

Associations between non-registered ultrasound examination in pregnancy and adverse perinatal outcomes in immigrant and non-immigrant women: a Norwegian population-based study 1999-2016

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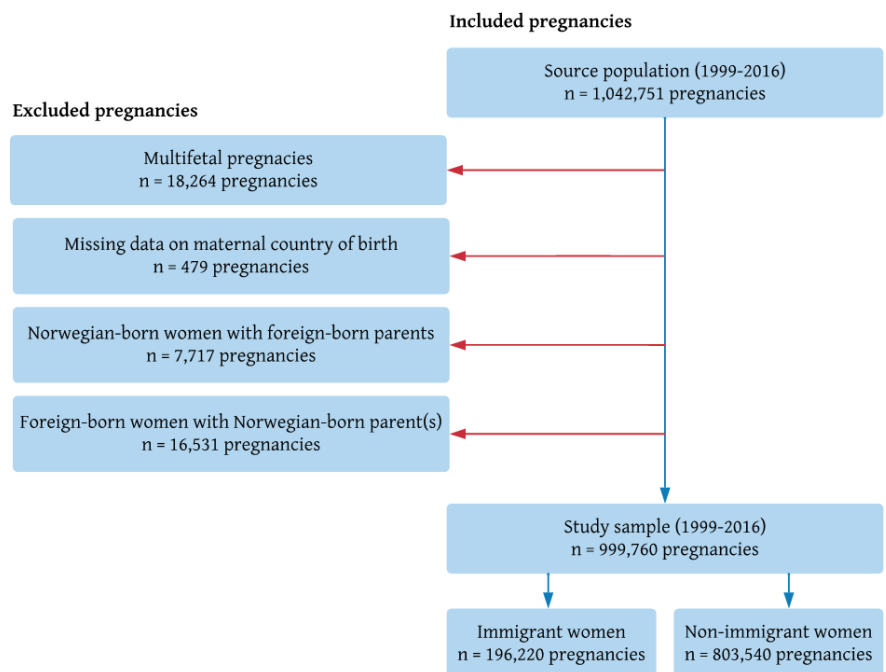
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Abstract

Objectives (i) Estimate the proportion of non-registered prenatal ultrasound examinations; (ii) Examine associations between non-registered ultrasound examinations and adverse perinatal outcomes, by migrant-related factors, in women giving birth in Norway. **Design** A national population-based study. **Setting and sample** Individually linked data from the Medical Birth Registry of Norway and Statistics Norway, 1999-2016, comprising 999,760 singleton pregnancies to immigrants ($n = 196,220$) and non-immigrants ($n = 803,540$). **Methods** Crude and adjusted odds ratios (aOR) with 95% confidence intervals (CI) were estimated using logistic regression with robust standard error estimations, adjusted for year of childbirth, maternal age, parity, maternal smoking during pregnancy, educational level, and Norwegian health region at birth. **Main outcome measures** Prenatal ultrasound examinations; perinatal mortality; placental abruption; preeclampsia. **Results** Compared to non-immigrants, immigrant women had a higher proportion of non-registered ultrasound examinations (2.3% vs. 4.3% respectively). Compared to women *with* ultrasound examination, the aOR for perinatal mortality for women with *non-registered* ultrasound was 2.27 [95% CI 1.85, 2.79] for immigrants and 3.61 [3.21, 4.07] for non-immigrants. Non-registered ultrasound examination was also associated with placental abruption (aOR 1.32 [1.08, 1.63]) for non-immigrant women, but not for immigrant women. Non-registered ultrasound examination was not associated with preeclampsia in either immigrant or non-immigrant women. **Conclusion** Compared to non-immigrants, immigrant women have a higher proportion of non-registered data on prenatal ultrasound examinations. Both immigrants and non-immigrants with non-registered ultrasound examinations have an increased aOR of perinatal mortality, but no association was found for preeclampsia. Non-immigrant women had an increased aOR for placental abruption.

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Study outcome	Outcome vs no outcome		Adjusted odds ratio [95% CI]	
	US not registered	US registered		
Perinatal mortality	Total sample	422/26,943	4,423/967,972	3.21 [2.89, 3.55]
	Non-immigrant	313/18,551	3,405/781,271	3.61 [3.21, 4.07]
	Immigrant	109/8,392	1,018/186,701	2.27 [1.85, 2.79]
Placental abruption	Total sample	133/27,232	3,544/968,851	1.26 [1.06, 1.50]
	Non-immigrant	94/18,770	2,779/781,897	1.32 [1.08, 1.63]
	Immigrant	39/8,462	765/186,954	1.09 [0.78, 1.50]
Preeclampsia	Total sample	825/26,540	28,080/944,315	0.94 [0.88, 1.01]
	Non-immigrant	659/18,205	24,339/760,337	1.01 [0.94, 1.10]
	Immigrant	166/8,335	3,741/183,978	0.85 [0.72, 1.00]

0.61 1.00 1.65 2.72 4.48
Adjusted odds ratio [95% CI]

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