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Title page

Changing patterns in women seeking terminations of pregnancy: A trend analysis of data from one service provider 1996-2006.

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Abstract

Objectives

The purpose of this study was to assess emerging trends in five characteristics: age, first ever pregnancy, contraception at time of conception, contraception choices post-operatively and referral source of women presenting for a termination of pregnancy (1996-2006) from a southern service in Adelaide, South Australia.

Method

A time-series study, from 1996 to 2006, using 3434 cases from a termination of pregnancy service provider. Five characteristics associated with women attending for a termination of pregnancy were examined. Data were analysed using simple linear regression analyses and one-way ANOVA.

Results

There was a significant increase in women aged 30-50 years having a pregnancy terminated (ANOVA $F_{1,9} = 5.901$, $p=0.041$), with 67% of women using contraception at the time of conception. An increasing percentage of women chose not to use any contraception post-operatively (ANOVA $F_{1,9} = 14.409$, $p=0.006$), although 90% of women left the service with contraception. Additionally, there was a significant decline in women using natural family planning methods (ANOVA $F_{1,9} = 13.654$, $p=0.006$). Referral patterns changed significantly over the ten years, with fewer women being referred by a general practitioner (ANOVA $F_{1,9} = 46.492$, $p=0.000$) and family planning clinics (ANOVA $F_{1,9} = 13.011$, $p=0.007$).

Conclusions and implications

Termination of pregnancy patterns from a hospital based regional termination service have changed over the past ten years in this study population. There are implications for policy, strategic plans and health promotion activities in the southern region of Adelaide.

Keywords: abortion, termination of pregnancy, contraception, first pregnancy, referral source, Australia, time-series, quantitative research.

There are many myths and inaccurate information surrounding termination of pregnancy. Little is known about changes to trends in women seeking termination of pregnancy over time although it is recognised that women's fertility patterns are changing^{1,2,3}. In an evidence based resource manual for health professions by The Royal Australian and New Zealand College of Obstetricians and Gynaecologists,⁴ it was found that there was limited epidemiological research on pregnancy terminations. With the issue of pregnancy terminations so much in focus over the past two years in Australia, it has been identified that there is a lack of current Australian research available on abortion issues in general, to inform debates and that further research is required⁵. An extensive literature review, also showed a lack of research worldwide on trends in characteristics of women presenting for a termination of pregnancy.

This article presents a time-series analyses of five characteristics associated with termination of pregnancy to determine if there were significant changes in trends in the data collected over ten years from July 1996 to June 2006. Although this study is for one area of South Australia, and the generalisability of the findings to a wider population are limited, this research will provide valuable insights into changes in women's reproductive health. This research will support women's health workers and interested bodies in developing and providing best practice service responses. It also will help guide community health promotion programs to address population health needs from an evidence-based perspective by allowing specific areas of health care needs to be targeted. Additionally, analysis of termination of pregnancy data will be of interest to government and bureaucratic bodies. Furthermore, results may encourage and guide future research in this sensitive area.

Review of the literature

A worldwide literature search on 41 databases such as CINHAL, ProQuest, and Medline (OVID) for trend studies greater than five years, using keywords such as abortion, termination of pregnancy, unwanted pregnancy, trends, contraception, time-series, repeat, and epidemiology, from 1995-2006 was conducted. There were 28 articles identified, which fell into two main categories. Those conducted over a period ranging from 5 to 9 years, ($\bar{X}=7$ $SD\pm 2$ years), and 10 to 37 years, ($\bar{X}=20$ $SD \pm 8$ years). The majority (89.3%) of studies were for periods greater than ten years. Seven of the 28 studies were conducted in Australia. Analysis of the studies showed that 24 characteristics were identified (Table 1). The first five characteristics were considered as important as they impact significantly on reproductive health policies and education programs. These were age at the time of termination, first ever pregnancy, contraception at time of conception, contraception chosen post-operatively and referral source to the service.

Table 1. Literature search articles – Termination of pregnancy characteristics studied.

