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Increased risk of adverse maternal pregnancy outcomes among undocumented migrants in Norway

Ragnhild Misje [a], Frode Eick [a,b], Odd Martin Vallersnes [c,d], Heidi E. Fjeld [a], Ingvil K. Sørbye [e], Cecilie Dahl [f,*]

[a] Department of Community Medicine and Global Health, Institute of Health and Society, University of Oslo, Norway
[b] Lovisenberg Diaconal University College, Oslo, Norway
[c] Department of General Practice, Institute of Health and Society, University of Oslo, Norway
[d] Oslo Accident and Emergency Outpatient Clinic, Department of Emergency General Practice, City of Oslo Health Agency, Norway
[e] Department of Obstetrics, Division of Gynaecology and Obstetrics, Oslo University Hospital, Norway
[f] Department of Public Health Science, Institute of Health and Society, University of Oslo, Address: Postboks 1130 Blindern, Oslo 0318, Norway

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ABSTRACT

Background: Migrants are known to have an increased risk for adverse complications during delivery. However, it is not known whether undocumented migrants have a different risk profile compared to documented migrants and non-migrants. Better knowledge about undocumented migrants' reproductive outcomes is crucial to enable targeted preventive interventions.

Method: We performed a historical register-based population study based on numbers from the Medical Birth Registry of Norway (MBRN) from 1999 to 2020. Women aged 18–49 years with singleton births were included, in total 1,247,537 births. Legal status, i.e., undocumented migrants (without a Norwegian identity number), documented migrants (with a Norwegian identity number and born abroad) and non-migrants (with a Norwegian identity number and born in Norway), was used as the exposure. We used logistic regression to estimate the association between legal status and adverse maternal birth outcomes.

Results: In total 5856 undocumented migrant women gave birth during the study period, representing 0.5 % of all births in Norway. Undocumented migrants had an odds ratio (OR) of 1.39 (95 % Confidence Interval (CI) 1.28–1.50) for an acute CS and OR=0.86 (95 % CI 0.76–0.98) for a planned CS, both compared to non-migrants. Similarly, the OR for severe postpartum haemorrhage (PPH) was =1.22 (95 % CI 1.03–1.43) and OR=0.69 (95 % CI=0.56–0.85) for anal sphincter injury. None of the results were significantly different when documented migrants were used as the reference group.

Conclusion: Undocumented migrants have an increased risk of adverse maternal birth complications compared to non-migrants, but not different from documented migrants. This indicates that for maternal birth complications, factors concerning migration may affect the risk profile to a larger degree than legal status.

1. Introduction

Undocumented migrants across Europe often face challenging living conditions and most countries have restricted their right to health care (Haddeland, 2019, Noret et al., 2017, Onarheim et al., 2018), despite their known health risks. These restrictions are considered important barriers to the goal of universal health coverage for all (Onarheim et al., 2018, Winters et al., 2018, Sawyer et al., 2011). In Norway, while universal health coverage is available to most residents, undocumented migrants are generally limited to emergency care and excluded from types of care such as primary health care provided by general practitioners (GPs) and non-emergency hospital services. Pregnant women and children, recognised as particularly vulnerable are entitled to special protection under international law (Universal Declaration of Human Rights 1948). This principle is reflected in the legislation of several countries, including Norway, where legal access to health care is granted during pregnancy and labour (Universal Declaration of Human Rights 2011). In 2011, Norway introduced a regulation allowing undocumented migrants full access to antenatal care and to give birth at a hospital, However, they remain excluded from access to a GP and

* Corresponding author.
E-mail address: cecilie.dahl@medisin.uio.no (C. Dahl).

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reimbursement schemes, both crucial components of the Norwegian public health care system (Eick et al., 2022).

Despite fundamental rights to health care, several studies have found that undocumented migrants are at increased risk of receiving suboptimal care during pregnancy (Winters et al., 2018, de Jong et al., 2017, Munro et al., 2013, Gieles et al., 2019, Merry et al., 2013). Documented migrants (i.e. migrants granted legal residency) have been found to have a higher risk of acute caesarean section (CS) and other complications during labour (Gieles et al., 2019, Merry et al., 2013, Liu et al., 2019). Previous studies have identified country of birth, length of residency, and language barriers as important risk factors for maternal birth/-labour complications (Sørbye et al., 2022, L Merry et al., 2016, Abubakar et al., 2018) The risk of labour complications among undocumented migrants is, however, not known and the literature calls for larger, quantitative studies on maternal and perinatal birth outcomes (Munro et al., 2013, Liu et al., 2019).

Norwegian guidelines define the core adverse maternal outcomes as caesarean section (CS), severe postpartum haemorrhage (PPH) (>1500 ml or need for blood transfusion), obstetric anal sphincter rupture grade 3 and 4 (OASI), and instrumental vaginal birth by forceps or vacuum (Laine et al., 2020, Macsali et al., 2020, Nyfløt et al., 2020). However, these complications are highly different types. CS is considered a complication and is associated with more negative outcomes for mother and child, but is also a mode of delivery, a potentially lifesaving procedure (Sandall et al., 2018, Boerma et al., 2018, de Leeuw and Daly, 2021). Important indications for acute CS are a failure in labour progress and foetal distress, both diagnoses largely dependent on clinical assessment (L Merry et al., 2016). This makes acute CS a complication with a complex causality. Planned CS are planned before the onset of labour and are often due to clinical necessities (Coates et al., 2020). CS itself, no matter its reason, is associated with a broad range of complications for both mother and child. Maternal complications after a CS can be divided into short-term, including haemorrhage or wound infection, and long-term including a higher risk of abnormal placentation, ectopic pregnancy or uterine rupture in the next pregnancy (Sandall et al., 2018, Eriksen et al., 2009). PPH and OASI have no positive outcomes and should always be avoided (Abedzadeh-Kalahroudi et al., 2019, Al-Zirqi et al., 2008). While these can be considered due to physiological factors, there are still important prevention measures. Studies have shown that there is an increased risk for OASI among women who do not speak the majority language and communication in the last phase of birth is considered effective to prevent OASI (Sørbye et al., 2022). All adverse maternal complications call for a closer follow-up in the weeks after labour (Sandall et al., 2018, de Leeuw and Daly, 2021, World Health Organization 2012, Henrich et al., 2008, Betrán et al., 2018).

Undocumented migrants are a group that, in the capacity of being undocumented, are difficult to study and follow up during pregnancy. While some studies have found an increased risk of adverse maternal complications among documented migrants, there is little evidence of the state of undocumented migrants. The current study aimed to determine whether undocumented migrants have a different risk of complications during labour compared to documented migrants and non-migrants, with particular emphasis on related occurrences such as the use of CS. This was the first study on undocumented migrants and maternal pregnancy outcomes in Norway and is primarily descriptive. With this, we examine whether legal status is associated with maternal birth outcome/labour complications and infer whether the health care system in Norway is adequate to provide sufficient care during birth for all women.

2. Methods

2.1. Design

The study was a historical register-based population study of women who gave birth in Norway from 1999 until 2020. It was a descriptive study to estimate the association between legal status and maternal complications. The goal was not to establish causality. An a priori approach was used, and determinants were decided based on the previous literature.

