

Modifiable risk factors in pregnancy associated with adverse outcomes in a rural population: an application of the Quality Improvement Data System (QIDS) database.

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Introduction

Smoking and obesity are modifiable pregnancy risk factors with increased rates in rural populations [1]. The Quality Improvement Data System (QIDS) is a relatively new source of data from the Clinical Excellence Commission that can be used to access local population pregnancy data and compare with other health organisations [2]. Identification of associated adverse outcomes may help target these risk factors.

Aims

- To compare smoking, obesity and associated pregnancy complications in a rural population with NSW.
- To demonstrate application of QIDS database to identify areas where improvement is needed.

Methods

This is a retrospective cohort study with data from the QIDS MatIQ Database. All pregnancies between 2019 and 2021 were included for analysis. Smoking and obesity (BMI>30) rates were drawn from the rural locality and NSW. Complications associated with smoking that were analysed were stillbirth, fetal growth restriction (FGR), abruption and preterm birth. Complications associated with obesity included macrosomia, shoulder dystocia, caesarean and gestational diabetes. Population characteristics were summarised for the rural locality and NSW. Statistical tests were assessed at a significance level of 0.05 with a two-sided alternative hypothesis. A chi-squared test was used, except in cases where a low cell count (less than 50) meant that Fisher's exact test was more reliable.

Characteristic		Rural Hospital (n = 3,863)	NSW (n = 216,692)	p value
Maternal Age	<20	4.71% (182)	2.01% (4365)	<0.01
	20 – 29	50.71% (1959)	40.39% (87520)	
	30 – 39	42.35% (1636)	53.48% (115886)	
	>40	2.23% (86)	4.12% (8918)	
Parity	0	37.15% (1435)	41.90% (90803)	<0.01
	1	30.81% (1190)	33.66% (72934)	
	2+	32.05% (1238)	24.44% (52952)	
Ethnicity	ATSI	27.26% (1053)	7.05% (11603)	<0.01
	Caucasian	46.70% (1804)	51.73% (85077)	
	Asian	6.68% (258)	17.01% (27973)	
	Others	19.36% (748)	24.21% (39814)	
Diabetes	Pre-Existing	1.11% (43)	0.89% (1465)	0.06
	Gestational	12.84% (496)	13.94% (22924)	
	No	86.05% (3324)	85.17% (140078)	
Conception	Assisted	4.22% (163)	4.59% (7553)	0.29
	Spontaneous	95.78% (3700)	95.41% (156913)	
Hx Mental Health	Yes	33.34% (1288)	30.19% (49652)	<0.01
	No	66.66% (2575)	69.81% (114815)	
Hx Hypertension	Yes	4.69% (181)	4.31% (7087)	0.26
	No	95.31% (3682)	95.69% (157380)	

Table 1 – Population Characteristics

Results

Population comparison showed significant differences ($p<0.05$) between maternal age, parity, ethnicity and history of mental health [Table 1].

Smoking (14.4% v 22.7%, $p<0.01$) and obesity (20.3% v 30.4%, $p<0.01$) were increased in the rural population [Figure 1]. Preterm birth was significantly increased [9.6% v 7.7%, RR 1.24 (1.12-1.37), $p<0.01$]. Caesarean section was statistically increased [35.6% v 32.9%, RR 1.08 (1.04-1.13), $p<0.01$]. There were no statistically significant differences with other outcomes [Table 2].

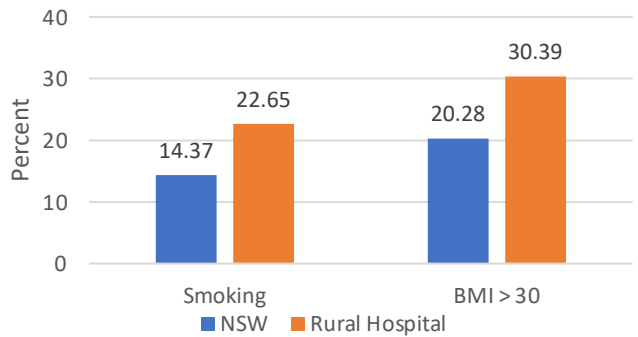


Figure 1 – Modifiable Risk Factors

Outcome	Rural Hospital (n = 3,863)	NSW (n = 216,692)	Relative Risk (95% CI)	p-value
Abruption	0.67% (26)	0.58% (953)	1.16 (0.79, 1.71)	0.45
FGR	3.68% (142)	3.70% (6090)	0.99 (0.84, 1.17)	0.93
Stillbirth	0.96% (37)	0.74% (1609)	1.29 (0.93, 1.78)	0.13
PTB	9.55% (369)	7.70% (16693)	1.24 (1.12, 1.37)	<0.01
Macrosomia	10.82% (418)	10.45% (17193)	1.04 (0.94, 1.13)	0.46
Shoulder Dystocia	8.56% (213)	8.88% (9730)	0.96 (0.85, 1.10)	0.59
Caesarean Section	35.57% (1374)	32.90% (71284)	1.08 (1.04, 1.13)	<0.01
Diabetes in Pregnancy	13.95% (539)	14.83% (24389)	0.94 (0.87, 1.02)	0.14

Table 2 – Adverse Outcomes

Discussion

Increases in preterm birth and caesarean may be attributable to higher rates of smoking and obesity. However, direct comparison is difficult to interpret due to population differences. Lower maternal age may be protective against other adverse outcomes and account for the lack of difference between them. The QIDS MatIQ database is a useful tool that individual health organisations can use to identify target areas for improvement in local pregnancy outcomes and general health.

References

- AIHW. Australia's mothers and babies – Data Collection. <https://www.aihw.gov.au/reports/mothers-babies/australias-mothers-babies/contents/technical-notes/data-sources> Accessed 31/10/22
- Clinical Excellence Commission; Maternity and Neonatal Safety Program. <https://www.cec.health.nsw.gov.au/keep-patients-safe/maternity-and-neonatal-safety-program/Safer-Baby-Bundle/research> Viewed 31/10/22