Effect of Parental Age on Embryo Sex Ratio Using PGT Data from IVF Cycles

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BACKGROUND

- The human sex ratio is expressed as the proportion of males relative to females in a given population. Numerous studies have investigated different variables and their impact on sex ratio, including environmental exposures, season of pregnancy, and maternal stress.[1]
- As delayed childbearing becomes more prevalent, there is an increasing trend toward older first-time parents worldwide.[2]
- Previous studies that have explored the effects of maternal and paternal age on sex ratio have exclusively looked at secondary sex ratio (SSR), or the sex ratio at birth.[3–5] While valuable, this information is inherently biased due to the inability to control for confounding factors.
- In the context of assisted reproductive technology (ART), there is tremendous incentive to better understand and characterize the factors that influence sex ratio, particularly as the average age of the patient population continues to increase.
- Before the advent of preimplantation genetic testing (PGT), estimating the primary sex ratio (PSR), or the sex ratio at conception or fertilization, was not possible. Utilizing this data offers a unique opportunity to better understand PSR.

OBJECTIVE

Our study aims to evaluate sex ratio using data from PGT. This information can be invaluable for counseling patients, particularly as parental age increases and more couples express interest in sex selection for family balancing.

MATERIALS & METHODS

- A retrospective chart review was performed at a university-affiliated fertility center. All IVF cycles with PGT between 1/2023 and 2/2024 were included. Cycles yielding no euploid embryos or utilizing donor gametes were excluded.
- Chi squared and logistic regression analyses were conducted to assess whether parental age was associated with embryo sex ratio.

RESULTS

- 1,100 euploid embryos from 334 IVF cycles (292 patients) were included in the analysis.
- Paternal age ranged from 26.0 to 59.2 years with mean of 37.0 years. Maternal age ranged from 26.0 to 44.7 years with mean of 34.7 years.
- The overall sex ratio was 109:100 (625 XY/573 XX embryos). Sex ratios across parental age groups are presented in **Table 1**.

RESULTS (cont.)

- The differences in sex ratios did not reach statistical significance. Multivariate logistic regression including both paternal and maternal ages did not show significant correlation between parental age and embryo sex ratio.

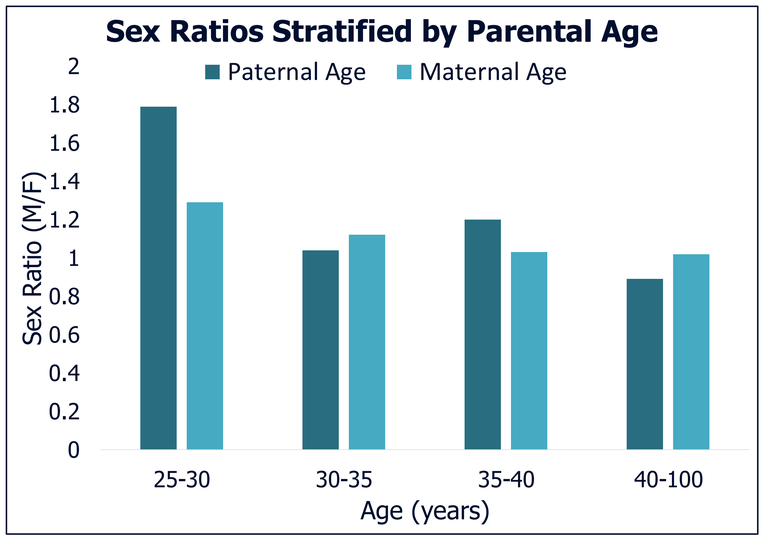

Table 1. Sex ratios across parental age groups.

Paternal Age (years)	25-30	30-35	35-40	40-100	*P*-value
No. of XY/XX Embryos (Sex Ratio)	25/14 (179:100)	209/201 (104:100)	277/230 (120:100)	114/128 (89:100)	0.103
Maternal Age (years)	**25-30**	**30-35**	**35-40**	**40-100**	***P*-value**
No. of XY/XX Embryos (Sex Ratio)	58/45 (129:100)	289/257 (112:100)	232/226 (103:100)	46/45 (102:100)	0.717

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CONCLUSION

A larger study is needed to validate whether there is a trend towards lower sex ratios (number of male embryos to female embryos) with increasing parental age.