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Risk for delivery complications in Robson Group 1 for non-Western women in Norway compared with ethnic Norwegian women – A population-based observational cohort study

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ABSTRACT

Objectives: To assess the pregnancy outcome of low-risk pregnancies for women originating from non-Western countries compared with ethnic Norwegian women.
Study design: A retrospective population-based observational cohort study with prospectively registered data. Conducted at Stavanger University Hospital, Norway, with approximately 4800 deliveries annually, from 2009 to 2015. We included women with low-risk pregnancies of non-Western origin (n = 1413), born in Africa (n = 224), Asia (n = 439), Eastern Europe (n = 499), Middle East (n = 138), South America (n = 85), Western (n = 979), and ethnic Norwegian women (n = 7028).
Main outcome measures: The relative risk of emergency cesarean section or postpartum hemorrhage by country of origin was estimated by odds ratios with 95% confidence intervals using logistic multiple regression.
Results: In total, the pregnancy outcomes of 9392 women were analyzed. Risk of emergency cesarean section was significantly higher for women originating from Asia (aOR: 1.887), followed by Africans (aOR: 1.705). Lowest risk was found in women originating from South America (aOR: 0.480). Risk of postpartum hemorrhage was significantly higher in women originating from Asia (aOR: 1.744) compared to Norwegians.
Conclusion: Even in a low-risk population, women originating from Asia and Africa had an elevated risk of adverse pregnancy outcome compared to the Norwegian group. The elevated risk should be considered by obstetric care providers, and we suggest that women originating from Asia and Africa would benefit from a targeted care during pregnancy and childbirth.

Introduction

In a globalized world migration is omnipresent. There are about 214 million international immigrants around the world today. International immigrants and refugees from across the world comprise a growing share of the European population and create new challenges for European health systems [1]. The health challenges associated with migration are, according to the World Health Organization, a crucial public health matter [1]. Immigrants constitute vulnerable groups, yet their health needs are often poorly understood. Health outcomes seem to vary between immigrants and ethnic native women [1,2].

Almeida, Mulready-Ward [3] found that some migrant groups have better pregnancy outcomes than the ethnic native women, yet most studies have shown the opposite; that immigrants form non-Western countries have a higher prevalence of adverse pregnancy outcomes than women from the receiving countries. Also in a developed country, non-Western women seem to have greater perinatal health risks than native women [4–6].

Norway can be described as a multiethnic society. Socioeconomic status and the level of education vary among the non-Western population in Norway. The antenatal healthcare program in Norway is designed to detect pregnancy complications and risks associated with childbirth. It is free of charge and aims to offer equal healthcare to all pregnant women. Still we experience a trend among non-Western women toward using antenatal care less frequently than the native women [5–9]. Further, non-Western women have been shown to access antenatal care later in pregnancy than native women, with less chance to detect any pregnancy complications, and increased likelihood to end

Abbreviations: BMI, Body Mass Index

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up with emergency cesarean section when in labor [7].

Compared to European women, there seem to be a severe increased risk of postpartum hemorrhage in women born in Southeast Asia [10]. Somali women in Sweden have been shown to have a larger risk of emergency cesarean section than in an ethnic Norwegian population [8,11].

In January 2016 the immigrant population in Norway represented 223 countries. The non-Western immigrants constituted 9.1 percent of the total Norwegian population (475 340 persons) of which 359 085 persons (6.9 percent) were first-generation immigrants [12]. Of all children born in 2015, 15 percent were born to immigrant parents [13]. At Stavanger University Hospital, the non-Western immigrants constituted approximately 25 percent of the maternity population in 2015. As for the rest of Norway; all maternity services at Stavanger University Hospital are free of charge.

Updated research on pregnancy outcomes among non-Western women is essential to improve health outcomes through evidence-based practice. Several studies have been conducted on pregnancy outcomes among non-Western women, but few of these differentiate between induced pregnancies and women with spontaneous onset of labor. Furthermore, few studies differentiate between primiparous; first birth, and multiparous; second, or higher birth order. It will be of great importance to see if the differences found in previous research remain when looking only at women into a low-risk group, based on Robson Groups. This has, to our knowledge, not been done previously. The ten Robson Groups were developed by M. Robson in 2001 [14] and is used to classify risk factors in women pre-delivery. The aim of this study was to compare the pregnancy outcomes of women in Robson Group 1; primiparous woman, with a single cephalic pregnancy ≥ 37 weeks' gestation, with spontaneous onset of labor, originating from a non-Western country with pregnancy outcome in ethnic Norwegian women in the same selected group, who gave birth at Stavanger University Hospital in the study period.

