Thieme

Do the Antenatal Care and Perinatal Outcomes of Women with a Vietnamese Migration Background Differ from Those of Other Women?

A Retrospective Analysis

Unterscheiden sich Schwangerenbetreuung und perinatale Ergebnisse bei Frauen mit vietnamesischem Migrationshintergrund von anderen Frauen?

Eine retrospektive Analyse

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Authors
Lisa Antonia Lorenz-Meyer[1], Clara Sziborra[2], Wolfgang Henrich[1], Matthias David[2]

Affiliations
1 Klinik für Geburtsmedizin, Campus Mitte, Charité – Universitätsmedizin Berlin, Berlin, Germany
2 Klinik für Gynäkologie, Campus Virchow-Klinikum, Charité – Universitätsmedizin Berlin, Berlin, Germany

Keywords
migration, antenatal care, Vietnam, perinatal data, refugee

Schlüsselwörter
Migration, Schwangerenvorsorge, Vietnam, Perinataldaten, Geflüchtete

received 6.8.2024
accepted after revision 19.10.2024

Bibliography
Geburtsh Frauenheilk 2025; 85: 56–68
DOI 10.1055/a-2446-6504
ISSN 0016-5751

Georg Thieme Verlag KG, Oswald-Hesse-Straße 50, 70469 Stuttgart, Germany

Correspondence
Dr. med. Lisa Antonia Lorenz-Meyer
Klinik für Geburtsmedizin, Campus Mitte
Charité – Universitätsmedizin Berlin
Charitéplatz 1
10117 Berlin, Germany
lisa.lorenz-meyer@charite.de

Deutsche Version unter:
https://doi.org/10.1055/a-2446-6504.
Supplementary Material is available at
https://doi.org/10.1055/a-2446-6504.

ABSTRACT

Introduction
In Germany, 0.25% of the total population are persons with a Vietnamese migration background. There are almost no studies on this particular group of immigrants. We compared the perinatal data of women with a Vietnamese migration background with the pregnancy outcomes of non-Vietnamese women also living in Germany.

Methods
After using name analysis to allocate women into different groups, the perinatal data of women with a Vietnamese migration background who gave birth between 1.1.2016 and 31.12.2019 in Campus Charité Mitte in Berlin were retrospectively evaluated. These data were compared in a 3:1 ratio with the data of women of non-Vietnamese origin and the same age and parity. Multivariate regression analysis was used to determine factors which influenced caesarean section rates, the transfer rates of neonates to the neonatal department, and the rates of higher degree perineal tears.

Results
The perinatal data of 470 women with a Vietnamese migration background, 209 (44.5%) of whom were registered as living in a refugee shelter, were compared with those of 1410 controls. An "ideal pregnancy outcome," which included giving birth after 37+0 weeks of gestation, a 5-minute Apgar score ≥ 8, arterial cord blood pH ≥ 7.20, no transfer of the newborn to the neonatal department, and spontaneous birth or vacuum extraction without a higher

degree perineal tear, was recorded for 44.5 % of women with and 38.1 % of women without a Vietnamese migration background (p = 0.1), despite the lower attendance rates at antenatal screening appointments of Vietnamese women. Accommodation in a shelter for refugees was a protective factor against caesarean section (OR 0.5, 95 % CI: 0.36–0.73) and transfer of the newborn to the neonatal department (OR 0.45, 95 % CI: 0.23–0.89). A Vietnamese migration background was a risk factor for a third-degree perineal tear (OR 5.4, 95 % CI: 1.4–21.30)

Conclusion
Despite lower levels of antenatal care, women with a Vietnamese migration background did not have poorer pregnancy outcomes.

ZUSAMMENFASSUNG

Einführung
In Deutschland machen Menschen mit vietnamesischem Migrationshintergrund 0,25 % der Gesamtbevölkerung aus. Zu dieser besonderen Migrantinnengruppe gibt es bisher kaum Studien. Wir vergleichen Perinataldaten von Frauen mit vietnamesischem Migrationshintergrund mit den Schwangerschaftsausgängen nicht vietnamesischer Frauen.

Methoden
Nach einer Gruppenzuordnung mittels Namensanalyse wurden retrospektiv die Perinataldaten von Frauen mit vietnamesischem Migrationshintergrund ausgewertet, die zwischen 01.01.2016 und 31.12.2019 am Campus Mitte der Charité geboren haben. Gegenüber gestellt wurden in einem 3 : 1-Verhältnis Frauen nicht vietnamesischer Herkunft gleichen Alters und gleicher Parität. Durch multivariable Regression wurden Einflussfaktoren auf die Sectio- und Verlegungsrate der Neugeborenen auf die Neonatologie sowie auf die Rate an höhergradigen Dammrissen bestimmt.

Ergebnisse
Die Perinataldaten von n = 470 Frauen mit vietnamesischem Migrationshintergrund, von denen n = 209 (44,5 %) in einer Unterkunft für Geflüchtete gemeldet waren, wurden mit n = 1410 Kontrollpatientinnen verglichen. Ein „idealer Schwangerschaftsausgang“ mit Geburt ab 37 + 0 SSW, einem 5-Minuten-Apgar-Wert ≥ 8, einem arteriellen Nabelarterien-pH ≥ 7,20, ohne Verlegung in die Neonatologie bei Spontangeburt oder Vakuumextraktion ohne höhergradigen Dammriss lag bei 44,5 % der Frauen mit und bei 38,1 % der Frauen ohne vietnamesischen Migrationshintergrund vor (p = 0,1), trotz geringerer Inanspruchnahme von Vorsorgeuntersuchungen. Die Unterbringung in einer Unterkunft für Geflüchtete war ein protektiver Faktor gegen eine Sectio (OR 0,5, 95 %-KI 0,36–0,73) und eine Verlegung auf die Neonatologie (OR 0,45, 95 %-KI 0,23–0,89). Der vietnamesische Migrationshintergrund war ein Risikofaktor für einen Dammriss III° (OR 5,4, 95 %-KI 1,4–21,30)

Schlussfolgerung
Frauen mit vietnamesischem Migrationshintergrund weisen trotz geringerer Schwangerenvorsorge keine schlechteren Geburtsausgänge auf.

Introduction and Background

According to the 2023 micro-census conducted by the German Federal Statistical Office, about 215 000 people of Vietnamese descent live in Germany, 136 000 of whom have a personal experience of migration (the so-called first generation) [1]. This Vietnamese diaspora is not spread evenly across Germany; about 20 000 people of Vietnamese descent live in Berlin alone. The percentage of ethnic Vietnamese women presenting to the Charité Maternity Hospital in the district Berlin-Mitte is even higher, at around 7 % of pregnant women [2].

