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A systematic review of trend studies of women seeking termination of pregnancy

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Abstract

Aims and objectives

This article reports a systematic review of trend studies (1995-2006) that answers five questions: What are the patterns of:

- (1) age of women seeking termination of pregnancy,
- (2) first ever pregnancy ending in a termination,
- (3) contraception usage at the time of conception,
- (4) contraception chosen immediately post-operatively and
- (5) referral sources to termination of pregnancy services?

Background: Fertility patterns are changing and there is evidence to indicate that numbers of older women conceiving for the first time is increasing. At the same time there are new methods of contraception widely available. Little is known about the implications of these changes on termination patterns.

Design An extensive electronic search of databases such as CINAHL, MEDLINE® In-Process (OVID) and was conducted from January 1995 - June 2006 for trend studies in pregnancy terminations.

Methods: Articles chosen were based on trend studies greater than five years, contained primary quantitative research and official government statistical reports.

Results: Results of the search showed age was unable to be compared due to the many variations in measurements and time periods, there was only limited research worldwide of trends in contraception at the time of conception in relation to a termination of pregnancy. Additionally, 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-operative of a termination of pregnancy, or referral source to a termination of pregnancy provider.

Conclusion: Little is reported in the literature on trends in the five characteristics related to pregnancy termination.

Relevance to clinical practice

Evidence about the changing patterns of women seeking pregnancy termination is needed to inform policy and practice and to ensure that health promotion strategies are underpinned by accurate information that reflects the needs of the populations of women in relation to their reproductive health.

Introduction

Current debates around termination of pregnancy are hampered by a lack of comprehensive, reliable evidence. In an evidence based resource manual for health professions by The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG 2005), it was found that limited resources were available in the important area of epidemiology of pregnancy terminations. Epidemiology, using methods such as trend studies, can provide important information on past events which can impact on future development of policies, procedures and practices. Trends refer to the upward (incline) or downward (decline) movement that characterises a time-series design over a period of time (Bowerman & O'Connell 1979, pp. 6-9). A trend is loosely defined as 'the long term change in the mean', where long term refers to the number of years over which the data are collected (Chatfield 1975). A time-series design is where the chronological sequence of observations on particular variables are examined in the hope of discovering a historical pattern (Bowerman & O'Connell 1979, pp. 6-9). The benefits of historical type studies, such as a time-series study, include enhanced precision of findings and provision of statistically significant information for assessing clinical and public health interventions (NHMRC 2000). This can provide insight into how effective or ineffective education programs have been, such as reproductive health. That is, if the trend in pregnancy terminations is decreasing, the implication is that contraception education is being effective or it may be that other historical factors are impacting on the trends.

The impact of changing trend patterns on termination of pregnancy data needs to be determined. Changes in women's age of having pregnancy terminations, for instance, can indicate changing fertility patterns. There has been much research into the reasons for changes in fertility patterns in Westernised countries, but there is not one single, most important factor that can be identified (Lutz 2006). 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 (Lutz 2006). Other factors that impact on termination of pregnancy include the woman's relationship with the partner. Relationships of less than five years duration, or when the relationship was unstable resulted in higher rates of pregnancy termination (Sihvo et al, 2003). Availability of newer contraceptives such as hormone implants and easier access to emergency contraceptive pills may impact on pregnancy termination trends. Trend studies can identify changes in these and other related patterns.

The knowledge gained from the literature review may help inform the debates which influence the development of policies aimed at improving the reproductive health of women. This is an extremely sensitive area of health care and there is a need to ensure women's health issues are continually on the political agenda to ensure even basic primary health care needs are met.

Aims

The purpose of this review was to explore worldwide trends in termination of pregnancy over the past decade. Five characteristics were identified for analysis as they have significant implications for reproductive health policies and education programs. The five characteristics are:

- Age at the time of termination of pregnancy
- First ever pregnancy ending in a termination of pregnancy
- Contraception at the time of conception
- Contraception chosen immediately post-operatively
- Referral sources to termination of pregnancy services

Methods

Search strategies –

We conducted an extensive worldwide literature review of articles published from January 1995 to June 2006 to assess trends in characteristics of women presenting for a termination of pregnancy.

Forty-one databases, such as CINAHL, MEDLINE® In-Process (OVID) and six 'other' resources, such as Government documents, information papers and conference proceedings were searched. Keywords primarily consisted of combinations of words to ensure refinement of the search. These included the terms abortion, unintended pregnancy, unwanted pregnancy and termination of pregnancy, which were combined with terms such as age, Australia, characteristics, contraception, epidemiology, family planning, health promotion, longitudinal, older women, teenage pregnancy, time series, trends and women's health. Other information was sourced from conference proceedings and from reference lists of pertinent journal articles.

