EMBRYOS AND ETHNICITY: A STUDY OF PLOIDY RESULTS IN IVF

Authors: Emily Wentworth (1), Dinura Gunatilake (2), Mariana Jimenez (2), Heidi Hausermann (1) , Amber R. Cooper (1,2) , Angie Beltsos (1), Manuel Viotti (2)

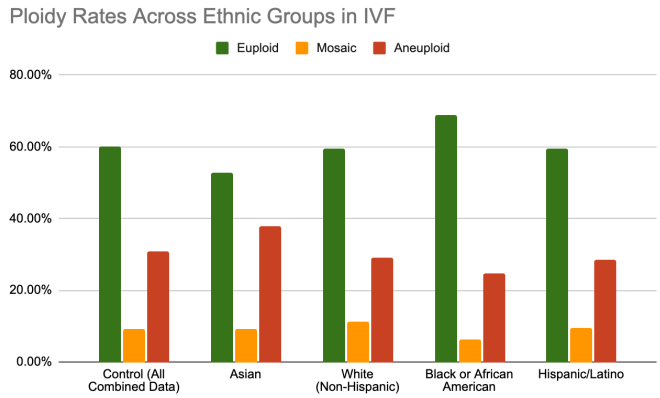
Affiliation: (1) Kindbody, Chicago, IL; and (2) Kindlabs, Secaucus NJ

Background
Ploidy status plays a crucial role in IVF outcomes, with euploid embryos more likely to result in successful pregnancies compared to aneuploid or mosaic embryos. While preimplantation genetic testing for aneuploidy (PGT-A) is increasingly used, little research has examined whether ethnicity affects the prevalence of euploidy, aneuploidy, or mosaicism. Aneuploidy and mosaicism, caused by meiotic and mitotic errors respectively, have been associated with gene variants in the general population, suggesting that ethnic differences in genetic backgrounds could potentially influence ploidy outcomes.

Objective
The objective of this study is to investigate whether ethnicity affects embryo ploidy outcomes, including rates of euploidy, aneuploidy, and mosaicism, in IVF patients across four ethnic groups.

Material and Methods
A retrospective chart review was conducted at a private multi-center fertility center, focusing on patients who underwent preimplantation genetic testing for aneuploidy (PGT-A). From an initial pool of approximately 3,000 patients who had undergone PGT-A testing, patients were grouped based on their maternal, self-reported ethnicity. A random sample of 250 autologous embryos was selected from each ethnic group, resulting in a total of 1,000 embryos. Ploidy rates were determined by dividing the number of embryos in each category (euploid, aneuploid, mosaic) by the total number of embryos in the sample. Results categorized as no result, inconclusive, or triploid were excluded from the ploidy interpretation to ensure the analysis focused exclusively on outcomes that provide clear insights for clinical decision-making. Each ethnic group was compared against the combined control group of all ethnicities to identify significant disparities in ploidy outcomes based on ethnicity.

Results
A chi-square test was performed to compare ploidy outcomes (euploid, mosaic, and aneuploid) across the control group, Asian, White (non-Hispanic), Black or African American, and Hispanic or Latino groups. The test showed no statistically significant differences in ploidy rates between the groups (chi-square = 6.49, $p = 0.59$). Since the p-value is greater than 0.05, ethnicity did not have a significant impact on ploidy outcomes in this sample.



Conclusions: These findings highlight the significance of investigating the impact of ethnicity on reproductive outcomes. Understanding the relationship between ethnic backgrounds and ploidy abnormalities could provide valuable insights into genetic risk factors and shape more effective fertility treatments in the future. Future research could expand on this by incorporating confounding variables such as paternal ethnicity, age, or BMI, in addition to maternal factors, to better understand how both parental contributions influence ploidy outcomes.

Financial Support: None

References:

1) Duran HE, Duran ME, Milman M. Maternal and paternal factors associated with the occurrence of aneuploidy in preimplantation embryos: A systematic review. Reprod Biol. 2020;20(3):244-54.

2) Huang L, Zhai Y, Cheng Y, Wang J. Aneuploidy and mosaicism in preimplantation embryos: A review of the literature. J Assist Reprod Genet. 2017;34(9):1165-76.

3) Kort J, Hsu S, Jansen RP, Munne S. Aneuploidy does not explain the difference in outcomes observed between Asian and Caucasian patients undergoing in vitro fertilization. Asian Pac J Reprod. 2015;4(4):305-8.