
Morbidity and mortality associated with older maternal age at birth

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The proportion of mothers giving birth aged 35 years and over in Queensland has increased from approximately 8% of births in 1987 to 20% of births in 2010¹. There is a large body of evidence to suggest that older mothers are more likely to experience pregnancy and labour complications (including medical conditions and mode of delivery e.g. caesarean sections), and that their offspring have higher risks of congenital anomalies and mortality²⁻⁴. The purpose of this report is to document the incidence and risk of these events amongst older mothers in Queensland.

Data were obtained from the Queensland Perinatal Data Collection for all Queensland usual resident mothers who gave birth to singletons in Queensland during 2009 and 2010. Where possible, these birth records were matched to admitted patient data to improve ascertainment of conditions and outcomes of interest. Because there are also documented increased risks associated with giving birth at a very young age⁵, mothers aged less than 20 years at the time of delivery were excluded from the referent comparison group included in this study in order to provide a clearer picture of the outcomes for older mothers.

Maternal morbidity

Birth records were obtained for 112,275 mothers. 23,392 (21%) were aged 35 years or older. Risks of morbidity were not consistently higher amongst older mothers but varied by condition. After accounting for parity (primiparous/multiparous), older mothers and those aged 20-34 years experienced similar risks of placental abruption and premature rupture of membranes (Table 1). However, older mothers were 87% more likely to have some form of diabetes (92% when adjusted for Indigenous status, BMI, rurality and socio-economic status) and more than twice as likely to have placenta praevia. As placenta praevia is closely associated with history of caesarean section⁶, and older mothers are more likely to have had a caesarean section than younger mothers, higher rates of placenta praevia were expected in this older group. However, this excess existed even among first time births: older mothers having their first baby were 2.80 times more likely to have placenta praevia than younger mothers. This suggests that other factors are associated with the higher rates. Rates of antepartum haemorrhage, and gestational hypertension were also elevated among older mothers (Table 1). Conversely, older mothers had a 10% lower risk (adjusted for parity) of postpartum haemorrhage compared to younger mothers.

Caesarean section delivery was 41% more common among older mothers than those aged 20-34 years (Table 1), and after adjusting for parity was 21% less likely to be preceded by any form of labour. The most common reason for caesarean section in both age groups was O34.2, *Maternal care due to uterine scar from previous surgery*. This code was used for 36% of mothers aged 20-34 delivering by caesarean and 47% of mothers aged 35 or more. The second most common reason was O62.2, *Other uterine inertia* (13% and 7% of caesareans respectively). There was little difference between the remaining reasons for caesarean codes between age groups. Older mothers who did not deliver via caesarean section had higher rates of augmented labour (34% vs 28%) but lower rates of induced labour than younger mothers (21% vs 26%; Table 1).

Table 1. Frequency and rate ratios of morbidity and mortality by maternal age, Queensland, 2009-2010.