2.2. Study population

The study population included all women between 18 and 49 with a singleton birth in Norway from 1999 until 2020 who were registered in the Medical Birth Registry of Norway (MBRN).

2.3. Setting

The Norwegian health system is universal and free of charge. Home births and private maternity services are unlikely and are also registered in the MBRN (World Health Organization 2019). Therefore, this study includes close to all births performed in Norway during our time of the study.

2.4. Data

The Medical Birth Registry of Norway (MBRN) is a National Health Registry where midwives, all birth institutions, and medical personnel assisting with home births are obliged to report a minimum amount of information about the birth, the woman's background and the antenatal care received. MBRN receives the data directly from the hospital computer systems (partus/natus). The data in this study were then transferred encrypted from MBRN to the secure TSD (Services for Sensitive Data) platform, developed for research and owned by the University of Oslo.

2.4. Exposure: women's legal status

We divided the legal status of the women into three categories: Undocumented migrants (i.e. women giving birth who did not have a permanent Norwegian identity number), documented migrants (women born abroad with a permanent Norwegian identity number) and non-migrants (Norwegian-born women with a permanent Norwegian identity number). For some undocumented migrants residing in Norway long-term, their status may shift to documented following subsequent births. This change can lead to retroactive updates in the MBRN for previous entries, often without explicit notation. Due to this restriction, the status had to be set as the current status at the time the data were extracted in April 2023.

2.5. Caesarean section and delivery outcomes

The mode of delivery was described in two ways. Firstly, as binominal categories of CS or vaginal birth. Secondly, CS was further divided into planned and acute CS. "Planned CS" is a CS planned before the onset of labour and performed > 8 hours after it is decided. "Acute CSs" are all other CSs (Macsali et al., 2020). MBRN did not differentiate between the different grades of acute CS. We did not include information about instrumental vaginal birth.

The occurrence of OASI was described as a binominal yes/no category of perineal lacerations grade 3 or 4. As OASI is not a possible result of a caesarean, these numbers are only estimated among vaginal births. PPH was categorized into two; bleeding 500–1500 ml and above 1500 ml/need for transfusion.

2.6. Maternal characteristics

The maternal characteristics were retrieved (directly) from the MBRN. Definitions were reported to MBRN according to applicable guidelines at the time of birth. We present the latest Norwegian guidelines.

Gestational diabetes was defined as fasting blood glucose ≥ 5.3–6.9 mmol/l and/or a 2-hour value of 9–11 mmol/l after a glucose tolerance test in pregnancy week 24–28 (Friis et al., 2020). Preeclampsia was defined as new-onset hypertension after pregnancy week 20 (systolic ≥ 140 mmHg and/or diastolic ≥ 90 mmHg) in combination with at least one other symptom of maternal or placental organ affection (Staff et al., 2020). Maternal age was presented in two ways. Firstly, as the median maternal age at the time of giving birth in all records, and secondly as the median maternal age at the time of giving birth in primiparous deliveries. Maternal body mass index (BMI) was calculated from registered weight at delivery. Marital status, work status and size of birth institution were retrieved directly from the MBRN. Parity (previous number of live births) was divided into groups of 0, 1–2 and 3 or more. Length of pregnancy was in number of weeks.

The maternal country of origin was categorized by the global burden of disease super regions (GBD 2019 Human Resources for Health Collaborators 2022). Undocumented migrants are not registered in the National Population Register. As information about the country of origin was extracted from this register, we did not have information about the maternal country of birth of the undocumented women.

2.7. Covariates

Potential confounding variables were identified based on the previous literature and determined using Directed Acyclic Graphs (DAGs) (Supplementary file) (Greenland et al., 1999, Textor et al., 2016): Marital status was identified as a confounder, due to its influence on legal status and maternal stress, which may lead to labour complications. Calendar year of the delivery (discrete numbers) was used to adjust for time trends, and maternal age to adjust for selection bias (younger women migrate and more often give birth). Parity was adjusted for as a confounder because it is known from the literature that it is strongly associated with ethnicity, a determinant we did not have information about (van den Akker and van Roosmalen, 2016). As maternal health conditions such as gestational diabetes or maternal BMI do not influence legal status, they are not considered confounders and were not adjusted for.

2.8. Statistical analysis

Descriptive maternal, pregnancy, and labour characteristics of the women were presented using numbers (n) and proportions (%). For maternal age and pregnancy length, we presented median and IQR.

Pearson chi-square and Wilcoxon tests were used to investigate whether there were significant differences in background factors between the groups of legal status. Logistic regression was used to estimate the association (odds ratio) with a 95 % confidence interval (CI) between the three different maternal complications and legal status.

Several comparisons were made: Firstly, Norwegian-born women were set as the reference group and the change of odds of labour complications in undocumented and documented were compared to this group. Secondly, we used documented migrants as the reference and compared the change in odds of labour complications in undocumented to this group. The p-value was set to 0.05. Assumptions for logical regression were checked, and robust variance estimators were applied to control for potential clustering of the women, as some women may have given birth several times during the study period (1999–2020). Potential multicollinearity was checked using variation inflation factor (VIF) and all values were <5.

In additional analyses, the data were divided into two groups based on calendar time, the first containing births before 01.01.2012, and the second containing births from this date and later. On this date, undocumented migrants were granted maternity rights by law in Norway. We also estimated the risk for acute and planned CS among primiparous women only.

3. Ethical approval

The study received approval from the Regional Ethical Committee (REC South-East, case number 68329), which also granted an exemption from consent to obtain information from the MBRN. A Data Protection Impact Assessment (DPIA) was conducted in collaboration with the Norwegian Centre for Research Data and approved by the University of Oslo.

4. Results

4.1. Demographic characteristics

We retrieved 1,247,537 birth records, comprising 95.9% of the total birth records in the study period. Fig. 1 shows which births were excluded from the final analysis. A total of 76.4% of the women were non-migrants, 23.1% were documented migrants and 0.55% were undocumented migrants (Eick et al., 2024).

Table 1 shows the characteristics of the women. The prevalence of induced onset of birth was similar in all groups. Undocumented migrants had a similar prevalence of diabetes as non-migrants, and lower than documented migrants. They were younger than documented migrants. Undocumented migrants were more often nulliparous and a higher proportion had parity of 3 or more compared to non-migrants but not to documented migrants. They more often gave birth before 34 weeks and after 42 weeks compared to documented migrants and non-migrants but had a similar median length of pregnancy. The prevalence of preeclampsia was similar in all groups.

4.2. Caesarean sections

Table 2 shows the proportion of birth complications by legal status. The proportion of reported acute CS was similar among undocumented migrants (11.5%) and documented migrants (11.7%), this was higher than among non-migrants (9.0%). There was a lower proportion of planned CS in undocumented migrants than in both documented migrants and non-migrants. Fig. 2 shows the proportion of acute and planned CS by legal status from 1999–2020.