The types of journals we sourced included national and international family planning, obstetrics and gynaecology and women's health journals. Articles were chosen which contained primary quantitative research on termination of pregnancy and official government statistical reports, although some qualitative articles were sourced due to their relevance. Studies published in languages other than English, except where translations were available, were excluded from this review.

A total of 154 articles were identified, which principally used a range of quantitative methods. These were then divided into three categories 'a', 'b' and 'c'. Category 'a' criteria were for the most directly relevant sources (n=28). Criteria for category 'b' were for extended sources which contained relevant information which would provide valuable insights into the discussion but did not meet all the criteria for category 'a' (n=62). Category 'c' articles were tangential sources which contained

information which was not directly relevant to category 'a' or 'b' but contained information useful for discussion, (n=64) This literature review examines articles in category 'a' as they were the most closely matched to the identified criteria (see Table 1).

The length of time over which studies were conducted ranged from 5 to 9 years, with a mean of 7 SD± 2 years and 10 to 37 years, with a mean of 20 SD ±8 years. The majority (89.3%) of the 28 studies were for periods greater than ten years (see Table 2).

Level of evidence

Each article was assessed for evidence according to level, quality, relevance and strength to minimise bias, according to the definitions used by the Health Advisory Committee of the National Health and Medical Research Council (NHMRC 1999, p. 14 Appendix C). The articles assessed were predominantly classified as Level 1V (18 of the 28), (Level 1 being the highest), which is where evidence is obtained from case series (either post-test, or pre-test and post-test). Case series studies, post-test, is defined as '...only outcomes after the intervention are recorded in the case series, so no comparisons can be made' (NHMRC 2000, p. 12). Most of the studies in this literature review used statistical reports from various sources and comparisons were not made as the studies were not comparable. Eight articles were classified as Level 111-3, which is where evidence is obtained from comparative studies with historical control, two or more single arm studies or interrupted times-series without a parallel control group (NHMRC 1999, Appendix C). Only two articles were categorised as Level 111-2, which is where evidence is obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case-control studies or interrupted time-series with a control group (NHMRC 1999, Appendix C).

According to the NHMRC (1999, p. 14), it is important to recognise that it may be difficult to apply the 'hierarchy of evidence' in the case of public health and social science interventions, as there is yet to be an agreed rating scale and as such, much of the evidence in the literature will be Level 1. It is recognised that achieving Level 1 in public health and social science may be difficult to attain, however it is important these areas of health care are not disadvantaged by the rigid application of the levels (NHMRC 1999, p. 14). Therefore, categorising the articles into the levels has provided a guide on the assessment for quality, relevance and strength to minimise bias, but the articles should not be disregarded as lacking these qualities due to not achieving Level 1.

Characteristics

Twenty-four characteristics of women associated with termination of pregnancy studies were identified in the 28 articles (see Table 3). A wide variety of characteristics were identified, including age, gestation, number of repeat procedures, employment and education level. Of the characteristics identified, the first five (see Table 3) were selected as the relevant focus characteristics of the literature review. These five characteristics are important for providing evidence-based information which can guide policies, guidelines and clinical practice for reproductive health providers and policy makers.

Results

Characteristics of the studies

1. Age

The manner in which the characteristic of age was examined varied greatly between all of the studies (see Table 4). Some studies referred to all women of reproductive age,

(Singh, S. & Sedgh 1997; Henshaw, Singh & Haas 1999; Peiro et al. 2001; Abortion Reporting Committee 2004; Whitcomb 2004; Chan & Sage 2005; Government Statistical Service for the Department of Health 2005; Straton, Godman & Gee 2005) while others examined age in more refined age brackets such as individual teenage years (van der Klis et al. 2002).

There were large variations in how the age groups of 15-44 years were reported. These included rate of termination of pregnancies per thousand women, (Bettarini & D'Andrea 1996; Kosunen & Rimpela 1996; Filakti 1997; Singh S & Sedgh 1997; Henshaw, Singh & Haas 1999; Semjiddmaa 1999; Socolov et al. 1999; Dickson et al. 2000; Goto et al. 2000; Singh S & Darroch 2000; Peiro et al. 2001; Addor, Narring & Michaud 2003; Abortion Reporting Committee 2004; Chan & Keane 2004; Information & Statistics Division 2004; Whitcomb 2004 Chan & Sage 2005; Chan et al. 2005; Straton, Godman & Gee 2005; Hamilton & Ventura 2006), percentage calculated out of women only having pregnancy terminations (not including all conceptions) (Bender, Geirsson & Kosunen 2003), or percentage of all conceptions leading to termination of pregnancy (Chan & Keane 2004; Filakti 1997), number of women who had a termination of pregnancy (Haldre et al. 2005) and ratio calculated as the number of termination of pregnancies per 100 births excluding miscarriages (Singh K et al. 1996; Singh S & Sedgh 1997), or ratio of termination of pregnancies per 1000 live births (Goto et al. 2000; Strauss et al. 2005; Whitcomb 2004). Several studies used a combination of these measurements as well.