Methods

The study was conducted at the Department of Obstetrics and Gynecology at Stavanger University Hospital, Norway, which serves an unselected population of 395 000 citizens, with approximately 4800 deliveries annually. Country of origin was classified as country of birth of the woman. Based on the M49 standard; conducted by the United Nations Statistics Division's on geographical regions for statistical use [15], the women were divided into seven groups: Norway; Western; Eastern Europe; Middle East; South America, Asia and Africa.

We performed a retrospective population-based observational cohort study [16]. Data was extracted from information registered by midwives during pregnancy, birth and the early postpartum period, by the hospitals' electronic medical record system (NATUS™, CSAM Health). To detect the country of origin of the non-Western women, we used the electronic journal system DIPS (Dips 7.3.14.6 ASA® Bodø, Norway). Country of origin is recorded based on information given by the women herself, or her next of kin. Data was collected after delivery. The study period was from 1 January 2009 through 31 December 2015. Data recorded were: country of origin, maternal age, pre-gestational BMI, hypertension, diabetes type 1, gestational diabetes, pre-eclampsia, cigarette smoking in pregnancy, epidural analgesia, oxytocin infusion in labor, spontaneous vaginal delivery, operative vaginal delivery, emergency cesarean section, postpartum hemorrhage, apgar score, and stillbirth. The study was performed in accordance with the Declaration of Helsinki [17] and permission from the Regional Ethics Committees for Medical and Health Research, REK West, was gained 9 May 2016, approval no. 2016/573.

Inclusion criteria:

Women selected Robson Group 1 who gave birth at Stavanger University Hospital during the study period.

Exclusion criteria:

Women with missing origin, preterm delivery, multiparous women, twins or triplets, induced labor, and misclassified or erroneously registered as Robson Group 1.

Statistical analysis

Emergency cesarean section and postpartum hemorrhage > 500 mL was set as the main outcome measures (Table 2). Country of the origin was the main exposure. Women defined as non-Western were all born in a non-Western country and included internationally adopted women. The demographic variables include maternal age, Body Mass Index (BMI), and maternal health before pregnancy. Neonatal outcomes = > apgar score at 1 and 5 min.

We used SPSS (IBM SPSS Statistics for Windows, Version 23.0.2 Armork, NY), for the statistical analysis. We used SamplePower 3 (IBM, SPSS) for the power calculation. We estimated a 5% acute cesarean section rate among ethnic Norwegian women and found that to detect a doubling of this rate for African women, we would need 7000 women. We then estimated that we would need to include deliveries from 1 January 2009 through 31 December 2015. Descriptive statistics was presented as frequencies, proportions, mean, standard deviation (SD) and range. Comparisons of means in maternal age and BMI in ethnic groups were analyzed using one-way analysis of variance, while comparison of proportions was analyzed by Chi-square test. Logistic regression models were performed to study differences in pregnancy outcome by ethnic groups. The Norwegian group was considered as the reference group. We calculated odds ratio (OR) with 95 percent confidence intervals (95% CI). Both univariable and multivariable logistic regression analysis were performed. Maternal age, BMI, smoking in pregnancy, epidural analgesia and oxytocin stimulation in labor were evaluated as possible confounding variables, and adjusted for in the adjusted OR. The threshold for statistical significance was $p < 0.05$.

Results

A total of 9571 births were eligible for inclusion. We excluded 136 women due to missing information on origin, and 43 women due to misclassification. This left 9392 women in the final study group.

This study consisted of women originating from 96 different countries (Supplementary Table 1). 75 percent of the women were ethnic Norwegian, 979 women were Western and 1385 were non-Western (Table 1).

The demographic data did not differ significantly in maternal age and BMI between the ethnic groups. There was a non-significant trend towards a higher frequency of preeclampsia in South American women and lower in women originating from the middle east.

Women originating from Eastern Europe and Middle East both had a higher use of epidural analgesia but did not differ significantly from ethnic Norwegians in other outcomes. More than half of the South American women were given epidural analgesia during delivery, and nearly half needed oxytocin stimulation. However, they had the lowest frequency of adverse pregnancy outcome in the study population. Women originating from Asia and Africa had the lowest frequency of spontaneous vaginal delivery, and moreover a significantly higher risk of all adverse pregnancy outcome registered (Table 2) when compared with ethnic Norwegians.

