals, Eastern Iran

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Abstract

Background: The increasing prevalence of preterm birth in many societies has raised concerns. This study was conducted to determine the prevalence and risk factors associated with preterm birth in hospitals in Neyshabur, Eastern Iran.

Methods: This cross-sectional study was conducted on 273 neonates born before 37 weeks of gestational age between 2017 and 2019 in the educational hospitals of Neyshabur. The infants were included in the research through convenience sampling. The research tool consisted of items addressing issues related to both mothers and newborns. Data analysis was performed using SPSS version 22, employing descriptive and analytical statistics, including chi-square and Fisher's exact tests.

Results: The rate of preterm birth in Neyshabur over the three-year period was 2.85%. Bicornuate uterus (1.83%) and cervical insufficiency (1.46%) were the most observed uterine factors, while umbilical cord prolapse (1.83%) and placental adhesion (1.46%) were the most prevalent placental factors. Moreover, breech presentation (10.98%) was the most common co-occurring fetal factor in preterm birth. A significant difference was found between the length of pregnancy and the type of delivery (Vaginal or cesarean section) (P=0.003).

Conclusion: Due to the high prevalence of preterm birth in Neyshabur, it is recommended that mothers undergo periodic evaluations before and during pregnancy to identify and manage any accompanying problems or underlying conditions promptly.

Highlights

What is current knowledge?

Prior knowledge in this area has focused primarily on the prevalence of preterm infants, while the factors contributing to preterm newborns have not been thoroughly investigated. Additionally, previous studies have not explored new data regarding the prevalence of preterm newborns in Neyshabur.

What is new here?

In the present study, we assessed the prevalence of preterm newborns in Neyshabur over a three-year period. Furthermore, we examined and discussed the key factors influencing preterm newborns.

Introduction

Despite advancements in medical science, preterm birth remains a significant concern in many societies. By definition, a preterm newborn is an infant born before 37 full weeks of gestation. This premature birth can lead to serious health problems for infants, including death, cerebral palsy, and other disabilities (1). The prevalence of preterm birth varies worldwide, with higher rates reported in some regions, particularly in developing countries. Studies have also shown a considerable prevalence of preterm birth in Iran (2,3). Various factors, such as maternal diseases and disorders (e.g., diabetes, hypertension, infections), maternal lifestyle factors (e.g., smoking, alcohol consumption, malnutrition), and fetal problems (e.g., twins or multiples), can contribute to preterm birth (4). Therefore, understanding the reasons for preterm births and the factors influencing them and providing proper education to families are crucial steps in reducing their prevalence (3,5). Since no study has been conducted in Neyshabur to identify the factors affecting preterm births and develop strategies to mitigate their occurrence, this study was undertaken to determine the prevalence and factors associated with preterm births in Neyshabur.

Methods

This descriptive, cross-sectional, retrospective study investigated the prevalence and factors associated with preterm births at Hakim and Qamar Bani Hashem hospitals in Neyshabur city. The study population included all preterm infants born at a gestational age of less than 37 weeks between April 2017 and March 2019. Information was collected through a census of medical records, and in cases where records were incomplete, mothers were contacted to provide the missing information.

The exclusion criteria included mothers of preterm infants who did not consent to participate in the study, did not answer phone calls, or had incomplete medical records. The research tool consisted of a checklist developed by the researcher based on the literature on pregnancy and childbirth, including works by Williams and Nelson. This checklist was reviewed and approved by professors and specialists in the field.

Data collection was conducted via phone, and informed consent was obtained from the participants. Complete explanations of the research purpose and the confidentiality of the information were also provided. Data analysis was performed using SPSS version 22 software.

Among the 20,850 live newborns recorded between 2017 and 2019 in the hospitals of Neyshabur, 596 preterm infants were born, of which 273 were included in the study.

Results

Among the preterm newborns, the majority were boys (58.2%) and were delivered via cesarean section (61.9%). Most mothers reported no pregnancy complications (96%) and had no history of abortion (71.8%). Additionally, many were experiencing their first or second pregnancy (69.2%) and had no history of drug use (64.5%) (Table 1). The average age of the mothers was 31.54 ± 4.27 years, and the average gestational age was 32.57 ± 3.12 weeks.

According to the results of the present study, the prevalence of preterm newborns in Neyshabur over a three-year period (2018–2020) was 2.85%. The yearly prevalence of preterm newborns is shown in Figure 1.

Table 2 shows the maternal and fetal complications among preterm infants born in neonatal educational hospitals. According to this table, factors such as maternal uterine complications, placental complications, and fetal complications are listed separately by type. The most common fetal issue was breech presentation (10.98%), and the most prevalent systemic disease among mothers was anemia (9.52%).