The migration background of ethnic Vietnamese women in the old Federal Republic of Germany and former West-Berlin is, in most cases, a consequence of the Vietnam war which was waged between North Vietnam and South Vietnam from 1955 to 1975. After the victory of communist North Vietnam, more than one million people fled from Vietnam across the South China Sea. Around 38 000 of these so-called Boat People were taken in by the Federal Republic of Germany between 1978 and the mid-1980 s, most of them from South Vietnam [3]. Ethnic Vietnamese women from the new German federal states and East Berlin have a different immigration history; their parents or other family members were usually recruited as contract workers from North Vietnam by the government of the GDR [4]. The social background of pregnant women of Vietnamese origin with a registered address in a refugee shelter is not clear, especially because in Germany, granting asylum to people from Vietnam is currently limited to exceptional cases [5].

The aim of this retrospective study was to compare antenatal and obstetric care and the birth outcomes of women with and women without a Vietnamese migration background. To estimate the impact of a special, socially stressful situation, in a second step we differentiated between women of Vietnamese origin with and those without a registered address in a refugee shelter. Up to now, the care provided to Vietnamese women with a recent history as refugees was neglected in publications on the medical care provided to immigrants, and our data collection, which included refugee women, is probably the first for German-speaking countries.

For the primary combined endpoint for the pregnancy outcome, we chose what we termed an “ideal normal birth outcome,” which we defined as spontaneous or operative vaginal delivery of

a singleton pregnancy from week 37 + 0 of gestation onwards, no higher degree perineal tear, a 5-minute Apgar score ≥ 8, an arterial cord blood pH of 7.20, a peripartum blood loss < 500 ml, and no transfer of the newborn to a neonatal department.

Methods

Study population

In the register of births of the maternity hospital of Charité University Hospital, Campus Mitte, we identified all patients who gave birth between 1.1.2016 and 31.12.2019 with a Vietnamese first name or surname. The registered addresses of all women were checked and a registered accommodation in a refugee shelter was recorded.

The women of Vietnamese origin were compared in a 1 : 3 ratio with women of the same age and parity and non-Vietnamese names who had given birth in the same hospital in the same period.

The non-Vietnamese women were randomly selected from our patient population; their nationality or ethnicity was not recorded. Women below the age of 18 and women for whom obstetric data was lacking were excluded from our evaluation. The perinatal data of all patients were obtained from the ViewPoint 5 documentation system (Solingen, Germany) and the digital SAP patient file (Walldorf, Germany).

Once each patient had been classified as either of Vietnamese (V) and non-Vietnamese (NV) origin, the patient data were anonymized.

Statistical analysis

All calculations were carried out with SPSS (Statistical Package for Social Sciences 23, IBM Corp., Armonk, NY, USA).

Descriptive analysis was carried out for continuous and categorical variables, with continuous variables presented as mean and standard deviation (± SD) and frequency reported in percent (%) and missing values. A non-normal distribution was assumed for all continuous variables, and Mann-Whitney U-test was used for analysis; similarly, Fisher's exact test was used for categorical variables. The two-sided significance level was set to 0.05. After the first part of the study, which compared two groups of patients either with or without Vietnamese ethnicity and compared Vietnamese migrants with and those without a registered address in a refugee shelter, multivariable regression analysis was carried out to evaluate the impact of different clinical parameters on caesarean section as the mode of delivery, transfer of the neonate to a neonatal department, and incidence of higher degree (3 rd or 4 th degree) perineal tears. To do this, the relevant influencing factors were identified and the corresponding odds ratios (ORs) and confidence intervals (95 % CI) were calculated using a multivariable generalized linear model (GLM).

Ethical approval and data protection

An application for ethical approval (EA2/24/20) was filed prior to the retrospective collection and analysis of data, and the study was approved by the Ethics Committee of the Charité. The guidelines of the Charité on good clinical practice were observed and the Berlin Data Protection Act was complied with.

Results

Patient characteristics and antenatal care

A total of 534 patients with a Vietnamese first name and surname presented to the Maternity Hospital in Campus Mitte of the Charité between 1 January 2016 and 31 December 2019, which corresponds to 6.7 % (with monthly fluctuations of between 2.2 and 15.0 %) of the total number of births. The perinatal data of 64 patients were incomplete with regards to the birth outcome, and these patients were excluded from the study. The comparison group consisted of 1410 patients of non-Vietnamese origin, of whom 11 women (0.8 %) were registered as living in a refugee shelter. In the group of ethnically Vietnamese women, this figure was 209 (44.5 %).

▶ **Table 1** shows the characteristics of the patient population with and without a Vietnamese migration background. The physical characteristics differed between groups, with a mean height of 156 cm recorded for one group of patients (V) compared to 166 cm for the other group (NV), p < 0.001. The mean BMI of Vietnamese women was lower (21 [V] vs. 24 kg/m^2 [NV], p < 0.001) and the percentage of underweight women (BMI < 18.5 kg/m^2) was significantly higher in the group of Vietnamese women (19.9 %) compared to non-Vietnamese women (6.4 %, p < 0.001). Only 1.1 % of Vietnamese women were overweight compared to 10.9 % of NV women (p < 0.001).

When we looked at the number of antenatal care appointments, it was clear that women of Vietnamese origin attended fewer appointments overall and that just under ¾ of these appointments only began after the end of the 1 st trimester of pregnancy, whereas 60 % of all non-Vietnamese patients already had their first antenatal examination before the 11 th week of gestation (GW) as part of their antenatal care (p < 0.001) (▶ **Fig. 1**). More than twice as many non-Vietnamese women (NV: 26.9 %) had a first trimester screening compared to Vietnamese women (V: 12.2 %) (p < 0.001).

It is also worth noting that the rate of hepatitis B surface antigen (HBsAg) was higher in Vietnamese women (V: 6.4 % vs. NV: 0.4 %, p < 0.001) and the percentage of women with gestational diabetes was also higher in this group (V: 13.4 % vs. NV: 9.5 %, p = 0.013).

