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ORIGINAL ARTICLE

Trends in female sterilisations in New South Wales, 2010–2019

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Background: Female sterilisation remains a common contraceptive method in many countries.

Aims: The aim is to analyse the recent changes in the incidence of female sterilisation in New South Wales (NSW).

Methods: Data were obtained from the NSW Admitted Patients Data Collection for all female patients who had undergone one of the five sterilisation procedures in a public or private hospitals in NSW during 2010 and 2019. Denominators for calculating sterilisation rates were estimated using census and other population data.

Results: The number of sterilisation cases dropped from 3407 in 2010 to 2561 in 2019, and the sterilisation rate declined from 22.6 per 10 000 females aged 20–49 in 2010 to 15.4 in 2019. Incidence was at its peak in the 35–39 age group in both years. Indigenous females had higher sterilisation rates than non-Indigenous females born in Australia or overseas. While some foreign-born females had higher sterilisation rates than for those who were in Australia or overseas on average their rates were lower than those who were born in Australia or overseas. There was a clear socio-economic gradient such that females living in the most disadvantaged areas had much higher sterilisation rates than those living in the least disadvantaged areas. The Indigenous, ethnic and socio-economic differences in sterilisation rates persisted in both years of this study.

Conclusion: Although fertility rates in NSW changed little over the 10-year interval a steady decline in sterilisation occurred, consistent with other forms of contraception (particularly long-acting reversible types) increasing concurrently in popularity.

KEYWORDS

electro-destruction of Fallopian tubes, laparoscopic sterilisation, New South Wales, open abdominal sterilisation, vaginal sterilisation

INTRODUCTION

Despite advances in contraception, female surgical sterilisation remains a common procedure world-wide.[1,2] An analysis of female sterilisation[3] rates in New South Wales (NSW) for the period 1981 to 1994–95 revealed a steady decline from 154 per 10 000 females aged 20–49 in 1981 to 72 in 1991 and 60 in 1994–95. The aim of this paper is to determine whether the declining trend in female sterilisation observed since 1981 has continued during the interval 2010–2019.

DATA AND METHODS

The scope of the data presented in this paper was limited to female patients who were residents of NSW, were discharged from a NSW public or private hospital during 2010 or 2019 calendar years, and had undergone any of the following sterilisation procedures mentioned in the ICD (International Classification of Diseases, 10th Edition, Australian Modification) as either a primary or one of the secondary surgical procedures:

- 35688-00: Laparoscopic sterilisation
- 35688-01: Sterilisation via vaginal approach
- 35688-02: Sterilisation by open abdominal approach
- 35688-03: Laparoscopic electro-destruction of Fallopian tubes, and
- 35688-04: Electro-destruction of Fallopian tubes.

Although salpingectomy occurs often as part of a gynaecological procedure, we did not include figures for it in our analysis, as in only about 10% of cases is sterilisation the goal (Dr James Brown, pers. comm.).

The main source of sterilisation data was the NSW Admitted Patients Data Collection (APDC) for calendar years 2010 and 2019. An examination of the data for intervening years showed that while there were small random fluctuations, the overall trend was consistently declining. The APDC contains information for each patient's age, her self-reported Indigenous status, country of birth, length of stay in hospital, hospital type and an indicator of the socio-economic conditions prevalent in the postcode of their area of residence. This indicator was based on the deciles of the Index of Relative Socio-Economic Disadvantage (IRSD) calculated by the Australian Bureau of Statistics (ABS) for each postcode in Australia.[4] For this analysis the deciles (D1–D10) were merged into quintiles (Q1–Q5). Thus, all patients with postcodes assigned Q1 were considered to be living in the 20% most disadvantaged areas, while those with postcodes assigned Q5 were taken as living in the 20% least disadvantaged areas.

Estimated resident populations (ERP) of females in NSW by age in mid-2010 and mid-2019 were obtained from the ABS website[5] and were used as denominators to calculate age-specific sterilisation rates for the two calendar years. Data from the 2011 and 2021 censuses were used for estimating the population of NSW by Indigenous status, and country of birth. These data were adjusted to align with the ERPs of NSW for mid-2010 and mid-2019. For IRSD the 2011 census data were used for 2010 analysis and 2016 census data for 2019 analysis as the ABS has not yet released the IRSDs based on 2021 census data (March 2023).

