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Socio-economic disparities in access to assisted reproductive technologies in Australia

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Abstract Women from disadvantaged socio-economic groups access assisted reproductive technology treatment less than women from more advantaged groups. However, women from disadvantaged groups tend to start families younger, making them less likely to suffer from age-related subfertility and potentially have less need for fertility treatment. Whether socio-economic disparities in access to assisted reproductive technology treatment persist after controlling for the need for treatment, has not been previously explored. This population based study demonstrates that socio-economic disparities in access to assisted reproductive technology treatment persist after adjusting for several confounding factors, including age at first birth (used as a measure of delayed child-bearing, hence a proxy for need for fertility treatment), geographic remoteness and Australian jurisdiction. Assisted reproductive technology access progressively decreased as socio-economic quintiles became more disadvantaged, with a 15.8% decrease in access in the most disadvantaged quintile compared with the most advantaged quintile after controlling for confounding factors. The adjusted rate of access to assisted reproductive technology treatment also decreased by 12.3% for women living in regional and remote

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areas compared with those in major cities. These findings indicate that financial and sociocultural barriers to assisted reproductive technology treatment remain in disadvantaged groups after adjusting for need. 

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Introduction

Subfertility affects approximately 15% of women of reproductive age at any given time worldwide, causing significant personal suffering to millions of couples around the globe from all socio-economic backgrounds (Boivin et al., 2007). The treatment of subfertility has been revolutionised over the last three decades, primarily through assisted reproductive technologies, such as IVF. The latest global estimates indicate that over 1.6 million assisted reproductive technology cycles are undertaken each year and that more than 6 million children have been born following assisted reproductive treatment (ICMART, 2015). Despite assisted reproductive technology becoming a mainstream medical intervention, there are widespread disparities in access to treatment between countries (Chambers et al., 2009; Ferraretti et al., 2013) and among different socio-economic and ethnic groups within countries (Hammoud et al., 2009; Jain, 2006; Smith et al., 2011).

The principle that healthcare systems ought to provide equal access for equal need has been widely recognized and has been the subject of recent attention by governments (Agency for Healthcare Research and Quality (AHRQ, 2012; Centers for Disease Control and Prevention (CDC, 2011; Marmot et al., 2011). There exists only limited knowledge of how disparities impact on access to assisted reproductive technology treatment. Furthermore, much of the previous research regarding access to assisted reproductive treatment has focused on ethnic disparities in the USA, which may not reflect socio-economic conditions and disparities in other countries (Bitler and Schmidt, 2012; Hammoud et al., 2009; Inhorn and Fakih, 2006; McCarthy-Keith et al., 2010; Smith et al., 2011).

In Australia, assisted reproductive technology treatment has historically been subsidised through the public health insurance scheme, Medicare. Since 2001, women have been eligible for partial reimbursement of almost all assisted reproductive technology cycles with no funding limit criteria, such as the number of previous cycles, maternal age, duration of subfertility, body mass index (BMI) or smoking status. Although assisted reproductive technology in Australia is primarily regulated by the federal government (NHMRC, 2007) legislative differences exist between the eight Australian states and territories. Patients pay an average out-of-pocket cost of approximately \$3000 – \$4000 AUD (\$2200 – \$3000 USD, 2015) for a fresh embryo transfer cycle and \$1500 – \$2000 AUD (\$1100 – \$1500 USD, 2015) for a frozen embryo transfer cycle, which represents about one third the cost of assisted reproductive technology fresh and frozen embryo cycles, respectively (Chambers et al., 2012). This relatively supportive environment had led to Australia having one of the highest assisted reproductive technology utilisation rates in the world (Chambers et al., 2009, 2014b).

We have previously demonstrated disparities in access to assisted reproductive technology treatment based on

unadjusted measures of socio-economic status (Chambers et al., 2013). However, to our knowledge no study has accounted for the fundamental differences in the prevalence of subfertility across socio-economic groups. Importantly, women in low socio-economic groups typically start their families earlier than those in higher socio-economic groups and therefore potentially have less need for fertility treatment (Räsänen et al., 2013). Like most developed countries, the average age of first time mothers in Australia is also increasing (Hilder et al., 2014), as is the average age of women undergoing assisted reproductive technology treatments (Macaldowie et al., 2015), indicating an increased need for assisted reproductive technology treatment due to age related subfertility.

This study uses national population datasets to investigate disparities in access to assisted reproductive technology based on socio-economic status and geographic remoteness, after accounting for average (mean) age at first birth as a proxy for the underlying need for fertility treatment across socio-economic groups.

Materials and methods

Data sources

Three population datasets were used to undertake this study. The Australian and New Zealand Assisted Reproduction Database (ANZARD) was used to quantify the number of women who underwent assisted reproductive technology treatment and number of assisted reproductive technology cycles performed in 2009 – 2012 in Australia, by Australian postcode of a woman's usual residence. ANZARD collects assisted reproductive treatment and outcomes data for all assisted reproductive technology cycles performed in all fertility clinics in Australia and New Zealand, and is managed by the National Perinatal Epidemiology and Statistics Unit (NPESU), University of New South Wales. For this study assisted reproductive technology treatment was limited to initiated autologous fresh and frozen/thaw cycles which account for 95% of the total assisted reproductive treatment cycles performed in Australia (Macaldowie et al., 2014).

A measure of socio-economic status (SES) was assigned to each woman's postcode of residence using the Australian Bureau of Statistics (ABS) Socio-economic Index for Areas (SEIFA). The Index of Relative Socio-economic Advantage and Disadvantage (ISRAD) was used and based on 2011 census data. The ISRAD incorporates variables indicating disadvantage such as low income, unemployment, low-status occupations and low education, and variables indicative of advantage such as high income, well paid occupations, higher education and high wealth (ABS, 2011b). Similarly, a measure of remoteness (major cities or regional and remote areas) was assigned to

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