Delivery outcomes

An overview of birth outcomes is shown in ▶ **Table 2** and ▶ **Fig. 2**. As regards the "ideal pregnancy outcome" according to our defined endpoints (i.e., delivery after 37 + 0 GW, 5-minute Apgar score ≥ 8, arterial cord blood pH ≥ 7.20, no transfer of the newborn to the neonatal department, and spontaneous birth or vacuum extraction without a 3 rd or 4 th degree perineal tear), there was no significant difference between women with a Vietnamese migration background (V) and women in the non-Vietnamese comparison group (NV) (V: 44.5 % vs. NV: 38.1 %, p = 0.1). However, 75.1 % of women of Vietnamese origin had spontaneous delivery or vacuum extraction without a 3 rd or 4 th degree

▶**Table 1** Basic characteristics of the patient groups of Vietnamese and non-Vietnamese origin including the number of cases; Mann-Whitney U-test was used for nominal variables and two-sided Fisher's exact test for categorical variables (level of significance p = 0.05).

	Vietnamese migration background	n	No Vietnamese migration background	n	P
Maternal age (years)	28.14 ± 5.40	470	28.13 ± 5.36	1410	0.996
Height (cm)	156.38 ± 4.85	470	165.74 ± 6.85	1410	< 0.001*
Body mass index (kg/m^2)	20.70 ± 2.69	462	23.96 ± 4.98	1387	< 0.001*
▪ Underweight (< 18.5 kg/m^2)	92 (19.9%)		89 (6.4%)		< 0.001*
▪ Normal weight (18.5–< 30 kg/m^2)	365 (79.0%)		1151 (83%)		< 0.001*
▪ Overweight (≥ 30 kg/m^2)	5 (1.1%)		147 (10.6%)		< 0.001*
Parity	1.77 ± 0.91	470	1.66 ± 0.78	1410	1.0
Gravidity	2.0 ± 1.13		2.0 ± 1.13		1.0
Primiparous	203 (48.1%)		701 (49.7%)		0.558
First trimester screening in week 11 + 0–13 + 0 of gestation	23 (12.2%)	189	280 (26.9%)	1040	< 0.001*
Detailed fetal scan in week 18 + 0–22 + 0 of gestation	103 (54.5%)	189	834 (80.2%)	1040	< 0.001*
Number of antenatal care visits	8.38 ± 3.0	455	10.54 ± 3.21	1284	< 0.001*
▪ ≤ 4	49 (10.8%)		47 (3.7%)		< 0.001*
▪ 5–7	121 (26.6%)		148 (11.5%)		< 0.001*
▪ 8–11	224 (49.2%)		627 (48.8%)		0.913
▪ ≥ 12	61 (13.4%)		462 (36%)		< 0.001*
First antenatal care appointment		462		1410	
▪ Before 11 th week of gestation	122 (26.4%)		796 (59.8%)		< 0.001*
▪ Between 11 th–20 th week of gestation	221 (47.8%)		466 (35.0%)		< 0.001*
▪ > 20 th week of gestation	119 (25.8%)		69 (5.2%)		< 0.001*
HBsAg positive	30 (6.4%)	470	6 (0.4%)	1347	< 0.001*
Gestational diabetes		469		1343	
▪ Positive test	63 (13.43%)		128 (9.53%)		0.013*
▪ No test carried out	118 (25.16%)		199 (14.81%)		< 0.001*
▪ Insulin-dependent gestational diabetes	11 (17.46%)	63	19 (14.84%)	128	0.675

perineal tear, whereas this only applied to 67.2% of women of non-Vietnamese origin (p < 0.001).

Indications for and rate of caesarean sections

The caesarean section rate for women with a Vietnamese migration background was 21.2% (V) compared to 32.1% for non-Vietnamese (NV) women (p < 0.001), which was around 10% lower than in the comparison group, although the indications for unplanned caesarean sections differed; the percentage of patients of Vietnamese origin who required a caesarean section for failure to progress in labor was lower than in the comparison group (V: 44.19% vs. NV: 18.90%, p < 0.001). Women without a Vietnamese migration background required a caesarean section more often for failed induction of labor (NV: 16.46% vs. V: 2.33%, p = 0.012).

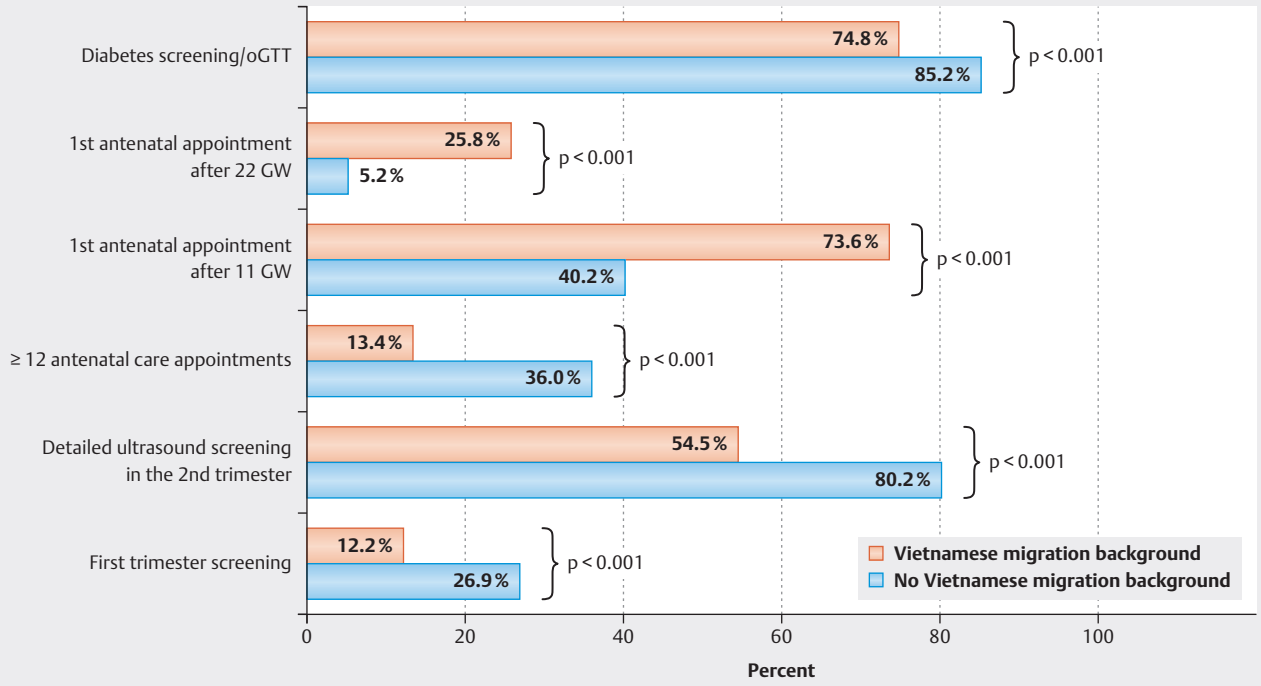
EDA rate, incidence of perineal tears and episiotomies

With a rate of 42.9% compared to 22.3%, almost twice as many non-Vietnamese patients received an epidural during vaginal delivery (p < 0.001).