Life-time probability of undergoing sterilisation in a public or private hospital in NSW was estimated as the cumulative sum of age-specific sterilisation rates from 20 to 49 years of age. Adjustment for female mortality during the reproductive period was deemed unnecessary, because the chance of a 20-year-old female in NSW surviving to her 50th birthday was very high – close to 98% according to the most recent life table for NSW.[6]

RESULTS

Frequency of sterilisation cases

In 2010, a total of 3407 female sterilisation procedures were carried out in NSW hospitals. This number declined by 24.8% to 2561 in 2019 (Table 1).

Age profile

Practically all, except ten sterilisation patients in 2010 and six in 2019, were 20–49 years of age. The modal age group was 35–39 in both years. The median age of sterilisation patients was 36.6 years in 2010 and 36.3 in 2019, and the mean ages were 36.4 and 36.1 years respectively. The declines in both the medians and means over the ten-year period were only marginal.

Indigenous status and country of birth

Over the ten-year period, while the number of sterilisation cases among the Australia-born non-Indigenous females declined substantially (reduction of one in four), the Indigenous females experienced a marginal increase of just over 3%. Most foreign-born females experienced a decline in the number of sterilisations except those born in Asia.

IRSD of the area of residence

The decline in sterilisation rates was greatest (43.9%) among females living in the least disadvantaged areas (Q5) compared to 23.7% in the most disadvantaged areas (Q1). Overall, a socio-economic gradient in sterilisation cases was apparent in both 2010 and 2019 calendar years.

Sterilisation procedure

The two most popular sterilising procedures were coded as 35688-00 (laparoscopic sterilisation) and 35688-02 (sterilisation by open abdominal approach). While the sterilisation cases using laparoscopy dropped by 50% during the ten-year period, sterilisation by open abdominal approach increased by more than 15%. The other three procedures underwent a very sharp decline.

The majority of laparoscopic sterilisations (67.5% in 2010 and 55.3% in 2019) were recorded as the principal surgical procedure. By contrast, most sterilisations performed via an open abdominal approach were recorded as a secondary surgical procedure where caesarean section was usually the principal procedure.

According to the official statistics from the NSW Ministry of Health[7] the total number of caesarean sections (both elective and emergency) was 28 948 in 2010 and 32 894 in 2019 – an increase

TABLE 1 Demographics and other statistics about female sterilisations in public and private hospitals: New South Wales, 2010 and 2019

	Sterilisation cases during			
	2010		2019	
	No.	%	No.	%
Age group				
20–24	56†	1.6	28	1.1
25–29	356	10.4	289	11.3
30–34	877	25.7	724	28.3
35–39	1286	37.7	929	36.3
40–44	677	19.9	477	18.6
45–49	157‡	4.6	114‡	4.4
Indigenous status				
Non-Indigenous	3186	93.5	2371	92.6
Indigenous	179	5.3	185	7.2
Not stated	42	1.2	5	0.2
Country of birth				
Australia	2546	74.7	1688	65.9
Foreign-born	819	24.1	868	33.9
NZ/UK/Europe	107	3.1	62	2.4
Asia	305	9.0	489	19.1
Middle East/North Africa	153	4.5	154	6.0
Other countries	254	7.5	163	6.4
Missing data	42	1.2	5	0.2
IRSD quintile of the area of residence				
Q1: Most disadvantaged areas	777	22.8	593	23.2
Q2:	687	20.2	508	19.8
Q3:	716	21.0	594	23.2
Q4:	658	19.3	555	21.7
Q5: Least disadvantaged areas	551	16.2	309	12.1
Missing data	18	0.5	2	0.1
Sterilisation procedure				
35688-00: Laparoscopic sterilisation	1861	54.6	931	36.4
35688-01: Sterilisation via vaginal approach	98	2.9	18	0.7
35688-02: Sterilisation by open abdominal approach	1391	40.8	1603	62.6
35688-03/04: Electro-destruction of fallopian tubes¶	57	1.7	9	0.4
Principal diagnosis at the time of admission				
Z30: Contraceptive management	1360	39.9	488	19.1
O82: Single delivery by caesarean section	596	17.5	1535	59.9
O34: Suspected abnormality of pelvic organs	587	17.2	6	0.2
N92-N94: Menstruation related	265	7.8	268	10.5
… Other diagnoses	599	17.6	264	10.3
Hospital type				
Public hospital	2277	66.8	1955	76.3
Private hospital	1022	30.0	563	22.0

