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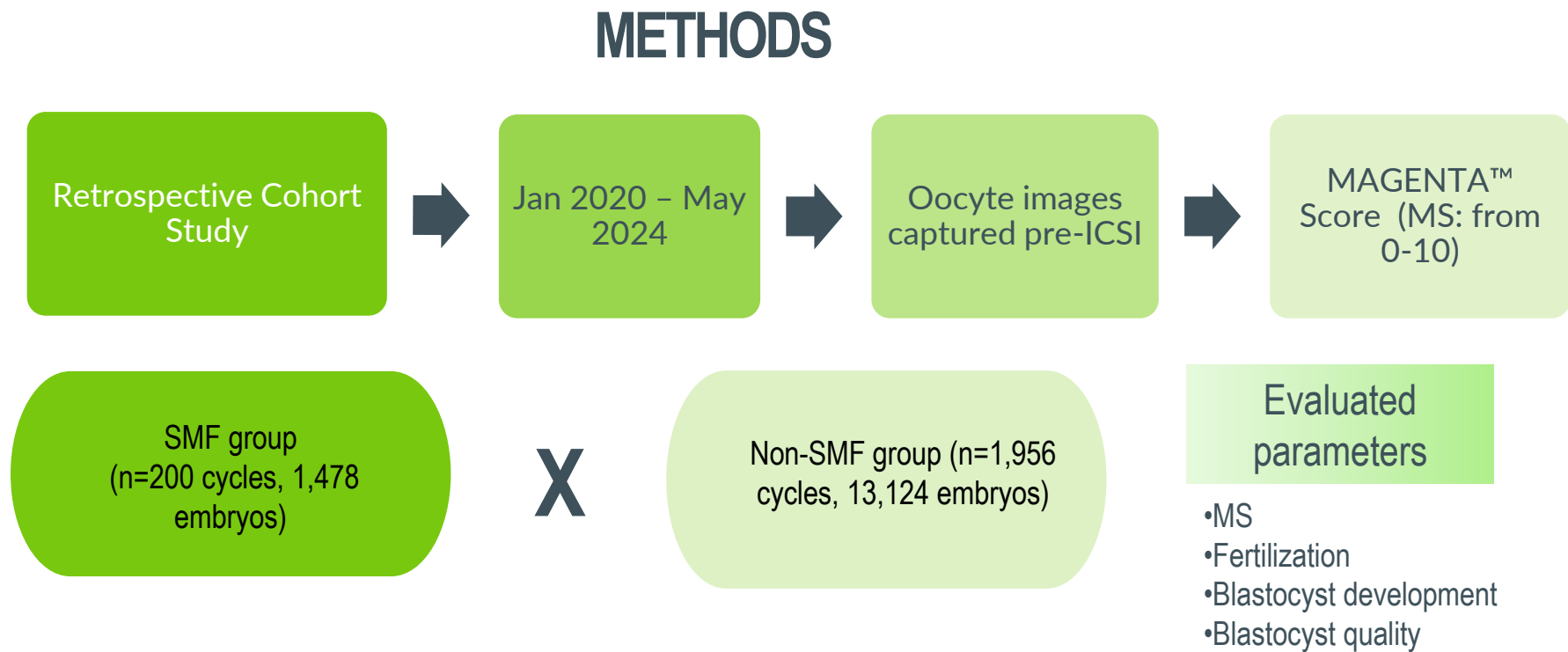
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OBJECTIVE

IAI models like MAGENTA™ are grounded in machine learning techniques that use vast amounts of data to predict outcomes such as fertilization rates and embryo viability. In the case of MAGENTA™, the tool evaluates oocyte images immediately before ICSI, scoring them based on numerous quality parameters that have been linked to successful fertilization and embryo development. In this study, we focus on couples with severe male factor infertility, defined as having fewer than 5 million sperm per ejaculate, a condition that complicates ART outcomes and necessitates precise methods to predict success. By dividing the data into two groups—one with severe male factor infertility (SMF group) and the other with non-SMF infertility (non-SMF group)—we aim to investigate how well the MAGENTA™ tool performs in predicting blastocyst development in these two distinct populations.

Variable	SMF Group (n = 200 cycles)	Non-SMF Group (n = 1956 cycles)	p-value
Maternal Age (years)	37.44 ± 4.41	37.79 ± 3.87	0.277
Paternal Age (years)	43.13 ± 8.39	39.04 ± 6.71	< 0.001
Female BMI (kg/m²)	23.88 ± 6.49	24.27 ± 4.78	0.416
Total Dose of FSH (IU)	2686.54 ± 859.01	2652.78 ± 869.24	0.674
Aspirated Follicles (n)	13.58 ± 11.58	13.88 ± 10.46	0.672
Retrieved Oocytes (n)	9.75 ± 8.20	9.95 ± 8.12	0.754
Mature Oocyte Rate (%)	73.47 ± 20.33	73.79 ± 20.30	0.849
Fertilization Rate (%)	67.06	74.69	< 0.001
Blastocyst Development (%)	46.61	50.80	0.003
Cumulative Pregnancy Rate (%)	46.50 (73/157)	(56.71) 1052/1855	0.025
Miscarriage Rate (%)	12.33 (9/73)	9.32 (98/1052)	0.499