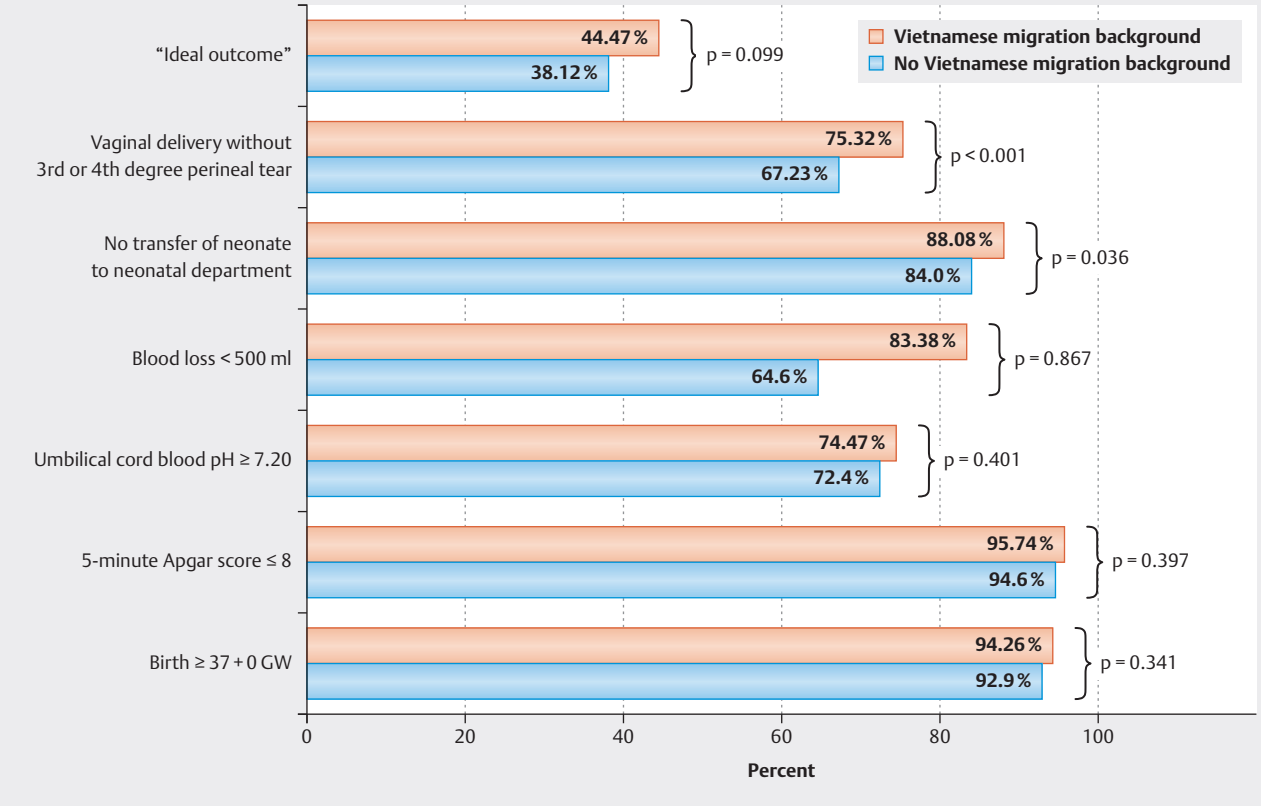
After vaginal delivery, the rate of 3 rd degree perineal tears was three times higher in patients of Vietnamese origin (V: 3.55% vs. NV: 0.94%, p < 0.001), and the rate of episiotomies during spontaneous delivery was also higher (V: 23.9% vs. NV: 17.5%, p = 0.016).

Neonatal birth outcomes

Children born to women of Vietnamese origin were born more often between week 37 + 0 and 40 + 0 of gestation and required transfer to the neonatal department less often (V: 11.9% vs. NV:



▶ **Fig. 1** Antenatal care of women with and without a Vietnamese migration background (in %).



▶ **Fig. 2** Pregnancy outcomes of women with and without a Vietnamese migration background (in %).

▶**Table 2** Comparison of mode of delivery and childbirth-related injuries in Vietnamese and non-Vietnamese patients. Mann-Whitney U-test was used for nominal variables and two-sided Fisher's exact test for categorical variables (level of significance p = 0.05).

	NV	V	P NV vs. V
All caesarean sections	453 (32.1%)	103 (21.19%)	< 0.001*
Primary caesarean section	262 (57.8%)	37 (35.92%)	< 0.001*
Secondary caesarean section	191 (42.2%)	66 (64.07%)	< 0.001*
Emergency caesarean section	31 (6.9%)	6 (5.82%)	0.829
Planned caesarean section	289 (63.80%)	60 (58.25%)	0.310
Repeat caesarean section	167 (57.78%)	40 (66.70%)	0.248
Breech presentation/transverse presentation	54 (18.69%)	11 (18.33%)	1.0
Pre-existing maternal condition	21 (7.27%)	2 (3.33%)	0.392
Macrosomia	11 (3.81%)	2 (3.33%)	1.0
Fetal growth restriction/placental insufficiency	5 (1.73%)	–	0.592
Placenta previa	4 (1.38%)	3 (5.00%)	0.101
Status post myoma enucleation	2 (0.69%)	–	1.0
Uterine fibroids	1 (0.346%)	–	1.0
Fetal indication	1 (0.346%)	–	1.0
Preventive caesarean section	23 (7.96%)	2 (3.33%)	0.277
Reason for preventive caesarean section			
▪ Anxiety/anxiety disorder	9 (39.13%)	1 (50%)	1.0
▪ Status post traumatic birth experience	3 (13.04%)	–	1.0
▪ Status post higher degree perineal tear	3 (13.04%)	1 (50%)	0.300
▪ Status post traumatic delivery of an acquaintance	3 (13.04%)	–	1.0
▪ Status post shoulder dystocia	1 (4.34%)	–	1.0
▪ Requested without giving a reason	2 (8.70%)	–	1.0
▪ Status post fertility treatment + maternal age	1 (4.34%)	–	1.0
▪ Symphysis pubis dysfunction	1 (4.34%)	–	1.0
▪ Unplanned caesarean section	164 (36.20%)	43 (41.75%)	0.310
▪ Pathological CTG	73 (44.52%)	13 (30.23%)	0.117
▪ Failure to progress	31 (18.90%)	19 (44.19%)	0.001*
▪ Failure to progress in the first stage of labor	14 (45.26%)	11 (57.89%)	0.560
▪ Failure to progress in the second stage of labor	17 (54.83%)	8 (42.10%)	0.560
▪ Breech or transverse presentation	1 (0.61%)	–	1.0
▪ Suspected uterine dehiscence	2 (1.22%)	3 (6.98%)	0.062
▪ Triple I/amniotic infection syndrome	21 (12.80%)	4 (9.30%)	0.608
▪ Premature placental abruption	8 (1.77%)	1 (2.32%)	0.688
▪ Pre-eclampsia	9 (5.49%)	2 (4.65%)	1.0
▪ Fetal growth restriction/placental insufficiency	12 (7.32%)	–	0.076
▪ Failed induction of labor	27 (16.46%)	1 (2.33%)	0.012*
Spontaneous delivery	811 (55.17%)	326 (69.4%)	< 0.001*
Vacuum-assisted delivery	146 (10.35%)	41 (8.7%)	< 0.001*
With epidural anesthetic	411 (42.9%)	82 (22.3%)	< 0.001*

