

## Author instructions

*Brief Communication* giving a brief case presentation or short report of a pertinent clinical observation. Please use the correct format following the criteria: **max 600 words, max 5 references, max 1 table or 1 figure**, no abstract, no keywords, no headings. The information must be presented as a true Letter, e.g. starting with "Dear Editor, we found that... etc." Brief communications that do not meet this criteria will be returned to the author.

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### **Unprecedentedly high rates of gestational diabetes in women with body mass index $\geq 40\text{kg/m}^2$ at booking: a retrospective UK cohort study**

Dear Editor,

The rising prevalence of maternal obesity, defined as a body mass index (BMI)  $\geq 30\text{kg/m}^2$ , is a major public health concern. The Royal College of Obstetricians and Gynaecologists estimates that 21.3% of the UK antenatal population are obese, and the recent Confidential Enquiry into the 209 maternal deaths that occurred in the UK from 2015-2017 shows that over a third (34.4%) of the women who died were obese[1].

Given that 10 years have elapsed since the publication of the UK Obstetric Surveillance System study analysing the consequences of extreme maternal obesity[2], we decided to investigate rates of gestational diabetes mellitus (GDM), Caesarean section, fetal macrosomia (defined as birthweight  $>4500\text{g}$ ) and shoulder dystocia in women with class III obesity (BMI  $\geq 40\text{ kg/m}^2$ ) at our tertiary maternity unit in London.

Seventy-four women who booked with our maternity services between 1 January 2018 and 31 December 2018 met inclusion criteria, of whom 7 miscarried and 11 transferred care elsewhere. Of the remaining 56 women, 22 (39.3%) developed GDM, 30 (53.6%) delivered by Caesarean section (of which 13 were elective and 17 were emergency), 4 (7.1.9%) delivered a macrosomic baby and 2 had shoulder dystocia (7.7% of those delivering vaginally). There were no maternal or perinatal deaths in the cohort. Results are shown in Table 1, along with previously published findings from similar cohorts.

**Table 1: Rates of obstetric and perinatal complications in women with class III obesity**

	Knight et al.[2]	Schummers et al.[3]	Current cohort	P value†
Total number	659	3,380	56	
Mean maternal age (SD)	<i>Not stated</i>	30.0 (5.1)	32.1 (5.8)	<b>0.0019*</b>
Median BMI (range)	53 (50-80)	<i>Not stated</i>	42.6 (40-80)	
Gestational diabetes	10.3	20.8	39.3	<b>0.0008*</b>
Caesarean section	49.8	49.7	53.6	0.5627 (NS)
Macrosomia $>4000\text{g}$	<i>Not stated</i>	<i>Not stated</i>	17.9	
Macrosomia $>4500\text{g}$	9.3	6.1	7.1	0.7454 (NS)
Shoulder dystocia	4.4	4.1	7.7	0.1808 (NS)
Stillbirth	1.2	0.6	0	0.5610 (NS)

†P values shown represent comparisons between rates of complications observed in our cohort vs. rates observed by Schummers et al., the largest available series. \*denotes statistical significance, defined as  $p < 0.05$ ; NS, not significant.

Rates of Caesarean section and macrosomia were consistent with those identified in previous studies of maternal obesity[2, 3]. However, compared with the largest of these series[3], our data show significantly higher rates of GDM, as well as a trend towards higher rates of shoulder dystocia. The near-doubling in observed rate of GDM in our cohort compared to that of Schummers et al. (and the four-fold increase compared to that observed in 2010) is a striking finding that may reflect one or all of: (1) the use of more sensitive diagnostic criteria (our study used IADPSG criteria, whereas other units use NICE/WHO criteria); (2) a background year-on-year increase in global prevalence of GDM; (3) a genuine difference in our population; perhaps due to significantly higher maternal age.

There is a global imperative to reduce preventable stillbirths. Pre-existing maternal diabetes is a prominent risk factor for stillbirth, and while the relationship between GDM and stillbirth is less clear, there is evidence that failure to diagnose GDM in at-risk women leads to a significantly higher risk of stillbirth[4]. While a cohort of this size will never be sufficiently powered to detect differences in stillbirth rates, increasing the detection of GDM is likely to enhance opportunities for management of maternal glycaemic control and surveillance of fetal growth, with a corresponding reduction in stillbirth risk.

When presented locally, these findings provoked debate about a potential role for universal induction of labour (IOL) at term in women with BMI  $\geq 40$ , given the apparent considerable risks of macrosomia and shoulder dystocia. Accumulating evidence refutes the historical paradigm of IOL as an intervention that increases the risk of requiring Caesarean section. Instead, recent large-scale studies, most notably the ARRIVE trial, in whom over half of the participants were obese, have demonstrated that IOL at 39 weeks actually reduces the risk of Caesarean and of maternal hypertensive disorders, without increasing a composite of adverse perinatal outcomes.

The question of whether class III obesity constitutes an indication for IOL at 39 weeks will require further scrutiny. Although the ARRIVE findings have been supported by subsequent meta-analyses, Migliorelli et al. rightly point out in a recent edition of this journal that caution is required before extrapolating these results into different populations or into a universal policy of recommending elective induction at term[5].

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## References

1. Knight, M., Bunch, K., Tuffnell, D., Shakespeare, J., Kotnis, R., Kenyon, S., Kurinczuk, J.J., *Improving Mothers' Care - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2015-17*. National Perinatal Epidemiology Unit, University of Oxford, 2019.
2. Knight, M., et al., *Extreme obesity in pregnancy in the United Kingdom*. *Obstet Gynecol*, 2010. **115**(5): p. 989-97.
3. Schummers, L., et al., *Risk of adverse pregnancy outcomes by prepregnancy body mass index: a population-based study to inform prepregnancy weight loss counseling*. *Obstet Gynecol*, 2015. **125**(1): p. 133-43.
4. Stacey, T., et al., *Gestational diabetes and the risk of late stillbirth: a case-control study from England, UK*. *BJOG*, 2019. **126**(8): p. 973-982.
5. Migliorelli, F., S.S. De Oliveira, and B. Martinez de Tejada, *The ARRIVE Trial: Towards a universal recommendation of induction of labour at 39 weeks?* *Eur J Obstet Gynecol Reprod Biol*, 2020. **244**: p. 192-195.