(Continues)

TABLE 1 (Continued)

	Sterilisation cases during			
	2010		2019	
	No.	%	No.	%
Missing data	108	3.2	43	1.7
Length of stay in hospital				
1 day (including day surgery)	1893	55.6	908	35.4
2–3 days	667	19.6	986	38.5
4–6 days	728	21.4	563	22.0
7+ days	119	3.5	104	4.1

†Includes two cases under 20.
‡Includes eight cases aged 50+ in 2010 and six cases in 2019.
¶Includes 43 cases of laparoscopic electro-destruction of fallopian tubes in 2010 and two in 2019.
IRSD, Index of Relative Socio-Economic Disadvantage.

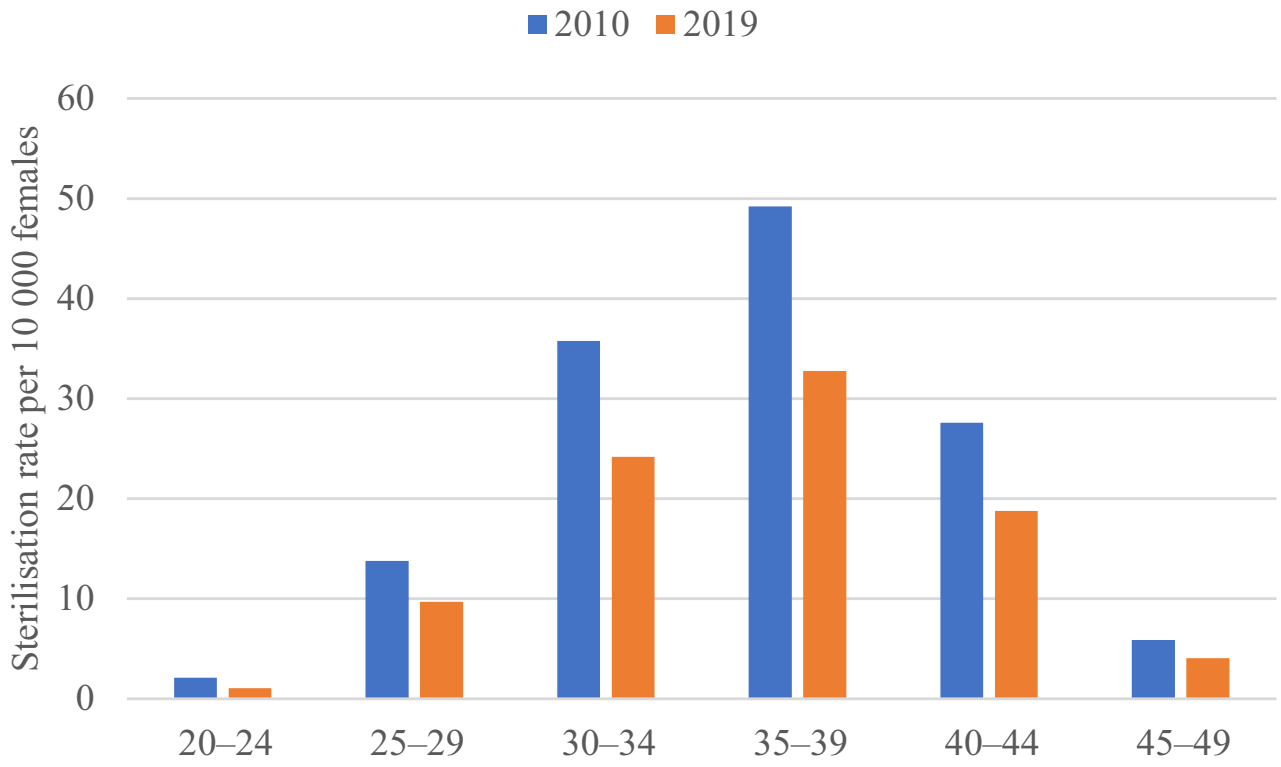

FIGURE 1 Age-specific sterilisation rate per 10 000 females: New South Wales hospitals, 2010 and 2019.

of just under 14%. The proportion of caesarean section deliveries including sterilisation remained more or less constant at around 5% over the period of this study.