For women originating from Asia the risk of emergency cesarean section was almost 13 percent; with an adjusted OR (aOR) of 1.89. The risk of emergency cesarean section among African women was 11 percent; compared to ethic Norwegian, these women had 71 percent increased odds to undergo an emergency cesarean section (Table 2). The frequency in use of operative vaginal delivery was high in all groups. However, it was found significant lower in women originating from eastern Europe (aOR: 0.68) and south America (aOR: 0.47).

Compared with ethnic Norwegians, women originating from Asia had an aOR 1.74 for postpartum hemorrhage > 500 mL. The aOR for

Table 1
Demographic and pregnancy data of women in RG1 in Stavanger University Hospital, 2009–2015 (N = 9392) – by ethnic group.

	Ethnic Norwegian N = 7028 % *(n)*	Eastern Europe N = 499 % *(n)*	Middle East N = 138 % *(n)*	South America N = 85 % *(n)*	Asia N = 439 % *(n)*	Africa N = 224 % *(n)*	Western N = 979 % *(n)*	*p-value*	F
Maternal age, years - *mean* [range]	27.6 [16–46]	27.3 [17–41]	25.7 [18–38]	30.2 [19–41]	28.9 [18–41]	26.6 [16–39]	29.1 [17–43]		
Body Mass Index, kg/m^2- *mean* [range]	23.4 [15–46]	22.0 [15–42]	23.0 [16–32]	23.1 [16–31]	21.5 [14–34]	22.7 [16–37]	22.7 [15–45]		
Maternal health in pregnancy;									
Preeclampsia mild	1% (70)	0% (0)	1% (1)	0% (0)	0% (0)	0% (0)	1% (10)	0.99	0.15
Preeclampsia severe	5% (351)	4% (29)	3% (4)	6% (5)	5% (22)	5% (11)	3% (29)	0.87	0.42
Cigarette smoking in pregnancy (*n*)	6.1% (429)	5.4% (27)	1.4% (2)	2.4 (2)	3% (13)	0.5% (1)	3.8% (37)	Not applicable	
Use of anesthesia (EDA)	43% (3022)	52% (260)	46% (64)	60% (51)	47% (206)	47% (105)	47% (460)	< 0.01	4.88
Use of oxytocin stimulation	32% (2249)	38% (190)	39% (54)	48% (41)	43% (189)	44% (99)	37% (362)	< 0.01	8.63
Neonatal outcome;									
Apgar score 1 min *(mean)*	8.78 (0–10)	8.87 (3–10)	8.84 (3–10)	8.94 (6–10)	8.83 (2–10)	8.56 (1–10)	8.82 (0–10)	0.019	2.53
Apgar score 5 min *(mean)*	9.48 (0–10)	9.54 (4–10)	9.54 (6–10)	9.59 (7–10)	9.50 (5–10)	9.40 3–10)	9.50 (0–10)	0.340	1.13

postpartum hemorrhage > 500 mL was lower in women originating from Middle east and South America when compared with ethnic Norwegian women.

Discussion

The results of this study support previous research implying an existing disparity in pregnancy outcomes between women with a non-western origin and ethnic Norwegian women. Our finding that this applies also to women in a low-risk group is novel. Women originating for Asia and Africa were at most risk of adverse pregnancy outcome. The reason for these disparities may be complex as these immigrant groups vary in many background characteristics. The migration and socioeconomic histories differ, as does religious and cultural preferences [4–6]. Hence, maternity service should try to respond to the needs of these women rather than expecting them to adapt to the Western values- and our cultural way of accessing healthcare services.

We found an aOR for emergency cesarean section after spontaneous onset of labor, of 1.89 in Asian women and aOR 1.71 in African women. These results are consistent with previous findings [4,18–22]. The elevated risk in Asian women has been attributed to the high proportion of Asian women married to Norwegian men. To investigate this possible correlation Vangen et al [23] examined the ethnicity of the father and the infant birth weight. They found an enhanced infant weight of 200 g in mixed coupled compared to Asian couples. However; they found an increased risk of emergency cesarean section also in Asian couples and concluded that the reasons for the disparities were more complex. The risk of having an operative vaginal delivery was high; with over 30 percent risk for Asian (aOR 1.24) and African (aOR 1.26) women in this study. However; there was no significant difference between the Asian women and the ethnic Norwegians. The aOR for postpartum hemorrhage > 500 mL in African women in this study was 1.6 (95% CI: 1.26–2.50). This result is consistent with previous findings [22].

Background characteristics like female genital mutilation were not controlled for in this study. The practice of female genital mutation is common in Africa, and according to UNICEF 98 percent of women in childbearing age in Somalia are subjected to mutilation [24]. Female genital mutation is known to increase the risk of adverse pregnancy outcomes as emergency cesarean section and postpartum hemorrhage [18,25]. Further this risk is suggested to increase with more extensive maiming. It is a possibility that some of the non-Western women in this study has undergone mutilation and thus are more vulnerable to adverse pregnancy outcomes. But limited information makes these suggestions speculative.