Table 3 shows *odds ratios (ORs) for the different complications. Comparison 1 shows the odds for undocumented migrants compared with non-migrants, comparison 2 shows the odds for documented migrants compared to non-migrants and comparison 3 shows the odds for undocumented migrants compared to documented migrants.

Undocumented migrants had, in the adjusted analysis, a higher risk of acute CS compared to non-migrants, OR=1.39 (95 % CI=1.28–1.51). The risk among documented migrants in the adjusted analysis was similar, with OR=1.38 (1.36–1.39). Undocumented migrants had a lower risk of planned CS than non-migrants, OR=0.86 (0.76–0.98), and documented migrants had a slightly lower risk compared to non-migrants, OR=0.97 (0.96–0.99), both in the adjusted analyses. Undocumented migrants had similar risk of acute CS compared to documented migrants, OR=1.01 (0.93–1.1), and lower risk of planned CS, OR=0.89 (0.78–1.0). Undocumented migrants had an increased risk for PPH in general compared to non-migrants, OR=1.11 (1.04–1.19). Further divided into subgroups the risk was close to similar for bleeding 500–1500 ml compared to non-migrants, OR=1.09 (1.02–1.17), but increased for bleeding > 1500 ml, OR=1.22 (1.03–1.43). Undocumented migrants had a lower risk for OASI with OR=0.70 (0.57–0.87).

4.3. Additional analyses

When only including primiparous women, both undocumented and documented migrants had an increased risk of acute CS with OR=1.21 (1.09–1.35) for undocumented and OR=1.27 (1.25–1.30) for documented compared to non-migrants. For planned CS primiparous undocumented had a lower risk than non-migrants, OR=0.66 (0.51–0.86)

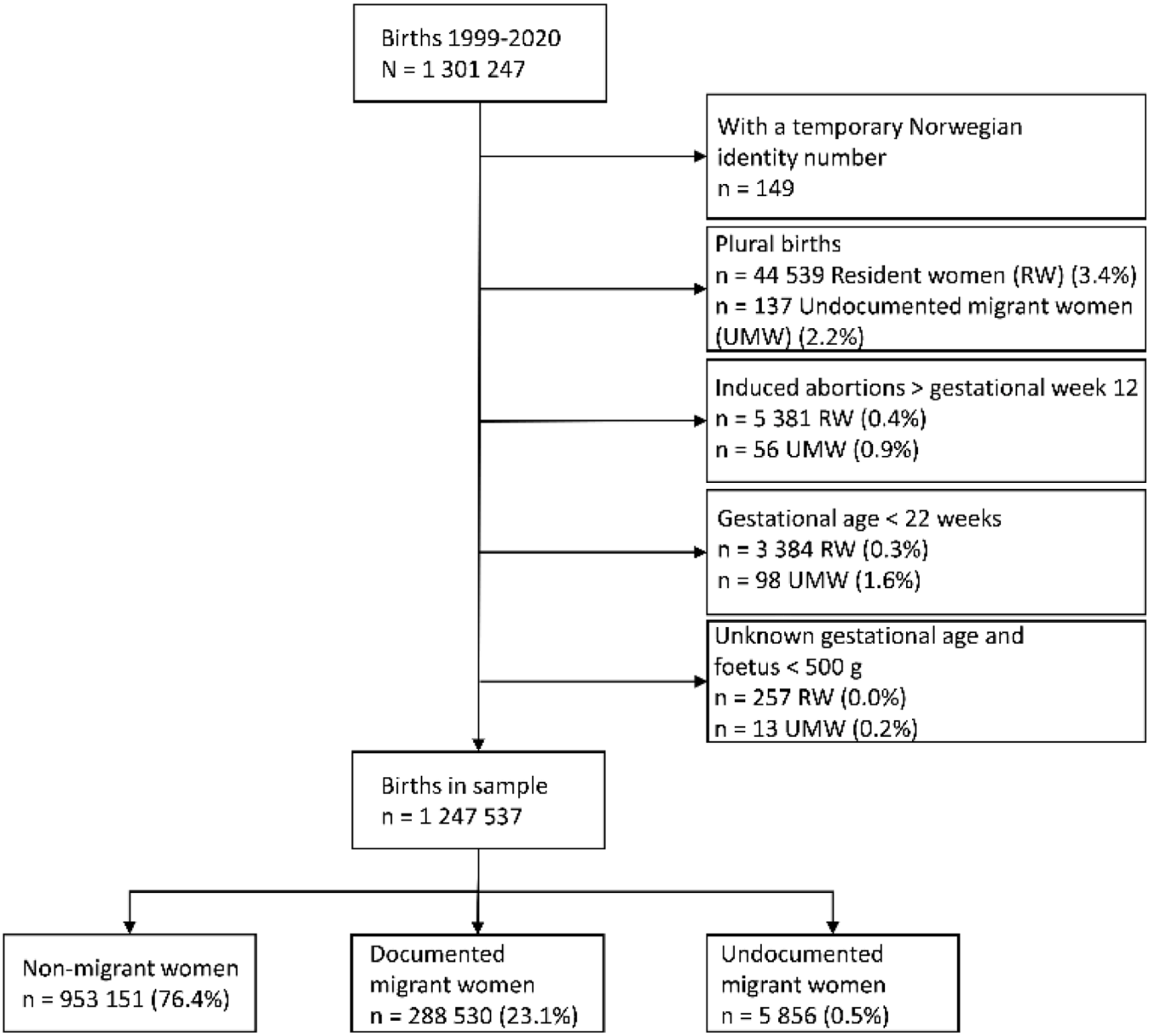

Fig. 1. Flowchart of included births (printed with permission from Eick et al., 2024).

and documented a similar risk to non-migrants, OR=1.04 (1.0–1.07). We also divided the population before and after 2012. There was an increase in the risk of any type of CS after 2012. This increase consisted mainly of the risk of planned CS from OR=0.76 (0.64–0.91) before 2012 to OR=1.0 (0.84–1.2) after 2012 (i.e. no difference by legal status after 2012). For acute CS the risk remained quite similar with OR=1.33 (1.19–1.49) before 2012 and OR=1.46 (1.30–1.65) after.

5. Discussion

5.1. Main findings

Undocumented migrants had a higher risk of acute CS compared to non-migrants, but a similar risk compared to documented migrants. Undocumented migrants also had a lower risk of a planned CS, compared with both non-migrant women and documented migrants. Additionally, undocumented migrants had a higher risk of PPH, particularly above 1500 ml, and a lower risk of obstetric anal sphincter injury. The findings regarding CS were consistent when adjusting for confounders, when including only primiparous women, and when analysing before and after undocumented migrants were granted more equal maternity rights in the year 2011.

5.2. Comparison to other European studies

This is the first study of maternal birth complications in undocumented migrant women living in Norway and among a few of its kind in Europe. The higher risk of maternal complications agrees with previous studies on migration status and birth complications (Merry et al., 2013, Liu et al., 2019, Sørbye et al., 2022, van den Akker and van Roosmalen, 2016, Tasa et al., 2021, M Eslier et al., 2023). While most studies on undocumented migrants and birth outcomes have been concerned with perinatal outcomes in the offspring, there have in recent years been few studies concerning maternal birth complications. The estimates vary according to the country and the comparison groups used. A Swedish study from 2019 compared maternal outcomes in asylum seekers, and potential undocumented migrants vs. other migrants, meaning migrants who had received a residence permit. In line with our results, the study

Table 1
Characteristics of women who gave birth in Norway 1999–2020 by legal and migrant status, recorded in the Medical Birth Registry of Norway (MBRN).