Reference Number	Author/s	Country of Study	Years of Study	1. Age	2. First ever pregnancy	3. Contraception at time of conception	4. Contraception post-operatively	5. Referral source	6. First termination of pregnancy	7. Repeat termination of pregnancy	8. Gestation at time of termination of pregnancy	9. Ethnicity	10. Country of birth	11. Number	12. Total First Abortion Rate Total Abortion Rate	13. Reasons for termination of pregnancy	14. Marital status	15. Place of Residence	16. Studies comparing International countries to their own studies	17. Complications	18. Fertility rate	19. Type of termination of pregnancy	20. Births	21. Employment	22. Education level	23. Number live children	24. Mortality	
6	Addor, V. et al	Switzerland	1990-1999	1								1	1	1														
7	Bender S Geirsson et al	Iceland, Nordic Countries	1976-1999	1									1					1	1	1	1							
8	Bettarini, S. D'Andrea, S	Italy	1979-1993	1											1	1					1							
9	Chan, A. Sage, L	Australia	1985-2003	1											1													
10	Chan, A. Keane, R	Australia	1971-2000	1				1						1	1			1		1								
11	Chan, A. Scott, J. et al	Australia	1971-2003	1										1	1													
12	Dickson, N. et al	New Zealand	1981-1997	1								1	1	1				1		1	1							
13	Filakti, H	England, Wales	1990-1994	1	1						1				1	1		1			1							
14	Goto, A. et al	Japan	1976-1995	1							1			1	1													
15	Government Statistical Service for the Department of Health, England Wales	England, Wales	1969-2004	1					1	1			1	1	1	1	1	1			1							
16	Haldre, K. Karro, H. Tellmann, A	Estonia	1992-2001	1						1	1		1	1	1		1											1
1	Hamilton, B. Ventura, S	USA	1960-2002	1								1		1	1						1							
17	Henshaw, S. K. Singh, S. Hass, T	54 countries	1975-1996	1											1				1									
18	Hudson, G. Hawkins, R	Australia	1988-1993	1	1	1	1	1	1	1	1			1														
19	Kosunen, E. Rimpela, M	Finland	1976-1993	1											1					1								1
20	Peiro, R. Colomer, et al	Spain	1974-1995	1										1	1			1	1									
21	Scottish Executive	Scotland	1985-1999	1						1				1	1	1	1	1			1							
22	Semjidsmaa, C	Mongolia	1985-1995	1										1	1										1	1		
23	Singh, S. Darroch, J	25 developed countries	1970s-1990s	1											1	1				1								
24	Singh, K. Fai, F.Y. et al	Singapore	1965-1994	1					1	1	1			1	1	1	1											1
25	Singh, S. Sedgh, G	Brazil, Colombia, Mexico	1977-1992	1	1										1			1	1	1	1						1	
26	Socolov, R. Pricop, F. et al	Romania	1988-1997	1										1				1									1	
27	South Australian Abortion Reporting Committee	Australia	1970-2004	1										1	1													
28	Statistics New Zealand Abortions	New Zealand	1988-2004	1					1	1	1			1	1				1							1		
29	Straton J, Godman k. Gee, V	Australia	1999-2004	1							1																	
30	Strauss, L. et al	USA	1990-2002	1							1	1		1	1		1	1	1		1	1						
31	van de Kليس, K. Westenberg, L. et al	Australia	1970-2000	1											1		1	1	1		1				1	1		
32	Whitcomb, D	USA	1973-2000	1								1			1	1												
Total in each characteristic Group				28	1	3	1	1	4	4	10	6	0	20	24	5	6	12	11	1	8	4	11	4	1	2	1	

Table 1.

The literature search identified limitations and gaps in knowledge in the five characteristics. Age was unable to be compared among studies due to the many variations in methods. There was only limited research worldwide of trends in contraception at the time of conception. There were no studies worldwide in the past 11 years which specifically examined trends in the characteristics of the number of first ever pregnancies which ended in a termination, contraception choices post-operatively or referral source.