▶Table 2 continued

	NV	V	P NV vs. V
With injuries	703 (73.46%)	262 (71.38%)	0.448
▪ 1 st degree perineal tear	129 (13.48%)	48 (13.08%)	0.928
▪ 2 nd degree perineal tear	170 (17.7%)	85 (23.17%)	0.029*
▪ 3 rd degree perineal tear	8 (0.83%)	13 (3.54%)	< 0.001*
▪ 4 th degree perineal tear	1 (0.10%)	–	1
▪ All episiotomies	232 (24.24%)	99 (26.98%)	0.199
▪ Episiotomy during vacuum extraction	90 (62.64%)	21 (51.2%)	0.281
▪ Episiotomy during spontaneous delivery	142 (17.51%)	78 (23.93%)	0.016*
▪ Cervical tear	7 (0.73%)	4 (1.09%)	0.510
▪ Labial tear	137 (14.32%)	18 (4.90%)	< 0.001*
▪ Vaginal tear	241 (25.81%)	37 (10.08%)	< 0.001*
Gestational age at delivery in weeks	39 + 1 ± 2.12	39 + 1 ± 1.57	0.047*
Birth weight in g	3310.11 ± 607.166	3226.21 ± 440.487	< 0.001*
Infant height in cm	50.59 ± 3.30	50.18 ± 2.41	< 0.001*
Infant head circumference in cm	34.5 ± 2.05	34.26 ± 1.76	< 0.001*
▪ Infant < 10 th percentile	165 (11.7%)	71 (15.1%)	0.064
▪ Infant: 10–90 th percentile	1156 (82.0%)	387 (82.3%)	0.890
▪ Infant > 90 th percentile	89 (6.3%)	12 (2.6%)	0.0013*
Arterial cord blood pH	7.23 ± 0.080	7.2404 ± 0.07	0.356
▪ Arterial cord blood pH < 7	7 (0.5%)	–	0.203
▪ Arterial cord blood pH 7.0–7.09	51 (3.6%)	7 (1.5%)	0.0202*
▪ Arterial cord blood pH 7.1–7.19	329 (23.5%)	113 (24%)	0.203
▪ Arterial cord blood pH ≥ 7.20	1014 (72.4%)	350 (74.5%)	0.310
5-minute Apgar score	9.33 ± 0.981	9.46 ± 0.92	0.003*
5-minute Apgar score ≤ 7	76 (5.4%)	20 (4.3%)	0.397
Transfer to neonatal department	224 (16.0%)	56 (11.9%)	0.036*
At ≥ 37 + 0 weeks of gestation	148 (11.3%)	39 (8.8%)	0.182
Peripartum blood loss in ml	400.54 ± 303.238	434.38 ± 417.05	0.229
Blood loss			
▪ < 500 ml	893 (64.6%)	307 (65.9%)	0.654
▪ ≥ 500 to < 1000 ml	441 (31.9%)	136 (29.2%)	0.298
▪ ≥ 1000 to < 1500 ml	29 (2.1%)	12 (2.6%)	0.585
▪ ≥ 1500 ml	19 (1.4%)	11 (2.4%)	0.144
Hemoglobin concentrations at discharge (mg/dl)	10.95 ± 1.47	10.88 ± 1.57	0.639
Received packed red blood cells	6 (0.4%)	8 (1.7%)	0.0101*

16%, p < 0.0036). The 5-minute Apgar score was slightly better for children born to women of Vietnamese origin (V: 9.46 vs. = NV: 9.33, p = 0.003). Likewise, detection of acidosis in arterial cord blood pH occurred less often in neonates born to women of Vietnamese origin (NV: 3.6% vs. V: 1.5%, p = 0.0202). Macrosomia also occurred less often in children born to women of Vietnamese origin (V: 2.6% vs. NV: 6.3%, p = 0.0013), although it must be noted that percentile curves for "Caucasian" children were used [6].

▶**Table 3** Basic characteristics of the group of patients of Vietnamese origin with and without a registered address in a shelter for refugees, including the number of cases; Mann-Whitney U-test was used for nominal variables and two-sided Fisher's exact test for categorical variables (level of significance p = 0.05).