Table 1: Comparison of Demographic Data and ICSI Cycles' Characteristics Between SMF and Non-SMF Groups (n=2156 cycles)



RESULTS

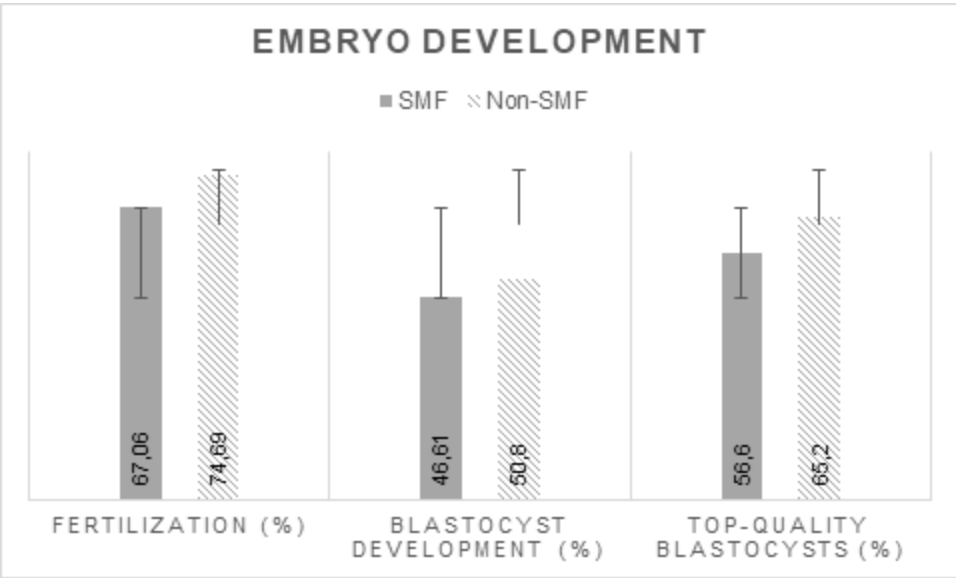


Figure 1. Fertilization, blastocyst development and tip-quality blastocysts rates comparison between severe male factor (SMF) and non-SMF groups.

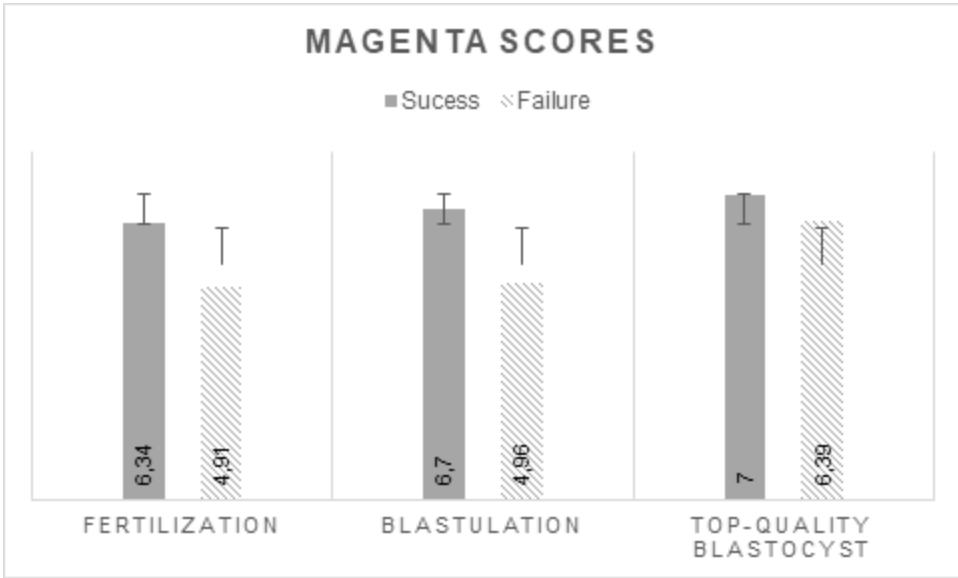


Figure 2. MAGENTA scores in oocytes that failed to or successfully fertilized, blastulated and became top-quality blastocysts, considering the SMF group only.

CONCLUSION

AI-based oocyte evaluation predicts fertilization, blastulation, and blastocyst quality in SMF couples undergoing ICSI cycles. MS values were consistently higher for blastocysts than non-blastocysts, demonstrating the AI tool's utility in identifying oocytes with greater developmental potential, regardless of male infertility factors.