Previous studies have shown that women with a non-Western origin seem to be prone to late first antenatal control, with fewer antenatal care visits during pregnancy compared to the native women [5,7,8]. One possible explanation for the disparities in pregnancy outcomes could be the late attendance to antenatal care, as it may cause a delay in referral to routine ultrasound followed by a delay in detection of possible pathology in pregnancy. It can also delay lifestyle intervention or medical treatment. Late attendance to antenatal care followed by late detected anemia in pregnancy has been reported among Somali women in Sweden [8]. Anemia in pregnancy is known to be a risk factor for postpartum hemorrhage [6].

Barriers, such as poor language proficiency and cultural differences,

Table 2
Logistic regression models.

	Ethnic Norwegian N = 7028 % *(n)*	Eastern Europe N = 499 % *(n)*	Middle East N = 138 % *(n)*	South America N = 85 % *(n)*	Asia N = 439 % *(n)*	Africa N = 224 % *(n)*	Western N = 979 % *(n)*
Delivery method; when Adjusted for maternal age, Body Mass Index, smoking in pregnancy, EDA, Oxytocin stimulation							
Operative vaginal delivery	**24.5%**(1722)	**21.0%** (105)	**27.5%** (38)	**18.8%** (16)	**33.3%** (146)	**31.3%** (70)	**26.5%** (259)
p-value		0.002	0.382	0.011	0.065	0.150	0.389
aOR		0.683	1.199	0.474	1.235	1.256	0.930
Emergency cesarean section	**7%** (489)	**7%** (35)	**5.1%** (7)	**4.7%** (4)	**12.8%** (56)	**11.2%** (25)	**8.3%** (81)
p-value		0.988	0.553	0.158	< 0.01	0.018	0.650
aOR		0.997	0.790	0.480	1.887	1.705	1.061
95% CI		0.803–1.649	0.401–1.872	0.215–1.632	1.595–2.918	1.203–2.894	0.893–1.479
Postpartum hemorrhage > 500 mL	**13% (941)**	**16% (80)**	**12% (17)**	**8% (7)**	**22% (96)**	**19% (43)**	**18% (176)**
p-value	< 0.01	0.047	0.615	0.034	< 0.01	0.007	0.002
aOR		1.294	0.868	0.402	1.744	1.609	1.340
95% CI		1.086–1.797	0.546–1.622	0.203–1.083	1.497–2.432	1.261–2.504	1.168–1.6

could be an explanation for the late attendance [5,9]. Inadequate communication and cultural differences may be an impediment to proper care, causing misunderstandings and inadequate treatment. The use of an interpreter may reduce these barriers [26]. Suboptimal antenatal care with lack of professional interpreters has been associated with maternal death and stillbirth in Nordic countries [5,6], underscoring the importance of adequate communication during pregnancy and delivery to reduce the likelihood of an adverse pregnancy outcome. Interpreting is the responsibility of the caregiver, according to national and international statements [1,2]. Use of interpreter is, however, not in common use during deliveries, hence misunderstandings due to challenges in communication can result in adverse pregnancy outcome.

One limitation of the study is that the number of participants in the non-Western groups made it impossible to compare differences between countries rather than continents. The amount of blood loss during childbirth is difficult to measure objectively and should therefore be measured and weighed. There is, however, no guarantee that this has been done. The potential for misclassification of the postpartum hemorrhage outcome should therefore be taken into account. Moreover, information that could be useful as control variables like paternal ethnicity, antenatal care attendance, pre-gestational health of the woman, nutrition status, socioeconomic status and the need for an interpreter was not available for this study.

The main strength of the study was that it included only Robson group 1. Presenting results in Robson groups may limit the possibility to address effect modification, however, it makes the comparison more reliable, and provides conceptually clean groups as all women were primiparous with a single cephalic pregnancy ≥37 weeks' gestation and spontaneous onset of labor; increasing the sense of what data implies clinically. The study period was long, reducing the risk of seasonal changes. Moreover, all women included in the study gave birth in the same hospital; minimizing the risk of great changes in guidelines for care and indicating that all women most likely have been given the same standard of care. The selection of women into a low risk group well suited for the purpose, the large number of participants and the large number of origins present, makes this study population well suitable for examining disparities between women in the different ethnic origins.

Conflicts of interest

Declarations of interest: none.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.srhc.2019.02.006.

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