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Ethnic Variations in Perinatal Outcomes following Assisted Reproduction

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Introduction

The 2021 EMBRRACE UK report still showed that women from ethnic minorities are still more likely to die in pregnancy, with black women 4 times, mixed ethnicity 3 times and Asian women two times more likely than their Caucasian counterparts to die in pregnancy. (1) Similarly recent Human Fertilisation and Embryology Authority data, show that despite record levels of in vitro fertilisation, birth rates are lower amongst ethnic minorities, especially black Africans and Southeast Asians compared to their white counterparts. (2) In the last decade, there has been a general decline in fertility and a concurrent rise in couples accessing assisted reproduction, with IVF birth rates 3 times higher. With the decline in birth rates and the increase in successful fertility treatment, more couples of diverse ethnicities are turning towards assisted reproduction to conceive. With literature suggesting that pregnancies resulting from assisted reproduction are at a higher risk of perinatal complications, more knowledge about perinatal outcomes in pregnancies achieved through reproductive would enable us to provide individualised perinatal care. (3,4)

Aim

This study assesses the perinatal outcomes for a diverse ethnic population of women, who underwent assisted reproductive techniques at our local fertility centre.

Methods

Retrospective observational cohort study at a tertiary centre, for women who underwent ART and had maternity care from 2012 to 2020. Data was collected from electronic data bases in the fertility and maternity units. Analysis was done using SPSS version 28.

Results

Table 1: Assisted reproductive treatment received
IUI intrauterine insemination
ICSI intracytoplasmic sperm injection

Treatment	IUI	In vitro fertilisation	Vitrified Embryo transfer	ICSI	Donor Egg	Donor sperm
Numbers	951	309	35	596	21	11
Percentages	49.1	15.9	18	30.8	1.1	0.6

Table 2: BMI of women receiving treatment

BMI	< 18.5	18.5 – 24.9	25 – 29.9	30 – 39.9	40 and above	Missing
Numbers	92	1161	478	202	3	2
Percentages	4.7	59.9	24.7	10.4	0.2	0.1

Table 3: Mode of delivery

Mode of delivery	Vaginal delivery	Caesarean section	Elective 13.5%
Percentages	57.9	42.1%	Emergency 28.6%

Table 4: Ethnicity of patients receiving treatment

Ethnicity	White	Asian	Black	Other	Missing	Maternal age
Number	1221	609	24	75	9	Mean 31.7
Percentage	63	31.4	1.2	3.9	0.5	SD 4.2

Table 5: Mean age of ethnicities receiving treatment

Ethnicity	White	Asian	Black	Other
Age (years)	31.9	31.2	29.9	32
Standard error	0.12	0.16	1.02	0.48

Table 6: Adverse perinatal outcomes

Complication	Number (n)	Percentage	UK average rates (%)
Gestational diabetes	158	8.1	5
Hypertensive disease in pregnancy	91	4.69	8 -10
Placenta praevia	36	1.86	0.05
Antepartum haemorrhage	34	1.75	-
CTG concerns	498	25.7	-
Preterm birth	209	10.8	8

Results

Univariate analysis was done using the gestational age at and birth weight as an outcome. Variables looked at included, BMI, ethnicity, treatment type, maternal age, and number of babies. Then a multivariate analysis was done.

Table 6: Multivariate analysis with birthweight <2500 gm as outcome variable

Variables	OR	Confidence interval 95%	P value
Maternal age	1.03	1.00 - 1.07	0.64
Caucasian ethnicity	1.29	0.537 - 3.13	0.56
Asian ethnicity	2.72	1.12 – 6.63	0.027
Black ethnicity	4.40	1.17 – 16.5	0.028
BMI < 18.5	1.12	0.529 – 2.39	0.76
BMI 18.5 – 29.9	1.01	0.63 – 1.63	0.94
BMI 30 and above	-	-	-
Singleton	0.74	0.051 – 0.10	0.001
Twins	-		-
Triplets	3.4	-	0.9
Intrauterine insemination	3.8	0.00	0.98
In vitro fertilisation	4.8	0.00	0.98
Vitrified ET	7.04	0.00	0.98
Intracytoplasmic sperm injection	3.6	0.00	0.98
Donor egg	5.7	0.00	0.98

Table 7: Multivariate analysis with weight < 2500grams as outcome variable

Variable	OR	Confidence interval 95%	P value
Gestational diabetes	1.3	0.81 - 2.07	0.2
Pre-eclampsia	1.9	1.05 – 2.77	0.035
Antepartum haemorrhage	2.3	1.44 – 3.89	<0.001
Thyroid disease	2.4	1.12 – 5.27	0.024

A multivariate analysis showed women were more likely to deliver preterm, if they had gestational diabetes (OR 1.75, 95% CI 1.05-2.9, p=0.031), pre-eclampsia (OR 2.97, 95% CI 1.57-5.6 p< 0.001), antepartum haemorrhage (OR8 4.49, 95% CI 2.73-7.4, p< 0.001), and thyroid disease (OR 3.36, 95% CI 1.49-7.5, p= 0.003).

Discussion

- Our data showed that 31.4% of women receiving fertility treatment were Asian, while only 1.2% of them were of Black ethnicity. Although not a direct comparism, this does appear to correlate with the Human Fertilisation and Embryology Authority data which shows a high number of woman of Asian ethnicity having in vitro fertilisation 14% compared to only 3% of Black women. (5)
- Reasons for the disparity between access to fertility treatment in different ethnicities is unknown but it is possible that cultural beliefs and the cultural stigma attached to fertility treatment may play a part.
- In this population of women, we noticed higher rates of preterm birth, placenta praevia and gestational diabetes than the UK average, though lower rates of pre eclampsia. This is very much in line with findings from other studies. (6)
- Reasons for this increased outcome is unknown but it could be that some of the risk factors associated with subfertility may contribute towards these adverse outcomes.
- We already know that ovulation disorders such as polycystic ovary syndrome are linked to some other endocrinopathies that impact on obstetric outcomes such as gestational diabetes.
- Women of Asian and Black ethnicity were statistically more likely to have small babies compared to their white counterparts. The reason for the disparity in outcome is unknown.
- Possible causes could be the higher rates of undiagnosed medical morbidities in this group of women, there could also be an association with socioeconomic status
- We also found that the women with pre-eclampsia, antepartum haemorrhage and thyroid disease were more likely to have small babies.

Conclusion

- These results do suggest that there is higher prevalence of certain diseases and risk amongst women undergoing assisted conception.
- Whether this is due to assisted conception or due to risk factors for subfertility amongst these women is unknown, more research is needed to establish the exact causes of these increased adverse outcomes.
- What is certain is that pregnancies resulting from assisted conception are at higher risk and therefore require closer perinatal monitoring in order to optimize perinatal outcomes.

References

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