	Undocumented migrants n=5,856	%	Documented migrants n=288,530	%	Non-migrants n=953,151	
Birth Onset						
Spontaneous	4439	75,8	216,722	75,1	722,132	75,8
Induced	1033	17,6	50,356	17,5	163,411	17,1
Caesarean section	384	6,6	21,452	7,4	67,605	7,1
Missing	0	0	0	0	3	0
BMI of mother						
<17,5	42	0,7	2585	0,9	3060	0,3
17,5-24,9	1341	22,9	90,689	31,4	223,356	23,4
25-29,9	544	9,3	30,771	10,7	84,290	8,8
30-34,9	200	3,4	9693	3,3	32,184	3,4
>35	72	1.2	3679	1,3	6057	1,7
Missing	3657	62,5	151,112	52,4	593,574	62,3
Marital Status						
Married	3603	61,5	203,265	70,5	373,211	39,2
Cohabitant	1535	26,2	61,317	21,3	514,175	54,0
Unmarried/single	473	8,1	15,778	5,5	52,142	5,5
Divorced/Widowed	40	0,7	3026	1,1	2838	0,3
Other/Unknown	205	3,5	5121	1,8	10,733	1,1
Missing	0	0	23	0,01	51	0,01
Maternal country of Origin						
High-income countries	N/A[1]		62,929	22,7		
Central and Eastern Europe			70,142	25,3		
Sub-Saharan Africa			38,041	13,7		
North Africa			37,538	13,5		
South and South-East Asia			60,146	21,7		
Latin Amerika			8 871	3,2		
Diabetes						
PreGD2 type 1	12	0,2	721	0,3	4 898	0,5
PreGD type 2	12	0,2	1090	0,4	1 551	0,2
PreGD unspecified	0	0	53	0,02	150	0,02
GD	127	2,2	12,450	4,3	18,027	1,9
No diabetes	5 704	97,4	274,015	95,0	927,497	97,3
Length of pregnancy in weeks						
Median	40,1		40		40,1	
IQR	39-41		39-40,1		39.1-41	
Maternal Age						
Median all	28		30		30	
IQR	24-32		27-34		26-33	
Median primiparous	27		28		28	
IQR	23-30		25-32		24-31	
Parity						
0	2 773	46,7	117,990	40,9	398,527	41,8
1-2	2 589	44,2	142,256	49,3	503,060	52,8
3 or more	530	9,1	28,284	9,8	51,564	5,4
Missing	0	0	0	0	0	0
Preeclampsia						
No	5726	97,8	281,423	97,5	920,913	96,6
Mild	73	1,3	4038	1,4	20,623	2,2
Severe	51	0,9	2361	0,8	8765	0,9
Unspecified	6	0,1	708	0,3	2850	0,3
Size of Birth Institution in Births per Year						
0-499	643	11	22,066	7,7	104,725	11
500-2999	3226	55	123,618	42,8	464,823	48,8
>3000	1913	32,7	140,229	48,6	375,275	39,4
Homebirths	24	0,4	1524	0,5	4611	0,5
Unknown/transport	50	0,9	1093	0,4	3717	0,4
Work Status						
Not working	2251	38,4	78,251	27,1	106,608	11,1
Part-time	326	5,6	28,319	9,8	126,164	13,2
Full time	907	15,5	94,396	32,7	516,471	54,2
Missing	2372	40,5	87,564	30,4	204,448	21,5

All differences in background factors between groups of legal status were significant with a p-value <0.5, IQR=Interquartile range
[1] No information about the Country of Origin of the undocumented women was available.
[2]Pregestational Diabetes

found that the risk of acute CS was similar for the two migrant groups. Contrary to our findings, they found a 34% increased risk of planned CS among the group of asylum seekers compared to refugee women with a residence permit (Liu et al., 2019). A Finnish study from 2021 found the rate of CS among undocumented migrants to be 13% higher, but not statistically significantly different when they were compared to all other women giving birth (documented migrants and non-migrants) (Tasa et al., 2021). A study from France found that undocumented migrants in general had an increased risk of adverse birth complications (Eslier et al., 2020). Lastly, a Norwegian study investigating pregnancy outcomes of women who were seeking healthcare at non-governmental organizations (NGOs) in the largest cities (Oslo and Bergen) estimated the prevalence of CS to be 19.3%, a somewhat higher prevalence than was found in the current population-based study (Eick et al., 2022).

Table 2
Number (n) and percent (%) of birth complications recorded in the Medical Birth Registry of Norway (MBRN), by legal status and migrant status.

	Undocumented migrants n=5856	%	Documented migrants n=288,530	%	Non-migrants n=953,151	%
Mode of delivery						
Vaginal birth	4,921	84.0	238,441	82.6	814,000	85.4
Acute CS	673	11.5	33,642	11.7	84,690	5.7
Planned CS	256	4.4	16,306	5.7	54,014	8.9
Missing	6	0.1	141	0.05	447	0.05
Postpartum haemorrhage						
500-1500 ml	1,018	17.4	56,307	19.5	151,869	15.9
>1500 ml	153	2.6	8,809	2.8	20,114	2.1
OASI[1]	87	1.8	6348	2.7	21,952	2.7

[1] Estimated among only vaginal births, n=1,057,362

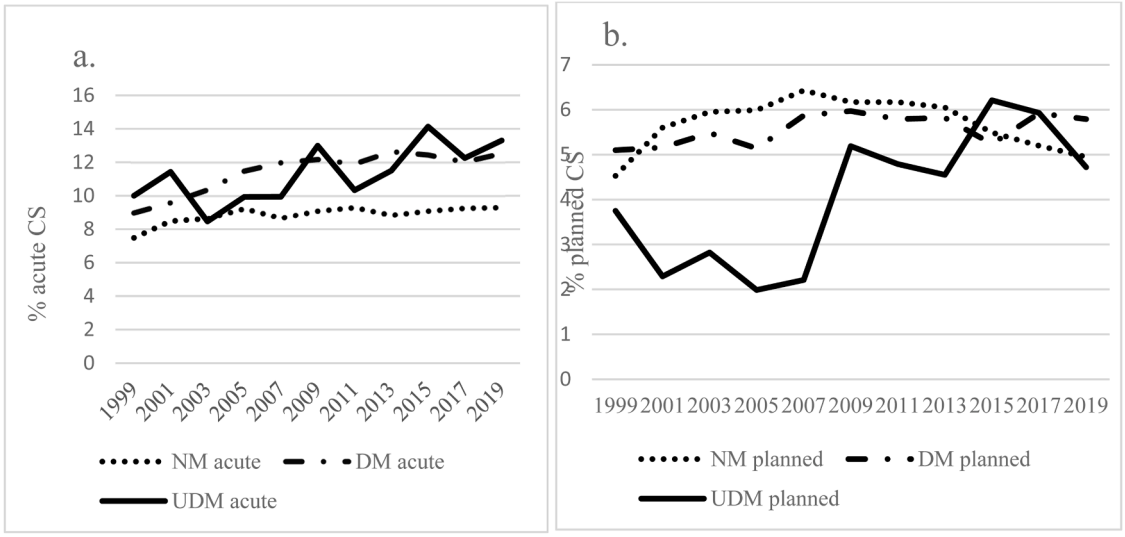

Fig. 2. Percentages (%) of acute (a) and planned (b) Caesarean Section (CS) recorded in the Medical Birth Registry of Norway (MBRN) by migrant status from 1999–2020: Non-migrants (NM), documented migrants (DM) and undocumented migrants (UDM).

