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Analysis of the Factors Affecting the Male-Female Sex Ratio of Babies Born through Assisted Reproductive Technology

Analyse des facteurs affectant le rapport de masculinité hommes-femmes des bébés nés grâce aux technologies de procréation assistée

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ABSTRACT

BACKGROUND: Until now, the sex ratio in a population is believed to be relatively stable with no male/female preponderance. There has been an increasing amount of evidence to suggest that assisted conception may significantly impact on sex ratio (SR). Several factors have been suggested to affect SR such as parental variables (paternal race, maternal age, and body mass index-(BMI), methods of fertilisation (in-vitro fertilisation/intracytoplasmic sperm injection), stage of embryo transfer (cleavage/blastocyst), type of IVF cycle (fresh/cryopreserved), medications used for controlled ovarian stimulation, poor sperm motility, and even culture media.

OBJECTIVES: This study aims to investigate the potential impact of the different ART procedures on sex ratio. It will also explore the relationship between paternal race, maternal age and body mass index BMI on sex ratio.

METHODS: A retrospective cohort study from January 2017 to December 2023. Participants were women who had successful ART and delivery at Ninewells Assisted Conception Unit (NACU) Dundee and ART centre of Lagos University Teaching Hospital, Nigeria.

RESULTS: Overall, 294 (66.2%) of the case records and 150 (33.8%) were evaluated from NACU and LUTH respectively. More male infants 244 (66.8%) were delivered following pregnancies conceived with blastocyst embryo stage transfer when compared with female infants which stood at 121 (33.2%). Concerning cleavage embryo stage transfer, 56 (70.9%) were in favour of female newborns while males accounted for 23 (29.1%).

CONCLUSION: The study revealed that there is an increase in the proportion of male babies born following certain assisted conception techniques such as blastocyst stage embryo transfer and IVF while more female babies were born when cleavage stage embryos were transferred or when ICSI was used as a method of fertilisation.

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KEYWORDS: Sex Ratio, ICSI, IVF, Blastocyst, Cleavage, Race, BMI, Frozen/fresh embryo.

RÉSUMÉ

CONTEXTE: Jusqu'à présent, le rapport de masculinité au sein d'une population est considéré comme relativement stable, sans prépondérance masculine/féminine. De plus en plus de preuves suggèrent que la procréation assistée peut avoir un impact significatif sur la sex-ratio (SR). Plusieurs facteurs ont été suggérés pour affecter la SR, tels que les variables parentales (race paternelle, âge maternel et indice de masse corporelle-IMC), les méthodes de fécondation (fécondation in vitro/injection intracytoplasmique de spermatozoïdes), le stade du transfert d'embryon (clivage/blastocyste), le type de Cycle de FIV (frais/cryoconservé), médicaments utilisés pour une stimulation ovarienne contrôlée, mauvaise motilité des spermatozoïdes et même milieux de culture.

OBJECTIFS: Cette étude vise à étudier l'impact potentiel des différentes procédures de TAR sur le sex-ratio. Il explorera également la relation entre les variables parentales telles que la race paternelle, l'âge de la mère et l'indice de masse corporelle (IMC) sur le sex-ratio.

Méthodes : Une étude rétrospective de janvier 2017 à décembre 2023. Les participantes étaient des femmes qui ont eu un TAR et un accouchement réussis à l'unité de conception assistée de Ninewells (NACU) de Dundee et au centre de TAR de l'hôpital universitaire de Lagos, au Nigeria.

RESULTATS: Au total, 294 (66,2 %) des dossiers de cas et 150 (33,8 %) ont été évalués respectivement par le NACU et le LUTH. Un plus grand nombre de nourrissons de sexe masculin, 244 (66,8 %), ont accouché à la suite de grossesses conçues avec transfert de stade embryonnaire de blastocyste, par rapport aux nourrissons de sexe féminin, qui s'élevaient à 121 (33,2 %). Concernant le transfert de stades embryonnaires par clivage, 56 (70,9%) étaient en faveur des nouveau-nés de sexe féminin tandis que les mâles représentaient 23 (29,1%).

CONCLUSION: L'étude a révélé qu'il y a une augmentation de la proportion de bébés mâles nés suite à certaines techniques de procréation assistée telles que le transfert d'embryons au stade blastocyste et la FIV, tandis qu'un plus grand nombre de bébés femelles sont nés lorsque des embryons au stade clivage ont été transférés ou lorsque l'ICSI a été utilisée comme méthode de fertilisation.

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MOTS-CLÉS: Ratio de sexes, ICSI, FIV, Blastocyste, Clivage, Race, IMC, Embryon congelé/frais.

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