The samples were divided into three groups based on the length of pregnancy: very early, early, and late. These groups were compared with other variables using the chi-square and Fisher's exact tests. A significant difference was observed between the duration of pregnancy and the type of delivery (Vaginal or cesarean section). In the very early preterm group, vaginal delivery was more common than cesarean section. However, in the early preterm and late preterm groups, cesarean sections outnumbered vaginal deliveries (P=0.003) (Table 3).

Table 1. Frequency distribution of preterm infants' demographic information

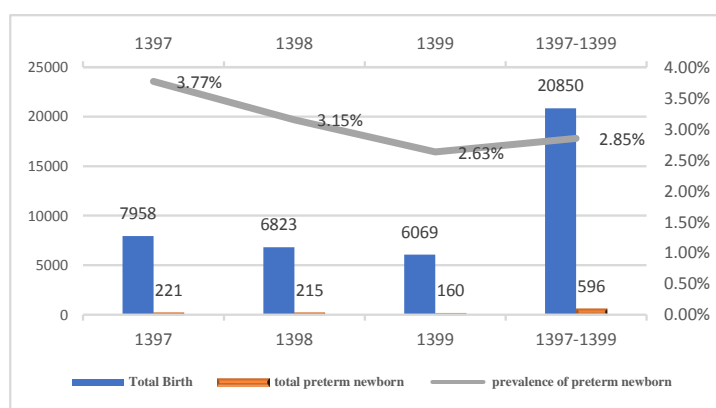| Variables		Frequency (Percentage)
Infant gender	Boy	159 (58.2)
	Girl	114 (41.8)
Type of delivery	Natural delivery	104 (38.1)
	Cesarean section	169 (61.9)
Pregnancy complications (Bleeding, severe abdominal and pelvic pain, severe nausea, fever)	Yes	11 (4.0)
	No	262 (96.0)
Abortion	Yes	77 (28.2)
	No	196 (71.8)
Gravity	1	98 (35.9)
	2	91 (33.3)
	3	60 (22.0)
	4	23 (8.4)
	5	1 (0.4)
Medication use during pregnancy	Yes	97 (35.5)
	No	176 (64.5)
Multiple pregnancy	Yes	5 (1.8)
	No	268 (98.2)
Vaginal and uterine infection during pregnancy	Yes	3 (1.1)
	No	270 (98.9)
Alcohol and smoking	Yes	2 (0.7)
	No	271 (99.3)
Invasive diagnostic procedures during pregnancy	Yes	2 (0.7)
	No	271 (99.3)

Figure 1. Frequency and prevalence of preterm newborns from 2017-2019

Table 2. Associated complications and disorders among preterm newborns (n=273)

Related factors	Frequency (Percentage)
Uterine factors	14 (5.12)
Bicornuate uterus	5 (1.83)
Uterine contractions during pregnancy	2 (0.73)
Vaginal bleeding	3 (1.09)
Cervical insufficiency	4 (1.46)
Placental factors	22 (8.05)
Placenta previa	3 (1.09)
Placental abruption	1 (0.36)
Placenta accreta	4 (1.46)
Umbilical cord prolapse	5 (1.83)
Fetal factors	35 (12.82)
Transverse lie fetus	5 (1.83)
Breech presentation fetus	30 (10.98)
Polyhydramnios	9 (3.29)
Maternal systemic diseases	90 (32.96)
Diabetes	12 (4.39)
Epilepsy	2 (0.73)
Blood pressure	11 (4.02)
Anemia	26 (9.52)
Heart diseases	3 (1.09)
Hypothyroidism	16 (5.86)
Hyperthyroidism	20 (7.32)

Table 3. Relationships between pregnancy length and demographic factors

Variables		Frequency (Percentage) week	Pregnancy week			P-value
			Extremely preterm (22-27) week	Early preterm (28-31) week	Late preterm (32-36) week	
Gender	Boy	159 (2.58)	16	37	106	0.456*
	Girl	114 (41.8)	10	21	83	
Type of delivery	Natural delivery	104 (38.1)	17	20	77	0.003*
	Cesarean section	169 (61.9)	8	44	117	
Pregnancy complications	Yes	11 (4.0)	0	2	9	0.683**
	No	262 (96.0)	21	53	189	
Abortion	Yes	77 (28.2)	7	18	52	0.678*
	No	196 (71.8)	16	48	132	
Medication use during pregnancy	Yes	97 (35.5)	7	19	71	0.311*
	No	176 (64.5)	14	39	123	

*Chi-square test
**Fisher exact test

Discussion

The findings of this study indicate that the prevalence of preterm newborns in Neyshabur is 2.85%. Factors such as maternal age, number of children, multiple pregnancies, and pregnancy complications significantly influence this outcome.

