UTS UNIVERSITY OF TECHNOLOGY SYDNEY

Egg donation and having a baby in Australia

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the degree of

Doctor of Philosophy (Public Health)

under the supervision of

Distinguished Professor Elizabeth Sullivan
Associate Professor Alex Wang and
Dr Jane Frawley

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I, Rosemarie Hogan declare that this thesis, is submitted in fulfilment of the requirements for the award of Doctor of Philosophy (Public Health), in the Faculty of Health at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

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FORMAT OF THESIS

This is a thesis by compilation. It is structured as a single manuscript and includes two published manuscripts and a further two manuscripts under peer review for consideration for publication. The manuscripts are included verbatim as accepted or submitted for publication. Copyright permission to reproduce the first two manuscripts has been obtained. The third manuscript has been peer reviewed and final revisions are being completed. The fourth manuscript is under review.

LIST OF PUBLICATIONS ARISING FROM THIS WORK

Peer-Reviewed Manuscripts Published (Chapters 4, 5 and 6)

Hogan, R.G., Wang, A.Y., Li, Z., Hammarberg, K., Johnson, L., Mol, B.W. & Sullivan, E.A. 2020, 'Having a baby in your 40s with ART: the reproductive dilemma of autologous versus donor oocytes', *Australian and New Zealand Journal of Obstetrics and Gynaecology,* published online 18 May 2020, <https://doi.org/10.1111/ajo.13179>.

Hogan, R.G., Wang, A.Y., Li, Z., Hammarberg, K., Johnson, L., Mol, B.W. & Sullivan, E.A. 2019, 'Oocyte donor age has a significant impact on oocyte recipients' cumulative live birth rate: a population-based cohort study', *Fertility and Sterility*, vol. 112(4), pp. 724-730, <https://doi.org/10.1016/j.fertnstert.2019.05.012>.

Hogan, R.G., Hammarberg, K., Wang, A.Y. & Sullivan, E.A. 2021, 'Battery hens' or 'nuggets of gold': a qualitative study on the barriers and enablers for altruistic egg donation', *Human Fertility*, in publication.

Peer-Reviewed Manuscript Under Review (Chapter 7)

Hogan, R.G., Hammarberg, K., Frawley, J., Wang, A.Y. & Sullivan, E.A. 2020, 'Recipients' experiences of altruistic egg donation in Australia', *Reproductive BioMedicine Online*, under review.

CONTRIBUTION OF AUTHORS

Rosemarie Hogan is the author of this body of work. With the guidance and advice of all supervisors, she developed the research concepts and the design of the four studies undertaken during this candidature. Rosemarie is the primary author of all the publications and manuscripts included in this thesis.

Distinguished Professor Elizabeth Sullivan was the principle supervisor and contributed to the conception, design, writing, editing and proof reading of all manuscripts arising from the research findings.

Associate Professor Alex Wang was a co-supervisor and contributed to the conception, design, writing, editing and proof reading of all manuscripts arising from the research findings.

Dr Jane Frawley was a co-supervisor and contributed to the writing, editing and proof reading of the fourth manuscript arising from the research findings.

Dr Karin Hammarberg contributed to the editing and proof reading of all manuscripts arising from the research findings.

Dr Zhuoyang Li provided assistance with the statistical analysis and interpretation of the data in manuscripts one and two.

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CONFERENCE PRESENTATIONS ARISING FROM THESIS

Hogan, R., Wang, A., Li, Z., Johnson, L., Hammarberg, K. & Sullivan, E., 'The effect of oocyte donor's and recipient's ages on cumulative live birth rate: a population-based cohort study', *34th Annual Meeting of the European Society of Human Reproduction and Embryology*, Barcelona, Spain, 1-4th July 2018.

Hogan, R., Wang, A., Li, Z., Hammarberg, K., Johnson, L., Mol, B.W. & Sullivan, E., 'Motherhood over 40: own eggs or donor eggs?', *Fertility Society of Australia and New Zealand annual conference*, Hobart, Australia, 14-18th Sept. 2019.

SCHOLARSHIPS AND AWARDS

2017-2020: Australian Government Research Training Program Scholarship.

2019: University of Technology Sydney, Vice Chancellors Conference Award.

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ABBREVIATIONS

AHR	adjusted hazard ratio
ANZARD	Australian and New Zealand Assisted Reproduction Database
AOR	adjusted odds ratio
ARR	adjusted relative risk
ART	assisted reproductive technology
BL	blastocyst
CI	confidence interval
CL	cleavage stage embryo
DET	double embryo transfer
FSA	Fertility Society of Australia
HR	hazard ratio
ICMART	International Committee Monitoring Assisted Reproductive Technologies
ICSI	intracytoplasmic sperm injection
IVF	in vitro fertilization
LBR	live birth rate
OR	odds ratio
RR	relative risk
RTAC	Reproductive Technology Accreditation Committee
SART	Society for Assisted Reproductive Technology
SD	standard deviation
SET	single embryo transfer
VARTA	Victorian Assisted Reproductive Treatment Authority

ABSTRACT

Background: Egg donation is an essential component of assisted reproductive technology (ART) treatment. Studies indicate that when a woman or couple inquire about egg donation, they want to know if the treatment will result in a healthy baby. As yet, there is limited evidence comparing women receiving ART treatment with their own eggs, to women of a similar age using donor eggs. Also, there is little research on how donors and recipients experience the process of egg donation in Australia.

Methods: Mixed-methods research was conducted. Two population-based cohort studies investigated the impact of age on the cumulative live birth rate (CLBR) in egg donation cycles. Semi-structured interviews and thematic analysis were conducted with egg donors and recipients to examine the barriers and enablers for altruistic egg donation.

Results: Overall, the findings demonstrate that women in their 40s using donor eggs were five times more likely to have a baby than women using their own eggs. The evidence confirms that the age of the egg donor is critical. Women using eggs from donors under 35 years had a statistically significantly higher CLBR when compared with recipients using eggs from donors over 35 years. However, most women in their 40s undergoing ART used their own eggs despite the minimal chance of having a baby as a result. The qualitative findings report that women experience difficulties finding a donor while egg donors described

feeling undervalued. The egg donors wanted clinics to provide more person-centred care and emotional support.

Conclusions: The results of this study are timely and highly relevant to fertility clinics where egg donation is offered and to inform public health policy. This research is the first to evaluate the CLBR in women who have received donated eggs. The findings can be used when counselling women over 40 about their ART treatment options. The results lend support for the requirement to have an upper age limit for egg donors in Australia. Steps to improve women's experience of egg donation have been identified. Public health strategies such as national education campaigns on egg donation and the establishment of a public egg bank are recommended to increase donor recruitment and retention. Critically, better clinic follow-up care, including post-donation counselling, would significantly improve donors' experience of altruistic egg donation, which in turn may lead to egg donors being willing to donate more than once.