Trends varied depending on the country being studied and the duration of the study. Additionally, it was difficult to compare global trends due to the differing political, cultural and social issues which impact on trend outcomes. Comparisons also were compromised by differences in units used to present results. Most of the studies did not examine the five characteristics and the ones that did lacked in-depth discussion on trend findings or what may have impacted on them over time. Therefore, this study was designed to explore trends in termination of pregnancy characteristics from 1996 to 2006 and identify changes in trends and what may have impacted on these changes.

Method

Design

A time-series design was used, which is where the chronological sequence of observations on particular variables are examined in the hope of discovering a historical pattern.³³

Sample and setting

Data were collected from a pregnancy termination service provider in southern Adelaide which predominantly included the southern suburbs, and to a less degree, the Fleurieu Peninsula and Kangaroo Island.

Ethics

Ethical approval for the project was granted by Flinders University Adelaide Social and Behavioural Research Ethics Committee, and the southern service ethics committee. All data was permanently de-identified to ensure confidentiality of all participants.

Setting

The service is incorporated into a private and public community hospital. However, there were very few privately insured patients who attended the clinic. Predominantly the women attending the service were from the southern suburbs of Adelaide, although a small proportion of women from outside the area attended, for numerous reasons, such as confidentiality, suitability of day of service, or friends/relatives who lived in the area. According to the most recent statistics for South Australia, 91.2% of all pregnancy terminations were performed in a metropolitan public hospital in 2005, where the southern service performed 7.3% of termination of pregnancy procedures.³⁴

Method of data collection

Information was collected on a pre-admission questionnaire and admission form for each client who attended the service over the ten year period, as part of the routine admission process. This information was regularly entered into a specifically designed database. The ten years of data were transferred to Statistical Program for Social Sciences (SPSS v12). The data were then refined into categories:

- three age groups; ≤ 19 years, 20-29 years and 30-50 years;
- first ever pregnancy;
- referral sources: General Practitioner, 'other' (such as community health centres, family/friends, other hospitals), self, SHine (Family Planning)

- contraception at the time of conception; hormone, barrier, natural family planning, and nil (Table 2);
- post-operative contraception categories; hormone, barrier, natural family planning, and nil (Table 2). These data are based on the contraceptive choices made by women leaving the clinic immediately after their termination.

Table 2. Definitions of contraception groups

Nil

No contraception used

Natural Family Planning

Timing

Billings Method

Temperature

Lactational amenorrhoea

Withdrawal

Barrier

Intrauterine device

Sterilization (male and female)

Condoms

Diaphragms

Hormonal

Emergency contraception

Oral contraceptive pill

Three monthly injection

Hormone rod implant

Data analysis

The time-series method was chosen as the most appropriate for this research project. Time-series data were examined using simple linear regression analyses, to assess patterns and trends in data from July 1996 to June 2006. Tests for normality were conducted using the Kolmogorov-Smirnov test in SPSS v12 on all the characteristics. The one-sample Kolmogorov-Smirnov Test indicated that all the data were normally distributed.³⁵ Durbin-Watson tests were performed on all the characteristics which indicated that there were no autocorrelations issues. The strength and direction of the correlations coefficient of each of the five characteristics was assessed.

Results

Age

There were no significant changes in trends in the teenage group of women 19 years and less (24% [SD± 1.09]), or in the 20-29 years age group (46.5% [SD± 0.80]). There was a significant increase in the number of women aged 30-50 years (29.51% [SD± 1.99]) having a pregnancy terminated over the ten years (Tables 3 & 4).