A study conducted in Nepal in 2020 reported a prevalence of preterm newborns of 3.4% over 14 months (6). In the present study, the prevalence rate was 2.85%, consistent with the Nepal study's findings. In Iran, Nepal, and Qatar, the rate of preterm newborns ranges from 8% to 26%. This rate is even higher in Italy, where it is approximately 26%. These rate differences may be attributed to variations in study populations, geographical regions, and time periods (7)

Research conducted in Iran has shown that the prevalence of preterm infants in different cities ranges from approximately 5.1% to 7.2% (8,9). These discrepancies may arise from differences in diagnostic criteria, population characteristics, cultural factors, health conditions, and total pregnancies and live births.

The results of the present study indicate that various complications may contribute to preterm birth. Among these, maternal complications such as a bicornuate uterus and cervical insufficiency had the highest prevalence rates. Women with a bicornuate uterus are more susceptible to preterm delivery, which is attributed to cervical weakness (10).

Regarding placental factors, placenta accreta, and umbilical cord prolapse were the most prevalent complications observed. Umbilical cord prolapse occurs when the cord slips out of the cervix before the fetal head. This condition is more common in preterm deliveries because of the smaller fetal head and increased space in the mother's pelvis. The cervix tends to open earlier in preterm labor (11). Regarding fetal complications, breech presentation was one of the most frequently observed complications co-occurring with preterm birth, which aligns with the findings of Shojaei et al. (2016) (12). The incidence of breech presentation at delivery decreases with increasing gestational age. At 28 weeks of gestation, one in five fetuses is in a breech position, whereas in term pregnancies, fewer than 4% of all singleton fetuses are in a breech position at the time of delivery. This is attributed to a lack of fetal movement or incomplete rotation of the fetus. Preterm labor is often associated with breech presentation at delivery, as the fetus has not yet had the opportunity to rotate. This fact makes preterm labor one of the strongest risk factors for breech presentation (13).

The results of the study also indicated that anemia during pregnancy increases the risk of preterm labor, a finding supported by the study of Kildal (2020) (14). The findings revealed that the duration of pregnancy was not significantly correlated with variables such as infant sex, fertility complications, history of abortion, or medication use during pregnancy. However, a significant difference was observed between the duration of pregnancy and the type of delivery (Vaginal or cesarean section).

The method of delivery for very-low-birth-weight preterm infants is still a topic of debate. There is no definitive evidence supporting the benefits of cesarean section. One study indicated that cesarean section delivery reduces the overall incidence of intraventricular hemorrhage (IVH), but it does not decrease the incidence of severe IVH. Additionally, a previous cesarean section increases the risk of preterm labor in subsequent pregnancies (15). Concerning sex, the current study revealed that women with male fetuses are more likely to experience preterm labor, which is consistent with the findings of Peelon (2021) (16). Limitations of the study include the failure to analyze some important risk factors, conducting the study in one city and two hospitals, and the lack of participation from all mothers in the interviews. A strength of the study is the collection of relevant data over three years. It is recommended that further research be conducted using relevant prospective studies with larger populations. Such research could aid in identifying risk factors and predictors of preterm labor in high-risk groups, leading to the development of effective interventions to improve pregnancy outcomes.

Conclusion

In a three-year study conducted at the educational hospitals of Neyshabur University of Medical Sciences, 2.85% of infants were born preterm. Placenta accreta and umbilical cord prolapse were the most significant placental complications observed. Additionally, breech presentation was frequently observed alongside preterm birth. The most common comorbidities observed were anemia, hyperthyroidism, and hypothyroidism. Pregnant mothers should undergo periodic evaluations for associated complications and underlying diseases before and during pregnancy to ensure prompt identification and management if any issues arise.

Acknowledgement

Funding sources

Ethical statement

A formal approval letter for conducting this study was obtained from the Ethics Committee of Neyshabur University of Medical Sciences, with the code IR.NUMS.REC.1399.042.

Conflicts of interest

This research does not present any conflicts of interest.

Author contributions

M.R., M.H., and A.G.: Data collection; M.R., A.G., and Z.M.N.: Analysis and interpretation of results; and M.R., M.H., A.G., and Z.M.N.: Draft manuscript preparation. All authors reviewed the results and approved the final version of the manuscript.