	Vietnamese migration background and a registered address in a shelter for refugees	n	Vietnamese migration background and a private address	n	p
Maternal age (years)	26.46 ± 4.5	209	29.48 ± 5.7	261	< 0.001*
Height (cm)	155.87 ± 4.60	209	156.79 ± 5.01	261	0.066
Body mass index (BMI) (kg/m^2)	20.66 ± 2.71	205	20.73 ± 2.69	257	0.645
Underweight (< 18.5 kg/m^2)	43 (20.98 %)		50 (19.46 %)		0.727
Normal weight (18.5–< 30 kg/m^2)	159 (77.56 %)		205 (79.77 %)		0.569
Overweight (≥ 30 kg/m^2)	3 (1.4 %)		2 (0.8 %)		0.659
Parity	1.54 ± 0.73	209	1.96 ± 0.995	261	< 0.001*
Gravidity	1.67 ± 0.89		2.26 ± 1.23		< 0.001*
Primiparous	99 (57.9 %)		104 (39.8 %)		0.1115
First trimester screening in week 11 + 0–13 + 0 of gestation	3 (4.5 %)	66	20 (16.3 %)	123	0.0196*
Detailed fetal scan in week 18 + 0–22 + 0 of gestation	19 (28.8 %)	66	84 (68.3 %)	123	< 0.001*
Number of antenatal care visits		206	8.97 ± 3.0	249	< 0.001*
▪ ≤ 4	7.67 ± 2.82		21 (8.4 %)		0.0944
▪ 5–7	28 (13.6 %)		21 (19.7 %)		< 0.001*
▪ 8–11	72 (35 %)		21 (53.8 %)		< 0.001*
▪ ≥ 12	90 (43.7 %)		45 (18.1 %)		0.0014*
First antenatal care visit	16 (7.8 %)	204		258	
▪ Before 11 th week of gestation	30 (14.7 %)		92 (35.65 %)		< 0.001*
▪ Between 11 th–20 th week of gestation	91 (44.6 %)		130 (50.39 %)		0.224
▪ > 20 th week of gestation	83 (40.69 %)		36 (2.3 %)		< 0.001*
HBsAg positive	13 (6.2 %)	209	17 (6.5 %)	261	1.0
Gestational diabetes		208		261	
▪ Positive test	24 (11.5 %)		39 (14.9 %)		0.340
▪ No test carried out	62 (29.8 %)		56 (21.5 %)		0.042*
▪ Insulin-dependent gestational diabetes	–	24	11 (28.20 %)	39	0.004*

Difference between women of Vietnamese origin registered in a refugee shelter and those not registered in refugee shelter

The characteristics of Vietnamese patients registered in a refugee shelter and women of Vietnamese origin not registered in a refugee shelter are listed in ▶ **Table 3**. Details on the respective pregnancy outcomes are given in **Table S1**. Vietnamese women with a registered address in a refugee shelter were three years younger, on average, compared to Vietnamese women who did not live in a refugee shelter (26.46 vs. 29.49 years, p < 0.001), had fewer children and had given birth less often (mean: 1.54 vs. 1.96, p < 0.001). With a rate of 4.5 % vs. 16.3 % (p = 0.0196), they were far less likely to attend a first trimester screening appointment and had a detailed fetal ultrasound screening (second trimester screening in weeks 18 + 0–22 + 0 of gestation) less than half as often (28.8 % vs. 68.3 %, p < 0.001) and in 40.7 % of cases vs. 2.3 % (p < 0.001) only presented to an antenatal screening visit after week 20 of gestation. Women living in a refugee shelter required an unplanned caesarean section significantly more often (56.76 % vs. 33.33 %, p = 0.024); at 13.5 % vs. 1.5 %, the percentage of emergency caesareans in this group was high (p = 0.022). The resulting maternal and infant birth outcomes show that infants born to mothers living in a refugee shelter had the same results with regards to Apgar scores and arterial cord blood pH-values but required transfer to a neonatal department less often (6.69 % vs. 16.09 %, p = 0.0016) despite a higher SGA rate (small for gesta-

tional age, neonatal weight ≤ 10 th percentile) of 20.09 % (vs. 11.1 %, p = 0.0092). Peripartum blood loss of more than 500 ml also occurred more often in Vietnamese women living in a refugee shelter than in the comparison groups (70.82 % vs. 60.91 %, p = 0.032).

Factors influencing caesarean section rate, neonatal transfer to a neonatal department, and 3 rd degree perineal tear

A comparison of the characteristics of women with and without a Vietnamese migration background and the subgroup analysis of Vietnamese patients living in a refugee shelter and Vietnamese patients not living in a refugee shelter showed significant differences between the compared groups, including differences in maternal height, BMI, the presence of gestational diabetes, neonatal birth weights, and attendance at antenatal screening visits as independent variables. Any significant impact of relevant independent variables on birth outcomes therefore had to be investigated using multivariable regression analysis, especially the dependent variables "caesarean section rate", "rate of neonatal transfers to a neonatal department" and the "rate of perineal tears." ▶ **Fig. 3** and **Table S2** shows the results: according to our analysis, living in a refugee shelter had the greatest protective effect against the need to have a caesarean section, with an odds ratio (OR) of 0.51 (95 % CI: 0.36–0.73); greater maternal height was also a protective factor with an OR of 0.97 (95 % CI: 0.96–0.99). The effect of a Vietnamese migration background just missed being significantly protective with an OR of 0.68 (95 % CI: 0.43–1.01).

According to our analysis, a higher gestational age at delivery (OR 0.93, 95 % CI: 0.91–0.95), a higher 5-minute Apgar score (OR 0.45, 95 % CI: 0.38–0.52) and maternal residence in a shelter for refugees (OR 0.45, 95 % CI: 0.23–0.89) had a significant protective effect on the transfer rates of neonates to the neonatal department.

When we investigated the factors influencing the occurrence of a 3 rd or 4 th degree perineal tear, multivariable regression analysis showed that a Vietnamese migration background was the only significant risk factor with an OR of 5.39 (95 % CI: 1.36–21.30).