Table 3
Crude and adjusted analysis for the association, odds ratio (OR) 95% Confidence Interval (CI) between legal status and adverse maternal outcomes using different reference groups recorded in the Medical Birth Registry of Norway (MBRN).

	OR (95% CI)	Crude analysis		Adjusted analysis[1]					
		Mode of delivery		Mode of delivery		Postpartum haemorrhage			Obstetric anal sphincter injury
		Acute CS vs. vaginal birth	**Planned CS vs. vaginal birth**	**Acute CS vs. vaginal birth**	**Planned CS vs. vaginal birth**	**Haemorrhage in general**	**500–1500 ml**	**>1500 ml**	**OASI[2]**
Comparison 1	Non-migrant	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Undocumented migrant	**1.31** (1.21–1.43)	**0.78** (0.69–0.89)	**1.39** (1.28–1.51)	**0.86** (0.76–0.98)	**1.11** (1.04–1.19)	**1.09** (1.02–1.17)	**1.22** (1.03–1.43)	**0.70** (0.57–0.87)
Comparison 2	Non-migrant	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Documented migrant	**1.36** (1.34–1.37)	**1.03** (1.01–1.05)	**1.37** (1.35–1.39)	**0.97** (0.96–0.99)	**1.19** (1.18–1.21)	**1.18** (1.16–1.19)	**1.21** (1.18–1.24)	**1.13** (1.09–1.6)
Comparison 3	Documented migrant	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Undocumented migrant	0.97 (0.89–1.05)	**0.74** (0.67–0.86)	1.01 (0.93–1.1)	0.89 (0.78–1.0)	0.93 (0.87–1.0)	0.93 (0.86–1.00)	1.00 (0.86–1.19)	**0.63** (0.51–0.8)

[1] Adjusted for parity, age of mother, calendar year of giving birth and marital status.
[2] Estimated among only vaginal births n=1057,362.
In bold: differences were significant with a p-value <0.5.

5.3. *Maternal health*

The health of the mother is known to influence her risk during pregnancy and birth (Sandall et al., 2018, Boerma et al., 2018, L Merry et al., 2016). The Norwegian guidelines point out diabetes, obesity, and higher age as important maternal risk factors for failure to progress in labour, ultimately increasing the risk of acute CS (Macsali et al., 2020). Migrants, in general, are known to be at increased risk for comorbidities such as diabetes, obesity, and infections during pregnancy (Liu et al., 2019, L Merry et al., 2016, van den Akker and van Roosmalen, 2016, M

Eslier et al., 2023). A Swedish study reported undocumented migrants to have a higher risk of comorbidities and poor self-reported health, and a French study reported a higher prevalence of HIV (Liu et al., 2019, Eslier et al., 2020). Particularly HIV is associated with a higher risk of acute CS (Chilaka and Konje, 2021, Ørbæk et al., 2020). It is possible that some of the differences in risk in the current study can be explained by differences in comorbidities between migrants and non-migrants.

On the other hand, the current study finds that undocumented migrants are younger than the two comparison groups, whereas comorbidities usually increase with age. Regardless of the uncertainties arising from the missing numbers, we did not find increased comorbidity among undocumented migrants. We did, however, find that undocumented migrants had higher parity, but our findings of an increased risk of labour complications in the undocumented group were consistent when including only primiparous women.

When arriving in a host country, migrants are often considered to be healthier than the general population as there is a selection of those who have the capacity to migrate, i.e. a "healthy migrant effect" (Rechel et al., 2013). This may be even stronger among undocumented migrants as there seems to be a tendency that only the healthiest of the undocumented have the resources to stay illegal in a country over time, referred to as the "unhealthy re-migrant effect" (Razum et al., 1998). Our findings agree with another Norwegian study that found undocumented migrants in Norway to have just as good, or sometimes better health than documented migrants and non-migrants (Eick et al., 2022). Furthermore, poor health is not considered a direct determinant of acute CS or other complications (L Merry et al., 2016). While poor maternal health may be a part of the mechanism of why undocumented migrants have an increased risk of labour complications, it is not likely to explain the whole difference in risk.

5.4. Migration as a Health Determinant

Socio-economic status is known to be associated with adverse maternal outcomes during birth (Almeida et al., 2013, Bollini et al., 2009, Jardine et al., 2020). Furthermore, there seems to be an association between social inclusion and pregnancy outcomes for migrants, as studies have shown that the risk of complications is approaching that of non-migrants with increasing length of residency. Also, this mechanism has two features.

Firstly, there is a concern that migrants in general receive a suboptimal follow-up during pregnancy and that this partly is explained by social exclusion because of linguistic and cultural barriers (Eick et al., 2022, Bollini et al., 2009, M Eslier et al., 2023, Gagnon et al., 2011). The concept of structural vulnerability can highlight this association, pointing to how political, social, and economic hierarchies affect health, and how health systems are not always able to compensate for increased vulnerability, but rather contribute to the worsening of health outcomes for certain populations, such as undocumented migrants (Carruth et al., 2021). We were not able to detect the pregnancy care received by the women. From previous studies, we know that despite equal rights to maternal health care, undocumented migrants still receive suboptimal care with later first antenatal visits and fewer visits in total throughout pregnancy than the recommended amount by the World Health Organization (8 visits recommended) (Eick et al., 2022, F Eick et al., 2023). In Norway *planned* CS is first and foremost performed due to factors possible to detect before or during pregnancy, such as maternal disease, placenta previa or abnormal foetal presentation (Macsali et al., 2020, Coates et al., 2020). We did find an increase in the risk of planned CS after the legislation change in 2011, with a lower risk for undocumented migrants compared to non-migrants before 2012, but a similar risk after 2012. However, the difference in risk of acute CS remained the same. The increased risk of planned CS may illustrate a closer follow-up during pregnancy and accordingly an increased detection of underlying risk factors such as comorbidities. The risk of acute CS did not decrease, which may illustrate that despite better follow-up, other factors have a stronger influence on the total risk profile.

Secondly, there are measures during labour that affect the outcome. A Lancet review on avoiding unnecessary CS found active management and dialogue during labour to be effective (Betrán et al., 2018). Planning and clear communication between health personnel and the woman giving birth are known to be important to provide a safe environment. It is known that the woman's feeling of safety influences the birth experience (Coates et al., 2020, Betrán et al., 2018, Grytten et al., 2013). Migrant women have pointed to culture and language differences as challenges in communication with midwives (Almeida et al., 2013, Fair et al., 2020).