Table 3. Number of women in each age group per year

	≤19 years	20-29 Years	30-50 years
1996/97	80	170	86
1997/98	88	179	86
1998/99	96	145	99
1999/00	72	176	113
2000/01	84	143	111
2001/02	96	161	106
2002/03	85	153	101
2003/04	97	150	93
2004/05	65	152	100
2005/06	62	167	118
Total	825	1596	1013

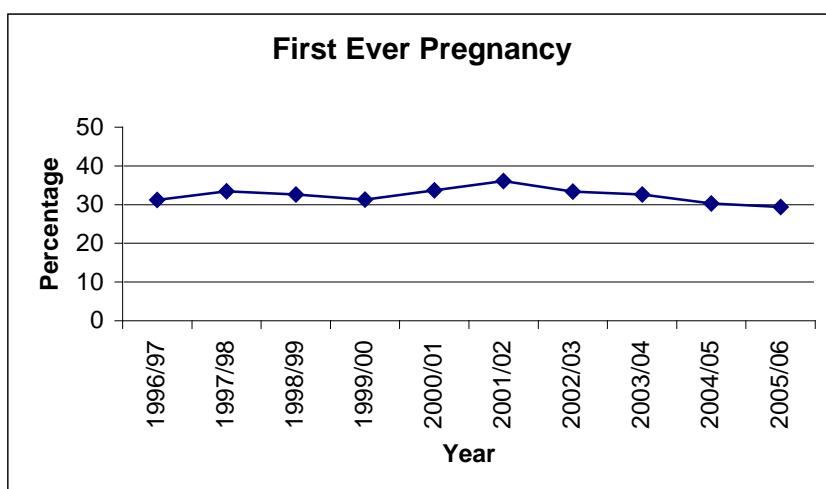
Table 4. Trend results

	ANOVA F _{1,9}	Sig.	Coefficient Regression	
Age Groups				
19 years and less	1.035	0.339	Low negative	-0.338
20-29 years	0.552	0.479	Low negative	-0.254
30-50 years	5.901	0.041	Moderate positive	0.652
First Ever Pregnancy				
Yes	0.739	0.415	Low negative	-0.291
Contraception Used				
Nil	2.578	0.147	Low positive	0.494
Natural Family Planning	2.734	0.137	Moderate negative	-0.505
Barrier Methods	0.058	0.817	Little if any positive	0.084
Hormone Methods	1.972	0.198	Low negative	-0.445
Contraception Chosen				
Nil	14.409	0.006	High positive	0.799
Natural Family Planning	13.654	0.006	High negative	-0.794
Barrier Methods	0.776	0.404	Low positive	0.297
Hormone Methods	6.395	0.035	Moderate positive	0.667
Referral Source				
GP	46.492	0.000	Very high negative	-0.924
Other	65.354	0.000	Very high positive	0.944
Self	26.612	0.001	High positive	0.877
SHine	13.011	0.007	High negative	-0.787

First ever pregnancy

Overall, there were 32.4% (SD± 0.55) of women who attended the service with a first ever pregnancy with no significant changes in trends (Table 4, Figure 1).