Discussion

Summary of the most important findings

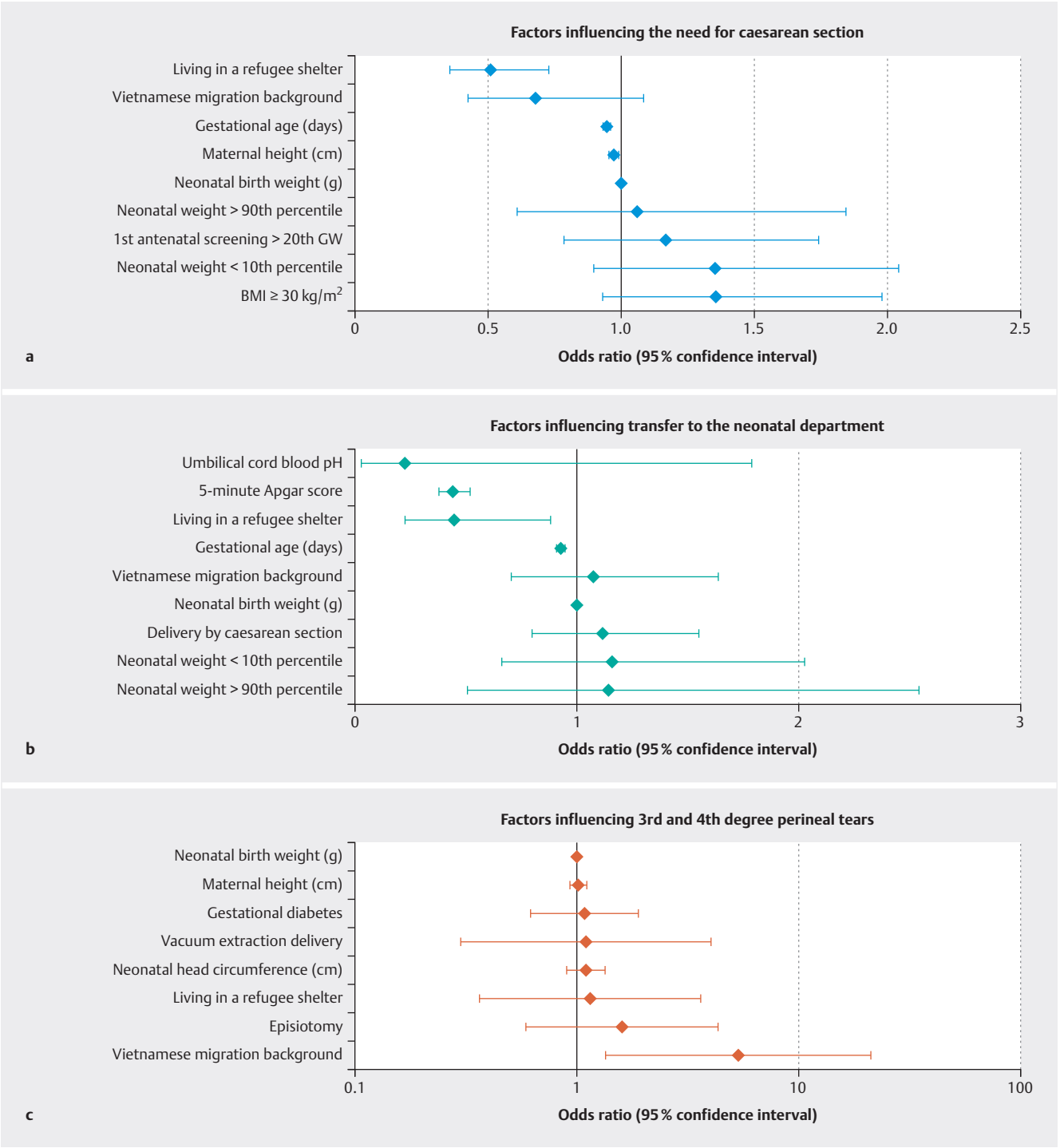
The investigated women with a Vietnamese migration background attended fewer antenatal screening appointments compared to the control group, but the pregnancy outcomes for women with a Vietnamese migration background were just as good and the caesarean section rates were lower as were the transfer rates of neonates to the neonatal department. Regression analysis showed that the independent protective variable against caesarean section was not a Vietnamese migration background as such, but maternal residence status with the mother living in a shelter for refugees. Interestingly, alongside the Apgar score, refugee status was an independent protective factor against transfer of the neonate to the neonatal department, and not the Vietnamese migration background as such.

Antenatal care of women with a Vietnamese migration background

The percentage of Vietnamese patients living, or at least registered as living, in a refugee shelter was surprisingly high at 44 %. In the European Union, the percentage of persons with refugee status according to the data of the UNHCR (United Nations High Commissioner for Refugees) was 0.6 % in 2022, which almost corresponds to the percentage of patients in our investigated control group registered as staying in a refugee shelter without a Vietnamese migration background (0.8 %)

As 95 % of the Vietnamese women registered to a refugee shelter only attended antenatal care appointments from week 11 of gestation and just under 41 % only attended antenatal screening appointments from week 20 of gestation, future studies should investigate whether these pregnant women are not offered adequate medical screening early on or whether they have only been living in Germany since a short time and the necessary medical examinations have been carried out abroad. Even if first trimester screening is not part of the Maternity Protection Directive (*Mutterschaftsrichtlinie*) issued by the Joint Federal Committee of Germany despite this being proposed by the Fetal Medicine Foundation, first trimester screening has the potential to detect 40–70 % of serious malformations early on; up to 95 % of aneuploidies are detected [7, 8, 9]

The generally higher risk of Asian female patients should also be considered, meaning that screening for gestational diabetes should be carried out even if Asian women present quite late for their first gynecological examination and, if necessary, these women should be given nutritional counselling in their national language [10, 11, 12]. In all cases, our study found that identified pregnancy outcomes for the group of patients with a Vietnamese migration background, especially for women living in a refugee shelter, were not worse, despite the lower attendance at antenatal care appointments. These results agree with those of the comparative study of Vietnamese and non-Vietnamese women in Berlin of Boxall et al. Similarly, in their study of perinatal outcomes which compared women with and those without a refugee status, Rosenberg-Jeß et al. came to the conclusion that there was no difference in pregnancy outcomes despite the lower levels of antenatal care [13, 14]. In their review published in 2023, Ramadan et al. summarized international studies published in the last 50 years which examined the perinatal outcomes of women with refugee status in OECD countries. Out of more than 1000 publications, the authors only identified nine publications which studied the perinatal health outcomes of refugees; one of these studies was an Australian survey which analyzed the perinatal outcomes of Vietnamese refugees. The authors also reported lower caesarean section rates and a lower need for peripartum analgesia. Studies of refugee women from other countries showed the same or lower caesarean section rates compared to local women in the respective country [15]. The systematic review by Heslehurst, which compared 29 reviews on the perinatal care of women with a refugee status and female asylum seekers, has pointed to the sometimes contradictory findings with regards to preterm birth rate, fetal growth restriction, perinatal mortality and mode of delivery [16]. The authors explain this by pointing out the heterogeneity of



▶ **Fig. 3** Factors influencing caesarean section according to multivariate regression analysis; the odds ratios (OR) and 95 % confidence intervals (CI) are shown.

the study populations and the differences in countries of origin and host countries.