5.5. The role of legal status

Undocumented migrants are facing the same challenges as documented migrants regarding the migration process and integration. In addition, they have several very specific challenges of restricted rights to work and health care, as well as restricted rights to all services that require a Norwegian identity number (Haddeland, 2019, Romero-Ortuño, 2004, Cuadra, 2012). Midwives working in primary health care services describe the challenges of providing optimal care to undocumented women due to the lack of Norwegian identity number, an often irregular lifestyle, and uncertainty regarding the rights of this patient group (Voldner et al., 2023).

Despite the structural and everyday challenges, our study does not show an increased risk of complications when comparing undocumented with documented migrants. As previously discussed, this may be due to better health or different demographic backgrounds, even though we did not have enough information to state that with certainty. Nevertheless, the similarity in risk for documented and undocumented migrants is an interesting finding. It indicates that even with full access to all parts of the Norwegian welfare state, migrants are not receiving appropriate care during pregnancy and birth.

5.6. Strengths and limitations

The main strength of this study is the size. It is one of the few large quantitative studies in Europe exploring adverse maternal outcomes among undocumented migrants. Nearly 6000 undocumented migrants made it possible to split the analyses into subgroups of CS and other labour complications and adjust for covariates such as maternal age. As the MBRN is a high-quality National Health Registry, we were able to include nearly all births in our study period of 22 years, even home births and other births occurring outside of hospitals.

There were several limitations. Firstly, we did not know the country of origin of pregnant undocumented migrants. As several studies indicate that there are risk differences between different regions (Merry et al., 2013, L Merry et al., 2016, Eslier et al., 2022, Sørbye et al., 2015), it would have been useful to see if the risk differences were connected to the country of origin rather than the legal status itself. Secondly, we did not know the length of residency in Norway for the women giving birth. This means they could have been newly arrived with optimal, or suboptimal, treatment in their home country, they could have lived with a legal residence permit for years in Norway and recently have lost it, or they could have lived for years undocumented. Thirdly, women who eventually became documented can have had their personal identity numbers recorded in the MBRN in the past without explicit notation, due to restrictions by the registry. This implies that some women registered as documented in our data were undocumented at the time of delivery, which means that the actual differences between undocumented and documented migrants may be underestimated. Despite conducting a sub-analysis using only recent data (after 2012) and obtaining the same results for acute CS, this may still have attenuated the differences between the groups. We could not rule out that each woman had several deliveries during the study period and we therefore used a robust variance estimator to control for potential clustering of the births. We also

did not have information about mortality, however maternal mortality in Norway is very low. Additionally, we lacked information on important risk factors for acute CS. A prior CS is known to be the strongest predictor for another CS (Sandall et al., 2018, Wu et al., 2019), but we did not have information on whether the women had a prior CS. We did find a smaller risk in the primiparous women (22% higher risk of acute CS compared to non-migrants) as opposed to in all women (39% higher compared to non-migrants), although the risk was still substantially higher than in non-migrants. This means that the actual risk of acute CS in undocumented migrants may be even higher in multiparous without a prior CS. Lastly, information about instrumental vaginal delivery would have shown a fuller picture.

5.7. Extern validity

The Norwegian system is universal and free of charge, and there are for practical matters no private institutions for giving birth (World Health Organization 2019). In Norway, as in other welfare states with generous universal coverage for residents and a health care system based on public services that are highly subsidised, there is a potentially large gap between health coverage for residents and others who fall outside this system. Norway is therefore a good setting to investigate the health consequences of migration. However, in the case of undocumented compared to other population groups, our results are not necessarily generalizable to countries where the coverage, in general, is lower, but where a larger civil society sector provides services to a wide range of groups, and where the level of care from NGOs will affect health outcomes (Winters et al., 2018, Merry et al., 2013).

6. Conclusion

Undocumented migrants had a higher risk of adverse maternal outcomes during delivery compared to non-migrants, but not higher than documented migrants. The differences may be due to several factors concerning maternal comorbidity, lack of follow-up during pregnancy, social health determinants, and the interplay between them, leading us to conclude that migrants in Norway face several challenges in achieving full maternity health coverage. There are indications that for maternal outcomes, other determinants concerning migration may be stronger explanatory factors than legal status. Still, being “undocumented” is related to a high level of social exclusion, found to be a risk factor for poor maternity health outcomes. To reduce social inequity in health, further interventions to increase access to maternity care for pregnant undocumented migrants should be implemented.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used Grammarly for language corrections. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

CRediT authorship contribution statement

Ragnhild Misje: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Frode Eick:** Writing – review & editing, Supervision, Project administration, Investigation, Funding acquisition, Data curation, Conceptualization. **Odd Martin Vallersnes:** Writing – review & editing, Funding acquisition, Conceptualization. **Heidi E. Fjeld:** Writing – review & editing, Funding acquisition, Conceptualization. **Ingvil K. Sørbye:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Cecilie Dahl:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Data curation.

Declaration of competing interest

First author R. Misje has received financial support (master scholarship of 22,000 NOK) from the Norwegian Red Cross who runs a health center for undocumented migrants. They had no involvement in the current research. All other authors declare no interests.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jmh.2025.100318.

References

Abedzadeh-Kalahroudi, M., Talebian, A., Sadat, Z., Mesdaghinia, E., 2019. Perineal trauma: incidence and its risk factors. J. Obstet. Gynaecol. 39 (2), 206–211, 17. februar.

Abubakar, I., Aldridge, R.W., Devakumar, D., Orcutt, M., Burns, R., Barreto, M.L., 2018. mfl. The UCL–Lancet Commission on Migration and Health: the health of a world on the move. Lancet 392 (10164), 2606–2654, 15. desember.

Al-Zirqi, I., Vangen, S., Forsen, L., 2008. Stray-Pedersen B. Prevalence and risk factors of severe obstetric haemorrhage. BJOG Int. J. Obstet. Gynaecol. 115 (10), 1265–1272.

Almeida, L.M., Caldas, J., Ayres-de-Campos, D., Salcedo-Barrientos, D., Dias, S., 2013. Maternal Healthcare in migrants: a systematic review. Matern. Child Health J. 17 (8), 1346–1354, 1. oktober.

Betrán, A.P., Temmerman, M., Kingdon, C., Mohiddin, A., Opiyo, N., Torloni, M.R., 2018. mfl. Interventions to reduce unnecessary caesarean sections in healthy women and babies. Lancet 392 (10155), 1358–1368.

Boerma, T., Ronsmans, C., Melesse, D.Y., Barros, A.J.D., Barros, F.C., Juan, L., 2018. mfl. Global epidemiology of use of and disparities in caesarean sections. Lancet 392 (10155), 1341–1348, 13. oktober.

Bollini, P., Pampallona, S., Wanner, P., Kupelnick, B., 2009. Pregnancy outcome of migrant women and integration policy: A systematic review of the international literature. Soc. Sci. Med. 68 (3), 452–461, 1. februar.