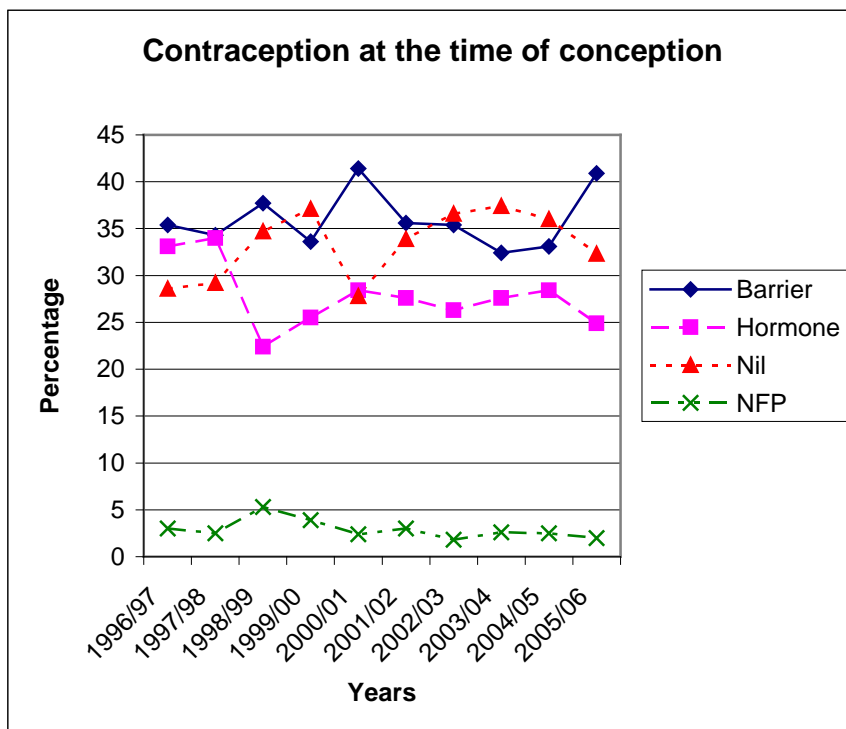
Figure 1. First ever pregnancy



Contraception at the time of conception

There were no significant changes in trends of contraception use at the time of conception (Table 4, Figure 2). Overall, the mean percentages over this period were 33.4% ($SD \pm 1.81$) using nil, 35.9% ($SD \pm 0.27$) using barrier methods, 27.8% ($SD \pm 1.57$) using hormone methods, 2.9% ($SD \pm 0.51$) natural family planning methods.

Figure 2. Contraception use at time of conception

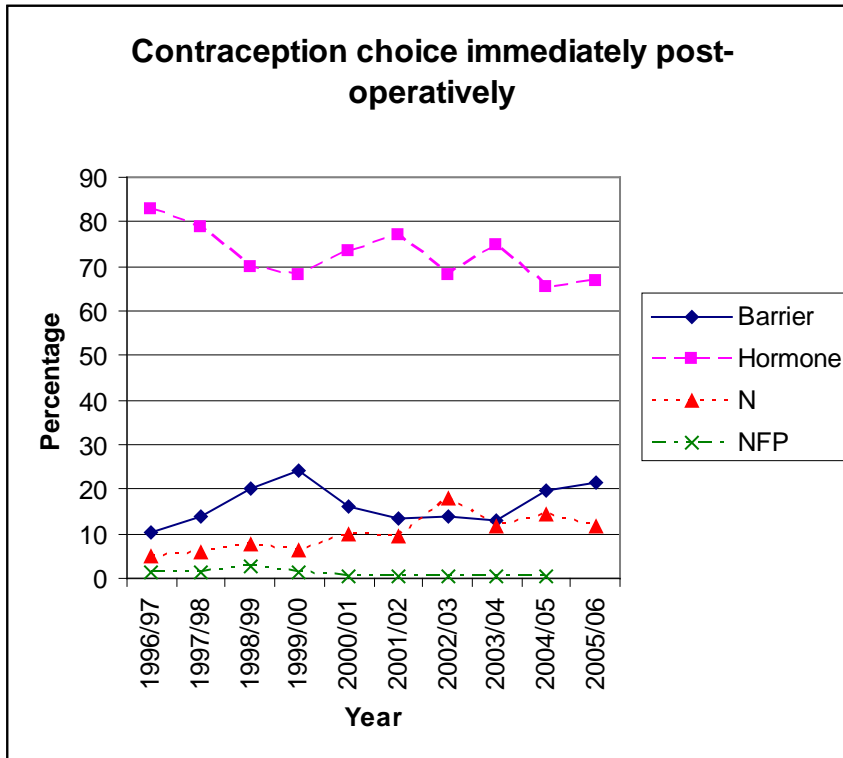


Contraception chosen immediately post-operatively

There were significant changes in contraception choices post-operatively (Table 4, Figure 3). An increasing percentage of women chose not to use any contraception post-operatively, and there was a decline in women choosing more reliable methods of contraception such as hormone methods. Additionally, there was a significant decline in women using natural family planning methods. Overall, the mean percentages over this period were 10% ($SD \pm 3.21$) left the service with nil contraception, 0.9% ($SD \pm 0.63$) natural family planning, 16.6%

(SD± 1.35) barrier, and 72.5% (SD± 3.91) with a hormone method. On average, 90% of all women over the ten years left the service with contraception organised.