The finding that perinatal outcomes were better despite poorer socioeconomic conditions has been called the "Latina paradox," in reference to the perinatal outcomes of female Hispanic immigrants to the USA compared to women already living in the USA [14]. Cited reasons for this paradox include differences in eating habits and nicotine consumption and cultural differences. When the "Latina paradox" is transferred to other populations, it is known as the "healthy migrant effect," i.e., despite poorer social and/or financial conditions, immigrants are in better health than the populations in their country of origin and the host country [17]. The healthy migrant effect in our analysis is underlined by the fact that the reasons cited for having a planned caesarean

section did not include pre-existing maternal or fetal medical conditions or growth restriction. Women who have the health and social resources to migrate from Vietnam to Germany could therefore also have better pregnancy outcomes. Elshahat et al. accounted for the healthy migrant effect by suggesting that immigrants have greater resilience and adaptability to adverse living conditions [18]. As regards our study population, it could be speculated whether Vietnamese women who only recently immigrated to Germany might have different cultural concepts about antenatal care and giving birth compared to women with a Vietnamese migration background who were born in Germany or had lived in Germany for some time and had therefore adapted to "German conditions."

Mode of delivery: caesarean section

In contrast to pre-existing medical conditions which require caesarean section, "soft" indications for caesarean section such as preventive caesarean section or caesarean section for failure to progress in labor were not diagnosed in individual women with a Vietnamese migration background or Vietnamese women registered to a refugee shelter. Future studies will be required to determine whether a poorer overall state of health or more frequent antenatal counselling and medical interventions during antenatal care might have led to the high rates of caesarean section in non-Vietnamese women.

With regards to women of Vietnamese origin, cultural preferences as well as more limited communication with these women due to the language barrier could also have played a role; this could not be conclusively determined in our study.

The state of Queensland has provided an online summary of the preferences and cultural practices associated with birth in the Vietnamese diaspora in Australia [19]. The document also reports that Vietnamese women are skeptical about having a caesarean section and fear complications such as blood loss. At the same time, other publications show that the caesarean section rate in the urban areas of Vietnam has risen to more than 40 % and is associated with higher incomes, high or low infant birth weights, and higher maternal age [20].

Our high percentage (15 %) of emergency caesarean sections in Vietnamese women who lived in a refugee shelter is also replicated in the literature; Gagnon et al. suggested that low income and a lack of health care insurance are risk factors [21]. Miani et al. confirmed a connection between low income and emergency caesarean section [22].

As the patients of Vietnamese origin in our study population were about 10 cm shorter and slim, cephalopelvic disproportion was also expected. In fact, failure to progress in labor as an indication for caesarean section was reported more than twice as many times for the group of patients with a Vietnamese migration background (V: 44.19 % vs. NV: 18.90 %); however, the incidence of planned caesarean sections for macrosomia was almost the same in both groups (NV: 3.8 % and V: 3.3 %).

Mode of delivery: vaginal delivery

EDA rates and the occurrence of higher degree perineal tears differed considerably between women with and women without a Vietnamese migration background.

Only half as many women with a Vietnamese migration background received EDA during vaginal delivery compared to women with a different migration background or women of German origin, although there were no differences with regards to refugee status. This difference could be due to insufficient medical information because of the language barrier but could also be ascribed to cultural preferences and ideas about EDA catheter placement, as Dao et al. showed in a study carried out in Switzerland [15, 23]. In a survey carried out in Hanoi, Nguyen reported that for the 50 % of women who had EDA during vaginal delivery, maternal age > 35 years, multiparity, higher income and higher educational status as well as an urban place of origin were predictors for the request for EDA [24]. These are findings that concur with the lower EDA rate found in our study for primiparous women with a lower mean age who were often refugees.

The literature largely confirms that higher degree perineal tears are three times more common in women with a Vietnamese migration background. Although a similar study by Boxall et al., which investigated the perinatal data of Vietnamese women, only reported a higher rate of episiotomies, something we had also noted in our cohort, and reported no change in the rate of third-degree perineal tears, this was contrary to findings in other international publications [13]. Just like our regression analysis showed (OR for 3 rd or 4 th degree perineal tear, Vietnamese migration background 5.4, 95 % CI: 1.4–21.4), in an analysis of patients living in Australia Davies-Tuck et al. also found that south Asian ethnicity was an independent risk factor for a higher degree perineal tear with an OR of 3.1 (95 % CI: 2.3–4.0) [25]. The recently published systematic review by Park et al., which looked at the results of 27 studies published over the last 30 years, confirmed that Asian ethnicity is a risk factor for the occurrence of higher degree perineal tears in non-Asian countries but that this higher rate of perineal tears is only partly reproduced in Asian countries, suggesting, in the opinion of the authors, that social factors, the language barrier, and racism could also be potential influencing factors [26]. Purely biological factors such as small maternal height or length of the perineum were not identified in the review as significant factors for a higher incidence of perineal tears.

Limitations

This study is a retrospective exploratory analysis, in which patients with a Vietnamese migration background were identified based on an analysis of their names, and were compared with a heterogeneous group of parturient women of non-Vietnamese origin. Even though no data on the specific ethnicity of patients was collected, this onomastic approach used to identify people from Vietnam has accuracy rates of more than 99 % [27, 28].

The women in our study who served as the comparison group for the women of Vietnamese origin consisted of a group of women different nationalities and origins. The potential impact of a possible language barrier could therefore not be determined for either the group of Vietnamese women or for the control group,

as no information on the German language skills of the investigated patients with and without a Vietnamese migration background was available. There was also no information about patients' social status, level of education and financial situation.

Conclusion for medical practice

The good pregnancy outcomes despite the more limited antenatal care reported for women with a Vietnamese migration background with and without a registered address in a refugee shelter should prompt reflections on how to make better use of resources when providing gynecological care to pregnant women. The inverted pyramid proposed by Nicolaides, which selects high and low-risk patients early on and only envisages a few routine examinations for healthy pregnant women in the third trimester of pregnancy, could serve as an example [29].

In addition to providing interpreters to avoid language barriers and showing sufficient empathy for the patient's individual wishes, gynecological counseling about the choice of delivery mode also requires that patients are properly informed about the incidence of risks during delivery. A closer study into the reasons for the not insignificant number of failed labor inductions and preventive and repeat caesarean sections carried out in non-Vietnamese women could potentially reduce the overall rate of caesarean sections in Germany in future.

Supplement

Table S1: Comparison of mode of delivery and birth injuries of patients with a Vietnamese migration background registered as living in a refugee shelter and those not living in a refugee shelter; Mann-Whitney U-test was used for nominal variables and two-sided Fisher's exact test for categorical variables (level of significance: $p = 0.05$).

Table S2: Regression analysis: **a)** factors influencing caesarean sections, **b)** transfer to the neonatal department, **c)** third-degree perineal tear.

Note

The investigation received no funding. Due to its retrospective character, we did not perform a public registration in advance.

Conflict of Interest

The authors declare that they have no conflict of interest.

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