References

1. Williams FW, Mclean K, McBride C, Pierce H. Updated prediction model for vaginal birth after cesarean as a tool to predict VBAC morbidity. American Journal of Obstetrics & Gynecology. 2022;226(1):S356-7. [View at Publisher] [DOI] [Google Scholar]

2. Jaberi E, Roksana M. A study on preterm births during 2013-2015, Shiraz, Iran. J Obstet Gynaecol. 2018;38(1):22-6. [View at Publisher] [DOI] [PMID] [Google Scholar]

3. Crilly CJ, Haneuse S, Litt JS. Predicting the outcomes of preterm neonates beyond the neonatal intensive care unit: what are we missing? Pediatr Res. 2021;89(3):426-45. [View at Publisher] [DOI] [PMID] [Google Scholar]

4. Ohuma EO, Moller AB, Bradley E, Chakwera S, Hussain-Alkhateeb L, Lewin A, et al. National, regional, and global estimates of preterm birth in 2020, with trends from 2010: a systematic analysis. Lancet. 2023;402(10409):1261-71. [View at Publisher] [DOI] [PMID] [Google Scholar]

5. Medley N, Poljak B, Mammarella S, Alfirevic Z. Clinical guidelines for prevention and management of preterm birth: a systematic review. BJOG: An International Journal of Obstetrics & Gynecology. 2018;125(11):1361-9. [View at Publisher] [DOI] [PMID] [Google Scholar]

6. Gurung A, Wrammert J, Sunny AK, Gurung R, Rana N, Basaula YN, et al. Incidence, risk factors and consequences of preterm birth-findings from a multicentric observational study for 14 months in Nepal. Arch Public Health. 2020;78:64. [View at Publisher] [DOI] [PMID] [Google Scholar]

7. Mancioppi V, Antoniotti V, Solito A, Mingoia E, Monzani A, Genoni G, et al. Evolution of Subclinical Hypothyroidism Diagnosed in the First 3 Months of Life in Newborns Living in North Italy: A Retrospective Cohort Study. Children (Basel). 2023;10(1):118. [View at Publisher] [DOI] [PMID] [Google Scholar]

8. Hemmatpour S, Mansori M, Moradi G, Sheikhahmadi S, Bagheri B. Assessing the risk factors for preterm births in Kurdistan, Iran: a case-control study. 2020 [Preprint] [View at Publisher] [DOI] [Google Scholar]

9. Valiani M, Torabi F, Khodaei FS. The relationship between oral, the kidney and urinary tracts infections and preterm delivery in pregnant women admitted to educational hospitals, Isfahan, Iran. Payesh (Health Monitor). 2021;20(5):581-7. [View at Publisher] [DOI] [Google Scholar]

10. Mastrolia SA, Baumfeld Y, Hershkovitz R, Loverro G, Di Naro E, Yohai D, et al. Bicornuate uterus is an independent risk factor for cervical os insufficiency: A retrospective population based cohort study. J Matern Fetal Neonatal Med. 2017;30(22):2705-10. [View at Publisher] [DOI] [PMID] [Google Scholar]

11. Wong L, Kwan AHW, Lau SL, Sin WTA, Leung TY. Umbilical cord prolapse: revisiting its definition and management. Am J Obstet Gynecol. 2021;225(4):357-66. [View at Publisher] [DOI] [PMID] [Google Scholar]

12. Shoja M, Shoja E, Gharaei M. Prevalence and affecting factors on preterm birth in pregnant women Referred to Bentolhoda hospital-Bojnurd. J North Khorasan Univ Med Sci. 2015;7(4):855-63. [View at Publisher] [DOI] [Google Scholar]

13. Toijonen AE, Heinonen ST, Gissler MV, Macharey G. A comparison of risk factors for breech presentation in preterm and term labor: a nationwide, population-based case-control study. Arch Gynecol Obstet. 2020;301(2):393-403. [View at Publisher] [DOI] [PMID] [Google Scholar]

14. Kielland-Kaisen U, Paul B, Jennewein L, Klemt A, Möllmann CJ, Bock N, et al. Maternal and neonatal outcome after vaginal breech delivery of nulliparous versus multiparous women of singletons at term-A prospective evaluation of the Frankfurt breech at term cohort (FRABAT). Eur J Obstet Gynecol Reprod Biol. 2020;252:583-7. [View at Publisher] [DOI] [PMID] [Google Scholar]

15. Zhang Y, Zhou J, Ma Y, Liu L, Xia Q, Fan D, et al. Mode of delivery and preterm birth in subsequent births: A systematic review and meta-analysis. PLoS One. 2019;14(3):e0213784. [View at Publisher] [DOI] [PMID] [Google Scholar]

16. Peelen MJ, Kazemier BM, Ravelli AC, De Groot CJ, Van der Post JA, Mol BW, et al. Ethnic differences in the impact of male fetal gender on the risk of spontaneous preterm birth. J Perinatol. 2021;41(9):2165-72. [View at Publisher] [DOI] [PMID] [Google Scholar]

How to Cite:

Rohaninasab M, Hesari M, Mollazadeh-Narestan Z, Gazerani A. Prevalence and risk factors associated with preterm births in Neyshabur hospitals, Eastern Iran. *J Res Dev Nurs Midw*. 2024;21(3) :26-9.