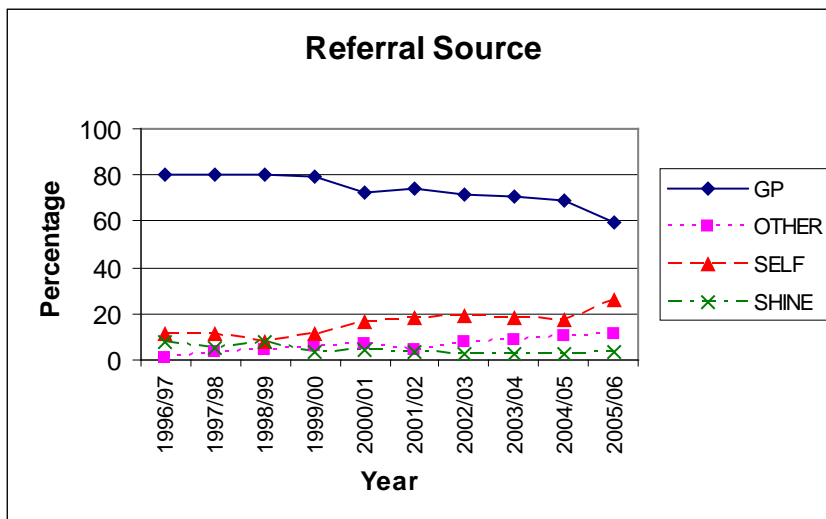
Figure 3. Post-operative contraception choices



Referral source

Referral patterns changed significantly over the ten years with fewer women being referred by a general practitioner and family planning clinics (Table 4, Figure 4). Overall, the mean percentages over this period were 73.7% (SD± 6.08) were by general practitioners, 15.7% (SD± 4.63) self, 6.3% (SD± 3.09) other sources, and 4.3% (SD± 1.67) SHine clinics.

Figure 4. Referral sources



Discussion

There were three significant changes in trends in a number of the five characteristics in women attending the southern service provider for a termination of pregnancy from July 1996 to June 2006. More specifically, these included an increase in women aged 30-50 years having pregnancies terminated, and changes to contraception choices post-operatively and referral sources.

Age

In Australia, it is difficult to ascertain the annual number of pregnancies terminated, however, in 2003 Australian estimates showed that there were 19.7/1000 women aged 15-44 years, and in South Australia for 2003 the rate was 16.7/1000 women aged 15-44 years.^{9,34} According to the Australian Bureau of Statistics Census³⁶ data, in South Australia there was a minimal increase in the number of women in the reproductive ages of 'under 19 years' age group and the 30-50 years age group from 1996 to 2001. However, no data are available for 2002-2006. Therefore, it is not possible to relate the significant increase in the percentage of women in the 30-50 years age group in the southern service seeking terminations of pregnancy with age demographics.

In addition to examining reproductive age groups in relation to pregnancy terminations, it was useful to examine birth trends to assess if there were changes which may have impacted on the research findings. The Pregnancy Outcomes Unit of South Australia shows the annual number of births in South Australia has only slightly declined since, the total fertility rate in 1996 was 1.76 decreasing to 1.74 in 2004. There was however, an increase in confinements of Asian women and Aboriginal mothers.¹¹ The state statistics show that since 1996 there has been a decline in the teenage birth rate and an increasing trend for women giving birth at an increased age.¹¹ The proportion of women who gave birth aged 35 years or more, increased from 4.6% in 1985 to 17.9% in 2004, whereas the mean age among women giving birth increased from 26.55 years in 1981 to 29.81 years in 2004. State trends for termination of pregnancy show that, the rate in 2004 was 15.9 per 1000 women.¹¹ The rate for teenage termination of pregnancy declined from 1996 (24.2 per 1000 women) to 2004 (21.1 per 1000 women).^{11,37}