Carruth, L., Martinez, C., Smith, L., Donato, K., Piñones-Rivera, C., Quesada, J., 2021. Structural vulnerability: migration and health in social context. BMJ Glob. Health 6 (Suppl 1), e005109, 7. april.

Chilaka, V.N., Konje, JC., 2021. HIV in pregnancy – An update. Eur. J. Obstet. Gynecol. Reprod. Biol. 256, 484–491.

Coates, D., Homer, C., Wilson, A., Deady, L., Mason, E., Foureur, M., 2020. mfl. Indications for, and timing of, planned caesarean section: A systematic analysis of clinical guidelines. Women Birth 33 (1), 22–34.

Cuadra, CB., 2012. Right of access to health care for undocumented migrants in EU: a comparative study of national policies. Eur. J. Public Health 22 (2), 267–271, 1. april.

de Jong, L., Pavlova, M., Winters, M., Rechel, B., 2017. A systematic literature review on the use and outcomes of maternal and child healthcare services by undocumented migrants in Europe. Eur. J. Public Health 27 (6), 990–997, 1. desember.

de Leeuw, J.W., Daly, JO., 2021. Forceps and vacuum: one goal, two entities. Int. Urogynecol. J. 32 (9), 2349–2352, 1. september.

Eick, F., Vallersnes, O.M., Fjeld, H.E., Sørbye, I.K., Storkås, G., Ekrem, M., 2022. mfl. Use of non-governmental maternity services and pregnancy outcomes among undocumented women: a cohort study from Norway. BMC Pregnancy ChildBirth 22 (1), 789, 24. oktober.

Eick, F., Vallersnes, O.M., Fjeld, H.E., Sørbye, I.K., Dahl, C., 2024. Perinatal mortality among pregnant undocumented migrants in Norway 1999-2020: A register-based population study. Soc. Sci. Med. 353, 117055 (1982).

Eick, F., Vallersnes, O.M., Fjeld, H.E., Sørbye, I.K., Ruud, S.E., Dahl, C., 2023. Use of emergency primary care among pregnant undocumented migrants over ten years: an observational study from Oslo, Norway. Scand. J. Prim. Health Care. 1–9, 24. juli.

Eriksen, H.M., Sæther, A.R., Løwer, H.L., Vangen, S., Hjetland, R., Lundmark, H., 2009. mfl. Infections after caesarean sections. Tidsskr Den Nor Legeforening [Internett]26. mars[sitert 22. februar 2023]; Tilgjengelig på: https://tidsskriftet.no/en/2009/03/infections-after-caesarean-sections.