Hospital type

The majority of sterilisations in both 2010 and 2019 were performed in public hospitals. The increasing use of public hospitals in 2019 could be related to the type of procedure such as sterilisation by open abdominal approach, which increased markedly in 2019 compared to 2010.

Length of stay in hospital

The majority of cases in 2010 required only day surgery compared to just under 65% in 2019 who were admitted for two or more nights, reflecting a decline in laparoscopic sterilisations and/or combination of sterilisation with other surgical procedures.

Sterilisation rates

As noted earlier, denominators for the calculation of sterilisation rates by age were based on the ERP data for NSW females aged

20–49 in mid-2010 and mid-2019 as well as using the appropriate data from the 2011, 2016 and 2021 population censuses (Figs 1,2 and Table 2).

Rates by age group

The overall sterilisation rate declined from 22.5 to 15.3 per 10 000 females aged 20–49, a decline of 32% over the period 2010 to 2019. While sterilisation rates dropped at each age, their modal value remained constant in the 35–39 age group (Fig. 1).

The life-time probability of a 20-year-old Australian female having a sterilisation in a NSW public or private hospital by the time she reached her 50th birthday was estimated at 6.7% in 2010 compared to 4.5% in 2019, a one-third decline.

Rates by Indigenous status and country of birth

The sterilisation rate among Indigenous females was more than double that for their non-Indigenous counterparts in 2010 and the gap had persisted in 2019, indicating that both groups experienced similar declines in incidence of sterilisation despite the fact that the Indigenous group increased by 28.9% compared to 8.5% growth among the non-Indigenous group.

Sterilisation rates were lower in 2019 compared to 2010, irrespective of the ethnicity of patients. In both 2010 and 2019 the sterilisation rates were lower among foreign-born females compared to Australian-born, except for those born in Middle East/North Africa.

Rates by IRSD of the area of residence

The socio-economic gradient in sterilisation rates was evident in both 2010 and 2019 and the difference between patients living in most disadvantaged areas compared to those living in least disadvantaged areas had increased during the period of this study.

DISCUSSION

Across the interval of study – 2010 to 2019 – we noted a decline in hospital sterilisation rates from 22.5 per 10 000 females aged 20–49 in 2010 to 15.3 in 2019. The landscape for the control of female fertility has changed considerably in recent decades with increased uptake of levonorgestrel intrauterine devices and contraceptive transplants.[8,9] These forms of contraception do not require admission to hospital.

Many tubal ligations in NSW were performed concurrently with caesarean section. Postpartum sterilisation accounted for about 9% of cases in the US, as described by Chan and Westhoff[10] and Fang *et al*.,[2] a practice that they describe as 'extremely rare' in other countries, but not in Australia. Evolving patterns of contraception use reflect not just an expansion of contraception options but also a shift toward more patient-centred practice.

According to ABS, the total fertility rate[11] in NSW was 2.02 per female in 2010 and 1.69 per female in 2019 – a decline of almost 14%. The combination of declining fertility and sterilisation rates is consistent with contraception now being achieved with other methods.