According to Lutz,² there has been much research into the reasons for changes in fertility patterns, but there is not one single, most important factor that can be identified. Although the trends for fertility patterns may peak and level off, there are currently very strong social and economic forces in society that exert pressure towards later childbearing, such as the expansion of education, and increasingly competitive work situations.² Hamilton and Ventura¹ examined trends in birth, fertility and pregnancy termination in the United States of America, from 1960 to 2002, where fertility rates for women 30 years and over had increased, and termination of pregnancy rates for women of 30-40 years had also increased. The shift in fertility age patterns and the impact of the 'baby-boom' population among women in the childbearing ages is attributed to the increase in the mean age of women commencing childbearing at an older age.² According to a French study women made different reproductive decisions at different stages of their lives depending on the impact of

socioeconomic and relationship factors³. Women older than 35 years chose pregnancy termination mainly due to work situations, the relationship with their partner (if the relationship was less than 5 years or if unstable), if the woman was single, or had a high school education and whose partner was highly educated.³ Younger women with unintended pregnancies more commonly terminated their pregnancy when their education level was high or if a student, or if she had a baby in the previous year. In another study in 1994 in Sweden,³⁸ the age-specific pregnancy termination ratio was U-shaped, that is, the highest ratio for the youngest and the oldest women in society. The same U-shaped pattern is seen in many other countries, such as other European countries and the United States of America.^{38,39} The late increase was more likely due to older women already having their desired number of children, a small percentage due to foetal abnormalities which increases with age, and less desire to have a child when nearing menopause.³⁸

In 2006, Lee and Gramotnev,⁴⁰ addressed the question of motherhood plans among young Australian women. This study looked at survey data from the Australian Longitudinal Study on Women's Health Survey (ALSWH) in 2000. Quantitative research showed that the majority (72%) of childless women aged 22 to 27 years, wanted one or two children by the age of 35 years, to be married, have paid employment and aspired to improve their formal qualifications.⁴⁰ Women in this age group saw education, employment and financial security as more fundamental to a happy and successful adult life than motherhood, and hence delayed parenting and having a preference for a small family size.⁴⁰

It is unclear whether the changes in fertility patterns will continue or level out as there are many factors which can influence this trend, such as changes in government policy. In the 2004-2005 Australian Budget report, a new Maternity Payment was announced starting from 1 July 2004. More commonly referred to as the 'baby bonus', it was paid as a lump sum of \$3000 for each newborn child (increased to \$4000 on 1st July 2006, and due to increase to

\$5000 from July 2008), as a universal payment to all families (usually the mother).⁴¹ In the 2006-2007 government budget report,⁴¹ funding also was announced, for the introduction of \$15.5 million over four years for a pregnancy support national telephone helpline and \$35.6 million over four years for a new Medicare item for general practitioners and qualified health professionals to conduct independent, non-directive pregnancy support counselling. This support is aimed for counselling women with an unintended pregnancy or where they are uncertain about continuing with the pregnancy. In 1986, the Singaporean government introduced a similar policy which encouraged Singaporeans to have three or more children if they could afford it, coupled with mandatory abortion counselling which resulted in the total number of pregnancy terminations declining until 1993.⁴²

According to Lutz,² however, the feasibility and the effectiveness of recent government policies aimed at increasing the level of fertility is unclear, as assessment is complicated by the fact that many social policies, ranging from labor laws to pension systems, have implications on childbearing behaviour. Although these new policy changes did not impact on these research findings, they may impact on future trends which may not be seen for some time, and further research into the impact of these policies is warranted.

First ever pregnancy

This research showed approximately one-third of termination of pregnancy procedures were for women who had never been pregnant before, and therefore two-thirds of pregnancy terminations were performed on women who have had a previous pregnancy, with no significant changes over the ten years of the study. According to the Pregnancy Outcomes Unit in South Australia,¹¹ from 1996 to 2004 the mean age of primiparous women rose from 26.89 years to 28.13 years and there has been an increase among primiparous women over the age of 35 years, a change from 7.1% in 1996 to 11% in 2004. There is much that can be learnt

from further trend research into women's first ever pregnancy experiences such as why is it that there has been no change in first ever pregnancies ending in termination but there is an increasing number of women commencing childbirth over the age of 35 years.