Condition/Outcome	Frequency 20-34 yrs	Frequency 35+ yrs	Rate ratio, unadjusted (95% CI)	P(χ^2) <0.05	Rate ratio, adjusted for parity (95% CI)	P(χ^2) <0.05
Total mothers and births	88,883	23,392	—		—	
Indigenous	4,708	658	0.53 (0.49 - 0.58)	Y	0.46 (0.43 - 0.50)	Y
Primiparous	37,184	5,665	0.58 (0.56 - 0.60)	Y	—	
Underweight	3,838	655	0.66 (0.60 - 0.71)	Y	No change	Y
Healthy weight	42,567	11,418	—		—	
Overweight	21,862	5,805	0.99 (0.97 - 1.02)		0.96 (0.93 - 0.99)	Y
Obese class I	10,838	2,854	0.99 (0.95 - 1.03)		0.92 (0.89 - 0.96)	Y
Obese class II	4,642	1,157	0.94 (0.88 - 1.00)	Y	0.85 (0.80 - 0.91)	Y
Obese class III	2,508	789	1.16 (1.07 - 1.26)	Y	1.04 (0.96 - 1.13)	
Unknown BMI	2,628	714	1.01 (0.93 - 1.10)		0.93 (0.85 - 1.01)	
Antepartum haemorrhage	3,144	873	1.06 (0.98 - 1.14)		1.09 (1.01 - 1.17)	Y
Diabetes	4,958	2,444	1.87 (1.78 - 1.97)	Y	No change	Y
Gestational hypertension	5,039	1,361	1.03 (0.97 - 1.09)		1.20 (1.13 - 1.28)	Y
Placental abruption	667	161	0.92 (0.77 - 1.09)		0.90 (0.76 - 1.08)	
Placenta praevia	900	506	2.14 (1.92 - 2.38)	Y	2.25 (2.01 - 2.51)	Y
Postpartum haemorrhage	7,421	1,713	0.88 (0.83 - 0.92)	Y	0.90 (0.85 - 0.95)	Y
Premature rupture of membranes	17,742	4,109	0.88 (0.85 - 0.91)	Y	1.02 (0.98 - 1.05)	
Congenital anomaly	6,677	1,793	1.02 (0.97 - 1.08)		1.06 (1.00 - 1.11)	Y
<i>Chromosomal</i>	131	108	3.07 (2.38 - 3.96)	Y	2.92 (2.25 - 3.78)	Y
<i>Non-chromosomal</i>	6,618	1,735	0.98 (0.93 - 1.03)		No change	
Heavy for gestational age*	10,149	2,986	1.12 (1.07 - 1.16)	Y	1.03 (0.99 - 1.07)	
Macrosomia (>4000g) [†]	11,841	3,004	0.96 (0.93 - 1.00)		0.91 (0.88 - 0.95)	Y
Preterm birth (<37 weeks) [‡]	5,918	1,736	1.11 (1.06 - 1.18)	Y	1.14 (1.08 - 1.21)	Y
Fetal distress	18,642	4,165	0.85 (0.82 - 0.88)	Y	0.99 (0.95 - 1.02)	
Fetal malpresentation	19,634	8,408	1.63 (1.59 - 1.67)	Y	1.39 (1.35 - 1.43)	Y
Perinatal death	773	268	1.32 (1.15 - 1.51)	Y	No change	Y
Fetal death	516	186	1.37 (1.16 - 1.62)	Y	No change	Y
Neonatal death	257	82	1.22 (0.95 - 1.56)		No change	
Non-caesarean delivery, not augmented/induced	28,269	5,786	—		—	
Augmentation of labour, Non-caesarean delivery	17,497	4,485	1.14 (1.11 - 1.18)	Y	1.19 (1.15 - 1.23)	Y
Induction of labour, Non-caesarean delivery	16,081	2,807	0.90 (0.87 - 0.94)	Y	0.97 (0.93 - 1.01)	
Vaginal, non-instrumental delivery	52,938	11,336	—		—	
Forceps/Vacuum delivery	8,909	1,742	0.92 (0.88 - 0.97)	Y	1.41 (1.34 - 1.48)	Y
Caesarean section delivery	27,036	10,314	1.41 (1.38 - 1.44)	Y	1.48 (1.45 - 1.52)	Y
Caesarean delivery preceded by labour	11,063	2,865	0.68 (0.65 - 0.71)	Y	0.79 (0.76 - 0.82)	Y

* Excludes 25 births in the 20-34 years group and 8 births in the 35+ years group due to missing birthweight, missing gestational age or gestational age < 20 weeks

† Excludes 13 births in the 20-34 years group and 3 births in the 35+ years group due to missing birthweight

‡ Excludes 6 births in the 20-34 years group and 3 births in the 35+ years group due to missing gestational age

Source: Queensland Perinatal Data Collection, Queensland Hospital Admitted Patient Data Collection

Neonatal morbidity and mortality

Infants born to older mothers were significantly more likely to be born preterm (14% more likely, adjusted, Table 1). When differences in parity were taken into account, rates of 'heavy for gestational age'⁷ were similar amongst the two maternal age groups, which suggests that the excess is due to having had previous pregnancies. Infants of older mothers were 9% less likely to be macrosomic (i.e. >4000g birthweight, Table 1), which is consistent with the finding that older mothers were less likely to be Indigenous or to be overweight or obese, but unexpected given the higher rates of diabetes among older mothers. This may suggest that diabetes is more likely to be detected and appropriately managed among older mothers. Older mothers had significantly higher levels of fetal malpresentation (36% vs. 22%, Adj RR 1.39; Table 1) which may have contributed to the higher levels of caesarean section among older mothers. On average, overall rates of congenital anomalies were slightly higher among infants of older mothers (6% higher, Adj RR 1.06) but chromosomal anomalies were almost three times more likely among infants born to mothers aged 35 or more (Adj RR 2.92; Table 1). Fetal and overall perinatal mortality were observed more frequently among babies of older mothers, but not neonatal mortality (Table 1).

Conclusions

These results suggest that older maternal age is associated with increased rates of certain risk factors and adverse outcomes. Although the size of the effects noted with older maternal age in Queensland is generally more modest than those reported elsewhere³, similar patterns exist. In some cases these risk factors and outcomes are related to older mothers being more likely to have had more babies (increased rates of heavy for gestational age, and class III obesity), but other adverse outcomes or risk factors persisted when parity was adjusted for (increased rates of placenta praevia, fetal malpresentation, preterm births, requirement for augmentation of labour and instrument assisted delivery, caesarean section, gestational hypertension, diabetes, chromosomal abnormalities, still births and decreased rates of caesarean section preceded by labour) which suggests that age, or other risk factors not assessed, had an impact. In particular, diabetes was more likely in older mothers even when typical risk factors such as BMI, Indigenous status and socioeconomic status were controlled for.

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