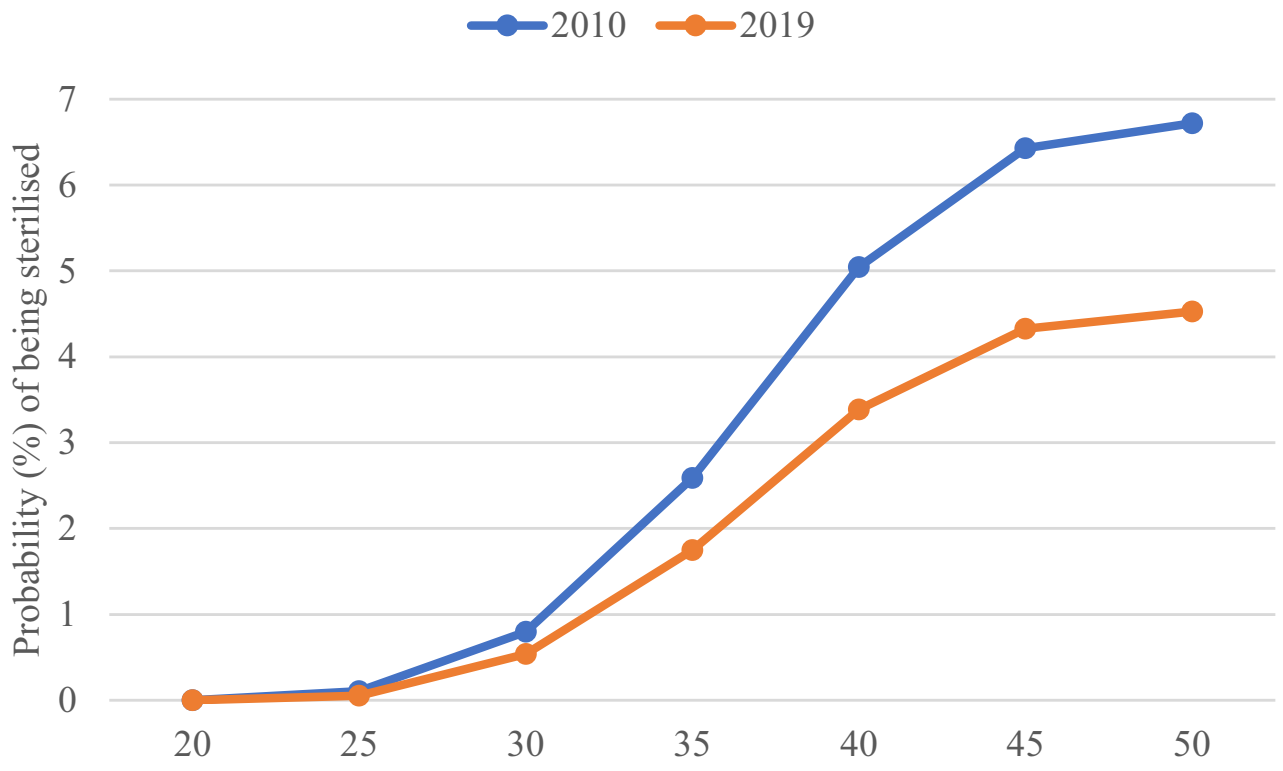

FIGURE 2 Probability (%) of being sterilised by a given age: New South Wales hospitals: 2010 and 2019.

TABLE 2 Sterilisation rates per 10 000 females by Indigenous status, country of birth and quintile of the IRSD for area of residence: New South Wales hospitals, 2010 and 2019

	Sterilisation rates per 10 000 women aged 20–49	
	2010	2019
Indigenous status		
Non-Indigenous	18.9	12.8
Indigenous	45.5	30.3
Country of birth		
Australia	23.0	14.3
Foreign-born	12.0	11.6
NZ/UK/Europe	8.9	5.7
Asia	11.6	12.1
Middle East/North Africa	31.7	25.3
Other countries	8.3	7.3
IRSD quintile of the area of residence		
Q1: 20% Most disadvantaged areas	21.0	16.1
Q2:	20.2	13.7
Q3:	22.9	17.3
Q4:	20.7	15.7
Q5: 20% Least disadvantaged areas	13.9	6.5

IRSD, Index of Relative Socio-economic Disadvantage.

Recently, a retrospective study was conducted at two western Sydney hospitals of salpingectomy as a means of contraception and noted to be uncommon but carrying the added benefit of potential ovarian cancer prevention.[12] However, as noted, the procedure is not commonly undertaken to achieve sterilisation, but it is a procedure that may change in frequency as concerns about prophylaxis against ovarian cancer increase.

Our study used the data from the APDC. This may be <100% accurate but as the same data source was used for the two years of the study, we did not suspect systematic errors in our estimates.

Using these data, health service managers may be able to reallocate some of the resources previously required for female sterilisation to other forms of gynaecological care. It will be interesting to see how in future the trend to less permanent fertility control procedures play out and whether surgical techniques will persist or be entirely replaced by non-surgical methods.

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