Contraception at time of conception

It is often reported in the media that women are irresponsible with contraception usage and that pregnancy terminations are used as a form of contraception.⁴³ The majority (67%) of women in this study used some form of contraception at the time of conception. This was a substantial increase on what has been previously reported in South Australia for the years 1988 to 1993, where 59% of women stated that contraception was used at the time of conception prior to a termination of pregnancy.¹⁹ Other studies have also shown that women use contraception at the time of conception prior to a termination of pregnancy.^{44,40} In 2006, Lee and Gramotnev⁴⁰ found that 71-81% young women in Australia aged between 22 to 27 years in 2000 were using some form of contraception. This dispels the myth that women are not using contraception at the time of conception. According to the World Health Organization⁴⁵ in 2004, there are failure rates with different contraception types which can vary greatly due to age, income, user's desire to prevent or delay pregnancy and culture. There are many contraceptive choices available to women and even though there have been recent and new methods introduced into the Australian market during the study period, such as the three year contraceptive implant and the hormone containing intrauterine device, the impact of these are yet to be seen.

Contraception choices post-operatively

Contraception choice patterns for women immediately after a termination of pregnancy changed significantly over the study period. More women chose not to use any contraception

after a pregnancy termination in the southern area of Adelaide. In 1996/97, 83% of women chose hormone methods of contraception, 10% chose barrier methods and 5% chose nil. However, by 2005/06 hormone methods had declined to 67%, barrier methods had increased to 21% and nil had increased to 12%.

Reasons why women changed from more reliable methods of contraception needs to be explored further. A Cochrane review,⁴⁶ states that hormone contraceptives are among the most popular reversible contraception used worldwide, however, typical use results in much lower effectiveness which reflects difficulties with adherence to regimes and slow rates of long term continuation. Health promotion and education are important considerations in contraception usage rates. Places, such as California (USA), have addressed the issue of reproductive health education/promotion using educational campaigns which include use of television, radio, print, use of community health programs and organizations to provide consumer education throughout California, and women's/teenage magazines.⁴⁷ These methods proved to be effective, particularly in the Netherlands which has both the lowest termination of pregnancy rate and lowest teenage pregnancy rate in the world, and additionally the most liberal termination of pregnancy laws.⁴⁸

Referral source

The majority of women were referred to the termination of pregnancy services by a General Practitioner (GP). A six year South Australian study conducted 13 years ago¹⁹ found that an average of 68% of women were referred to a termination of pregnancy service by their GP during the study period. This was notably different to the southern service in 1996 where 80% of women were referred by a GP, but by 2006 this had decreased to 60%. There were significant declines also in women being referred via family planning clinics. Women were being referred to the pregnancy termination service from a variety of 'other' sources such as

community health centres, other hospitals, and women's telephone service lines, which increased significantly over the past decade in the service. There was also a trend for more women to refer themselves. Having an understanding of the types of referral sources is particularly useful for development of health promotion strategies.

Conclusion and Recommendations

The examination of trends in five characteristics of women attending for a termination of pregnancy over a ten year period has uncovered what has changed over time in the southern area of Adelaide. With nearly 70% of women using contraception at the time of conception further research is needed to explore why contraception methods are failing, what are the implications of the failure rate in regard to continuing the unplanned pregnancy or termination of the pregnancy, where women obtain advice including contraception advice and what measures could be put in place to help with preventing contraception failure. The changing fertility patterns of women needs to be considered and reflected in policies, strategic plans and health promotion activities in the Southern area of Adelaide, especially focusing on women over the age of 30 years.

A limitation of this study was that only one area of Adelaide was presented and that generalisation to the general population is not possible. Additionally, no comparisons were made between ages and other characteristics such as contraception use or referral sources which would help in strategic planning policy development and tailoring health promotion programs. However, this research has highlighted the need for further investigation into why there were significant changes, the factors impacting on these characteristics, and why and how women make choices in regards to reproductive health matters. Replication of this study on a wider population base would provide useful information which could be more generalized. Further research is essential to assist in addressing the gaps in knowledge in this

important public health issue which can impact on service delivery, and more importantly, women's lives.

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