Eslier, M., Morello, R., Azria, E., Dreyfus, M., 2020. Comparative study between women born in France and migrant women with regard to their mode of delivery. J. Gynecol. Obstet. Hum. Reprod. 49 (2), 101648, 1. februar.
Eslier, M., Deneux-Tharaux, C., Sauvegrain, P., Schmitz, T., Luton, D., Mandelbrot, L., 2022. mfl. Severe maternal morbidity among undocumented migrant women in the PreCARE prospective cohort study. BJOG Int. J. Obstet. Gynaecol. 129 (10), 1762–1771.
Eslier, M., Azria, E., Chatzistergiou, K., Stewart, Z., Dechartres, A., Deneux-Tharaux, C., 2023a. Association between migration and severe maternal outcomes in high-income countries: systematic review and meta-analysis. PLoS. Med. 20 (6), e1004257, 22. juni.
Eslier, M., Azria, E., Chatzistergiou, K., Stewart, Z., Dechartres, A., Deneux-Tharaux, C., 2023b. Association between migration and severe maternal outcomes in high-income countries: systematic review and meta-analysis. PLoS Med. 20 (6), e1004257, 22. juni.
Fair, F., Raben, L., Watson, H., Vivilaki, V., den, Muijsenbergh M van, Soltani, H., 2020. mfl. Migrant women's experiences of pregnancy, childbirth and maternity care in European countries: a systematic review. PLoS. One 15 (2), e0228378, 11. februar.
Friis CMa, Holm J, Roland MC, Thordarson HB. Svangerskapsdiabetes. I 2020 [sitert 1. februar 2024]. Tilgjengelig på: https://www.legeforeningen.no/foreningsledd/fagmed/norsk-gynekologisk-forening/veiledere/veileder-i-fodselshjelp/svangerskapsdiabetes/.
Gagnon, A.J., McDermott, S., Rigol-Chachamovich, J., Bandyopadhyay, M., Stray-Pedersen, B., Stewart, D., 2011. mfl. International migration and gestational diabetes mellitus: a systematic review of the literature and meta-analysis. Paediatr. Perinat. Epidemiol. 25 (6), 575–592.
GBD 2019 Human Resources for Health Collaborators, 2022. Measuring the availability of human resources for health and its relationship to universal health coverage for 204 countries and territories from 1990 to 2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet Lond. Engl. 399 (10341), 2129–2154, 4. juni.
Gieles, N.C., Tankink, J.B., van Midde, M., Düker, J., van der Lans, P., Wessels, C.M., 2019. mfl. Maternal and perinatal outcomes of asylum seekers and undocumented migrants in Europe: a systematic review. Eur. J. Public Health 29 (4), 714–723, 1. august.
Greenland, S., Pearl, J., Robins, JM., 1999. Causal diagrams for epidemiologic research. Epidemiology 10 (1), 37–48.
Grytten, J., Skau, I., Sørensen, R., 2013. Do mothers decide? The impact of preferences in healthcare. J. Hum. Resour. 48 (1), 142–168, 1. januar.
Haddeland, HB., 2019. The right to health care for irregular migrants in Norway: interpretation, accessibility, and gaps between needs and rights. Nord J. Hum Rights 37 (4), 329–349.
Henrich, W., Surbek, D., Kainer, F., Grottke, O., Hopp, H., Kiesewetter, H., 2008. mfl. Diagnosis and treatment of peripartum bleeding. J. Perinat. Med. 36 (6), 467–478, 1. november.
Jardine, J., Blotkamp, A., Gurol-Urganci, I., Knight, H., Harris, T., Hawdon, J., 2020. mfl. Risk of complicated birth at term in nulliparous and multiparous women using routinely collected maternity data in England: cohort study. BMJ 371, m3377, 1. oktober.
Laine K, Spydslaug AE, Baghestan E, Norderval S, Olsen IP, Fodstad K. Perinealskade og anal sfinkterskade ved fødsel [Internett]. 2020 [sitert 22. februar 2023]. Tilgjengelig på: https://www.legeforeningen.no/foreningsledd/fagmed/norsk-gynekologisk-forening/veiledere/veileder-i-fodselshjelp/perinealskade-og-anal-sfinkterskade-ved-fodsel/.
Liu, C., Ahlberg, M., Hjern, A., Stephansson, O., 2019. Perinatal health of refugee and asylum-seeking women in Sweden 2014–17: a register-based cohort study. Eur. J. Public Health 29 (6), 1048–1055, 1. desember.
Macsali F, Laine K, Sugulle M, Strøm-Roum EM, Fagerli H. Keisersnitt. I Norsk gynekologisk forening; 2020 [sitert 25. mars 2024]. Tilgjengelig på: https://www.legeforeningen.no/foreningsledd/fagmed/norsk-gynekologisk-forening/veiledere/veileder-i-fodselshjelp/keisersnitt/.
Merry, L., Small, R., Blondel, B., Gagnon, AJ., 2013. International migration and caesarean birth: a systematic review and meta-analysis. BMC Pregnancy ChildBirth 13 (1), 27 desember.
Merry, L., Semenic, S., Gyorkos, T.W., Fraser, W., Small, R., Gagnon, AJ., 2016a. International migration as a determinant of emergency caesarean. Women Birth 29 (5), e89–e98, 1. oktober.
Merry, L., Vangen, S., Small, R., 2016b. Caesarean births among migrant women in high-income countries. Best. Pract. Res. Clin. Obstet. Gynaecol. 32, 88–99, 1. april.
Munro, K., Jarvis, C., Munoz, M., D'Souza, V., Graves, L., 2013. Undocumented pregnant women: what does the literature tell us? J. Immigr. Minor. Health 15 (2), 281–291, 1. april.
Noret, Isabelle, Frydryszak, Dagna, Macherey, Anne-Laure, Simonnot, Nathalie, 2017. ACCESS TO HEALTHCARE IN 16 EUROPEAN COUNTRIES 2017 Legal Report I. The European Network to Reduce Vulnerabilitis in health, Paris. DOI: [Internett] Tilgjengelig på: https://mdmeuroblog.files.wordpress.com/2014/01/2017_final-legal-report-on-access-to-healthcare-in-16-european-countries.pdf.
Nyfløt LT, Aase, TA, Jacobsen, AF, Pettersen, S, Sanda B, Baghestan E. Postpartum blødning (PPB). I Norsk gynekologisk forening; 2020 [sitert 4. oktober 2023]. Tilgjengelig på: https://www.legeforeningen.no/foreningsledd/fagmed/norsk-gynekologisk-forening/veiledere/veileder-i-fodselshjelp/postpartum-blodning/.
Onarheim, K.H., Melberg, A., Meier, B.M., Miljeteig, I., 2018. Towards universal health coverage: including undocumented migrants. BMJ Glob. Health 3 (5), e001031.
Ørbæk, M., Thorsteinsson, K., Moseholm Larsen, E., Katzenstein, T., Storgaard, M., Johansen, I., 2020. MFL. Risk factors during pregnancy and birth-related complications in HIV-positive versus HIV-negative women in Denmark, 2002–2014. HIV. Med. 21 (2), 84–95.
Razum, O., Zeeb, H., Akgün, H.S., Yilmaz, S., 1998. Low overall mortality of Turkish residents in Germany persists and extends into a second generation: merely a healthy migrant effect?*. Trop. Med. Int. Health 3 (4), 297–303.
Rechel, B., Mladovsky, P., Ingleby, D., Mackenbach, J.P., McKee, M., 2013. Migration and health in an increasingly diverse Europe. Lancet 381 (9873), 1235–1245, 6. april.
Romero-Ortuño, R., 2004. Access to health care for illegal immigrants in the EU: should we be concerned? Eur. J. Health Law 11 (3), 245–272.
Sørbye, I., Daltveit, A.K., Sundby, J., Stoltenberg, C., Vangen, S., 2015. Caesarean section by immigrants' length of residence in Norway: a population-based study. Eur. J. Public Health 25 (1), 78–84, 1. februar.
Sørbye, I., Bains, S., Vangen, S., Sundby, J., Lindskog, B., Owe, K., 2022. Obstetric anal sphincter injury by maternal origin and length of residence: a nationwide cohort study. BJOG Int. J. Obstet. Gynaecol. 129 (3), 423–431.
Sandall, J., Tribe, R.M., Avery, L., Mola, G., Visser, G.H., Homer, C.S., 2018. mfl. Short-term and long-term effects of caesarean section on the health of women and children. Lancet 392 (10155), 1349–1357, 13. oktober.
Sawyer, C., Blitz, B., redaktører, 2011. Statelessness in the European Union. 1. Utg. Cambridge University Press, Cambridge, UK.
Staff A, Kvie A, Langesæter E, Michelsen TM, Moe K, Strand KM, mfl. Hypertensive svangerskapskomplikasjoner og eklampsi. I Norsk gynekologisk forening; 2020. Tilgjengelig på: https://www.legeforeningen.no/foreningsledd/fagmed/norsk-gynekologisk-forening/veiledere/veileder-i-fodselshjelp/hypertensive-svangerskapskomplikasjoner-og-eklampsi/.
Tasa, J., Holmberg, V., Sainio, S., Kankkunen, P., Vehviläinen-Julkunen, K., 2021. Maternal health care utilization and the obstetric outcomes of undocumented women in Finland – a retrospective register-based study. BMC Pregnancy ChildBirth 21 (1), 191, 6. mars.
Textor, J., van der Zander, B., Gilthorpe, M.S., Liskiewicz, M., Ellison, GT., 2016. Robust causal inference using directed acyclic graphs: the R package «dagitty». Int. J. Epidemiol. 45 (6), 1887–1894, 1. desember.
Universal Declaration of Human Rights [Internett]. United Nations; 1948 [sitert 16. desember 2023]. Tilgjengelig på: https://www.un.org/en/about-us/universal-declaration-of-human-rights.
Forskrift om rett til helse- og omsorgstjenester til personer uten fast opphold i riket - Lovdata [Internett]. des 19, 2011. Tilgjengelig på: https://lovdata.no/dokument/SF/forskrift/2011-12-16-1255.
van den Akker, T., van Roosmalen, J., 2016. Maternal mortality and severe morbidity in a migration perspective. Best. Pract. Res. Clin. Obstet. Gynaecol. 32, 26–38, 1. april.
Voldner, N., Eick, F., Vangen, S., 2023. «Goodbye and good luck» midwifery care to pregnant undocumented migrants in Norway: a qualitative study. Sex Reprod. Healthc. Off J. Swed. Assoc. Midwives 37, 100878, 19. juni.
Winters, M., Rechel, B., de Jong, L., Pavlova, M., 2018. A systematic review on the use of healthcare services by undocumented migrants in Europe. BMC. Health Serv. Res. 18 (1), 30, 18. januar.
World Health Organization, 2012. WHO Recommendations For the Prevention and Treatment of Postpartum Haemorrhage. World Health Organization, Geneva, p. 41 [Internett][sitert 6. desember 2023]s. Tilgjengelig på: https://iris.who.int/handle/10665/75411.
Healthcare rights in Norway [Internett]. 2019 [sitert 20. november 2024]. Tilgjengelig på: https://www.helsenorge.no/en/health-rights-in-norway/health-care-rights/.
Wu, Y., Kataria, Y., Wang, Z., Ming, W.K., Ellervik, C., 2019. Factors associated with successful vaginal birth after a cesarean section: a systematic review and meta-analysis. BMC Pregnancy ChildBirth 19 (1), 360, 17. oktober.