There were several other issues which the articles considered in this review. Some authors acknowledged missing data (Goto et al. 2000), used models instead of actual data (Singh S & Sedgh 1997; Addor, Narring & Michaud 2003), had difficulty with number estimates (Bettarini & D'Andrea 1996; Henshaw, Singh & Haas 1999; Addor, Narring & Michaud 2003; Peiro et al. 2001; Strauss et al. 2005) and one article

was a conference paper with no references and missing information such as methodology, definitions of acronyms and references to tables (Semjidmaa 1999). A few studies described the method of analysis which varied from particular statistical techniques such as logistic regression (Addor, Narring & Michaud 2003), simple linear regression (Peiro et al. 2001) and chi-square (Hudson & Hawkins 1995; van der Klis et al. 2002). However, few studies presented confidence intervals or levels of significance. Epidemiological reports predominantly presented statistics rather than discussions on collection techniques or associated problems with data collection (Abortion Reporting Committee 2004; Information & Statistics Division 2004; Statistics New Zealand 2004; Government Statistical Service for the Department of Health 2005).

To be able to compare trends in age among the different studies, comparisons needed to be made for similar time periods and age groups. However, the period when studies were undertaken varied from more than 14 years ago to recently and ranged from 5-30 years duration, making comparisons of trends in age groups between the studies not possible.

2. First ever pregnancy

There were no time-series studies which specifically examined the characteristic of a woman's first pregnancy which ended in a termination of the pregnancy. One Australian study mentioned gravida. This is regardless of the outcome, such as birth, miscarriage, termination of pregnancy or ectopic pregnancy. In South Australia, between 1988 and 1993, gravidity ranged from one to eleven (mean=2.2 SD±1.4) (Hudson & Hawkins 1995). This study used descriptive data and showed levels of significance. However, there was no discussion of trends of this characteristic to examine patterns of change over the six years of the study. The data collection for this study concluded in 1993, 13

years ago. There is an apparent gap in the literature as no trend studies were found relating to this characteristic.

3. Contraception at time of conception

Only three of the studies, one of which was Australian, investigated contraception at the time of conception (Table 5). Filakti (1997), used secondary data (national England and Wales data), on contraception use and found that there was a 2% rise between 1986 to 1995, (totalling 73% in 1995), in women using at least one method of contraception. They also found a shift from the contraceptive pill to condoms in the 18-24 years age group and a shift from sterilisation to the contraceptive pill or condoms in the 30-44 years age group. However, this national data was based on general contraception usage and not directly associated with termination of pregnancy procedures. According to Moon and colleagues (2000) when using secondary data, consideration needs to be given as to how the data was collected and classified, as well as the quality and validity of the data. However, none of these issues were discussed in the study by Filakti (1997).

An Australian study examined contraceptive practices prior to the termination of pregnancy rather than at the time of conception and they found that 41.5% of women engaged in unprotected intercourse and 58.5% experienced contraceptive failure (Hudson & Hawkins 1995). Hudson and Hawkins (1995), found that hormonal methods remained a constant 21% from 1988 to 1993, barrier methods (mainly condoms) increased from 24% to 47% from 1988 to 1993, but no significant changes in natural methods or usage of intrauterine devices occurred over the same period of time.

A time-series study conducted by Singh and Sedgh (1997) in three South American countries, examined the correlation between contraception and termination of pregnancy. They found the termination of pregnancy ratio per 100 births (excluding

miscarriages) was positively associated with contraceptive use over time in nearly every region of each country due to changing fertility patterns. This study, however, did not look directly at contraception use at the time of conception prior to a termination of pregnancy, but examined the correlation between termination of pregnancy and general contraceptive use. Other major criticisms of this research include termination of pregnancy numbers were estimations and not from a known data source and were only based on women attending a hospital with complications of termination of pregnancy and not on women without complications. All data in the study was secondary data from a variety of sources, such as census data, government statistical surveys, estimates of crude birth rates, estimates from the World Fertility Survey, hospital data (mainly public hospitals) and different surveys used to estimate the same characteristic at different years. Data was weighted and adjusted to allow for discrepancies in different features of the research, such as method effectiveness, underreporting and misreporting. The study, which was published in 1997, concluded 14 years ago (1992) and acknowledged the lack of reliable information on contraceptive use among women.

