Long-term changes in cesarean delivery and recurrence in Norwegian nulliparous women, 1967-2014: A population-based study

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Abstract

Objective: To describe long-term changes in Cesarean Delivery (CD) and estimate CD recurrence risk across five decades. Design: Population-based cohort study Setting: Norway, 1967-2014 Sample: A total of 951,895 nulliparous women with their singleton, cephalic, term deliveries were followed through their first and second births. Methods: Data from the Medical Birth Registry of Norway was used to describe CD by maternal age (years): <20 (reference), 20-24, 25-29, 30-34, 35-39 and >=40 and onset of labor: spontaneous (reference), induced and pre-labor CD. Based on seven risk factors, women were grouped as lower (no factors) - and higher-risk (one or more factors). Risk estimates were stratified by periods: 1967-1982, 1983-1998 and 1999-2014. Multivariable regression models were used to estimate relative risk (RR) with 95% confidence interval (CI). Results: CD in the first birth increased across periods from 3.3% to 10.2% and from 8% to 20.5% in lower- and higher-risk women, respectively. The increase in CD was only found among women < 35 years. Compared to women with spontaneous onset, the RR of CD in lower-risk women with induced onset of labor increased from 3.8 (95% CI 3.6-4.0) to 5.9 (95% CI 5.7-6.2) across periods. Overall CD recurrence risk was 57.9%, but relative recurrence risk was lower in the last than in the first period. Conclusion: Overall CD risk increased over time in Norwegian women <35 years both in lower- and higher- risk groups, while it was stable or decreased in older women. CD recurrence risk declined across 47 years in Norway.

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	Time period	RR (95% CI)							P for trend
< 20 years	1967-1982	1.00 (Reference)		÷					
	1983-1998	2.33 (2.15-2.54)			+				
	1999-2014	2.75 (2.50-3.01)			-	•-			0.000
20-24 years	1967-1982	1.15 (1.08-1.24)		+					
	1983-1998	2.61 (2.44-2.78)			-				
	1999-2014	3.40 (3.19-3.64)				+			0.000
25-29 years	1967-1982	1.76 (1.64-1.88)			+				
	1983-1998	3.25 (3.05-3.47)				+			
	1999-2014	4.13 (3.88-4.40)				+			0.000
30-34 years	1967-1982	3.47 (3.19-3.77)				-			
	1983-1998	5.0 (4.68-5.35)				+			
	1999-2014	5.84 (5.49-6.23)					•		0.000
35-39 years	1967-1982	9.25 (8.45-10.13)					+		
	1983-1998	9.39 (8.71-10.12)					-		
	1999-2014	9.10 (8.50-9.73)					+		0.42
>= 40 years	1967-1982	17.64 (15.78-19.71)						-•	-
	1983-1998	19.26 (17.50-21.20)						-	•
	1999-2014	15.26 (14.06-16.55)						-	0.000
			.5	1	2	4	8	14	

	Time period	RR (95% CI)							P for trend
< 20 years	1967-1982	1.00 (Reference)		÷					
	1983-1998	2.02 (1.83-2.22)			-				
	1999-2014	2.34 (2.09-2.62)			-				0.000
20-24 years	1967-1982	1.25 (1.16-1.35)		+					
	1983-1998	2.40 (2.23-2.58)			+				
	1999-2014	2.95 (2.74-3.17)			-				0.000
25-29 years	1967-1982	1.79 (1.65-1.94)		-	-				
	1983-1998	3.13 (2.91-3.35)			-	•-			
	1999-2014	3.60 (3.36-3.86)				+			0.000
30-34 years	1967-1982	3.10 (2.82-3.42)			-	⊷			
	1983-1998	4.29 (3.98-4.62)				-			
	1999-2014	4.35 (4.06-4.67)				+			0.000
35-39 years	1967-1982	6.38 (5.73-7.10)					-		
	1983-1998	6.45 (5.92-7.04)							
	1999-2014	5.81 (5.39-6.25)				-	•		0.002
>= 40 years	1967-1982	9.73 (8.45-11.27)					-•	_	
	1983-1998	10.15 (8.91-11.55)						-	
	1999-2014	7.47 (6.80-8.21)					-		0.000
			.5	1	2	4	8	14	