4. Contraception choices post-operatively

Only one study, which was an Australian study, examined women's post-operative contraception choices following a termination of pregnancy (Hudson & Hawkins 1995). From 1988 to 1993 they found that the majority of women, (82% of all women), preferred hormonal contraception, although women older than 26 years of age did tend to continue using barrier methods more frequently than women under 25 years of age. Even though hormonal contraception was preferred, there was a shift away from more reliable methods of contraception during the study period, to an increased use in barrier methods, probably due to heightened awareness of HIV/AIDS and other sexually transmitted diseases. This study was published 13 years ago.

5. Referral source

Only one of the 28 studies in this review contained any information on the referral source of women to the place of service. An Australian study by Hudson and Hawkins (1995), found that the majority of women had been referred by a general practitioner to the termination of pregnancy service provider, however, it did not examine changes in patterns over the study period. There has been limited research on referral source in the literature from January 1995 to June 2006.

Discussion

After conducting an extensive search in the literature from January 1995 to June 2006, we found limitations and gaps in the literature (see Table 6). These were:

- Age was unable to be compared due to the many variations in measurements and time periods
- There was only limited research worldwide of trends in contraception at the time of conception in relation to a termination of pregnancy
- 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-operative of a termination of pregnancy
 - referral source to a termination of pregnancy provider.

In summary, we found trends varied depending on the country being studied and the duration of the study. 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.

There were several problems highlighted in the studies with data collection. There were many inaccuracies in data collection in some studies in countries such as Japan and the USA, some studies used models instead of actual numbers, rates or percentages and one study was based on estimates of pregnancy terminations rather than actual data. Official statistical reports presented only limited discussion on the presented data, although comprehensive tables were included which were able to be examined.

Relevance to clinical practice

The information gained from this review is of value to both researchers and nurses working in a multitude of clinical settings. The findings indicate that there is a need for further research into the changing trends in pregnancy terminations in the context of changing fertility patterns and new methods of managing fertility. Health promotion and policy needs to be informed by evidence. Analysis of the trends in age of women seeking termination, the number of first pregnancies that end in termination, contraception use at the time of conception and choices in contraception post termination will ensure that policy and practice is relevant to the demographics and behaviours of women seeking termination. Referral patterns indicate the pathways of care for these women and can inform about who is gaining access to care and where access needs to be improved.

Nurses working in areas such as community health, family planning, sexual and reproductive health, family nurse practitioners and midwifery, may be able to use this knowledge in their everyday practice. Additionally, this information will be useful to nurses providing clinical care to women before, during and after a termination of pregnancy as well as those working with women of reproductive ages in managing and

planning health education and health promotion. Nurses guided by evidence-based practice need to be aware of the vast differences in measurements used in the literature in relation to age groups to allow accurate interpretation of studies presented. Nurses need to be aware of the changes relevant to their country and tailor their clinical practice accordingly. This means they may need to consider the education programs which need to reflect contraception choices and preferences in different age groups. This information is especially useful for travel nurses who work in different countries in the specialised area of women's reproductive health.

Conclusion

Little is known of the trends in the five focus characteristics over time for women presenting for a termination of pregnancy worldwide and within Australia. Other significant characteristics that would impact on termination of pregnancy trends and need to be included in future reviews are a range of cultural and social variables. Future reviews could also include publications in languages other than English. We found it was difficult to compare global trends due to the differing political, cultural and social issues which impact on trend outcomes. Further trend research will provide evidence that will impact on relevant policy and practice around sexual health and reproduction and identify factors that impede the success of these policies. This evidence needs to be accompanied by qualitative research that will provide in-depth understandings and insights into the social, economic, policy, legislative and health factors that impact on women's decisions and choices around their reproductive health.

Contributors

Study Design C.P & W.A

Data collection & Analysis W.A

Manuscript preparation W.A & C.P.

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Table 1. Inclusion and exclusion criteria for category ‘a’

Included

Termination of pregnancy research
Primary research
Quantitative studies or data
Qualitative studies with a quantitative component
Published between 1995 and June 2006
Studies or reports presented research or data for periods greater than five years

Excluded

Qualitative research with no quantitative component
Secondary research
Articles not published in English

Table 2. Termination of pregnancy article summaries - Length of research study and origin of article.

Author/s	Length of Research in Years (5-9)	Length of Research in Years (≥10)	Country	Level of evidence
Addor, V. Narring, F. Michaud, P. (2003)		10	Switzerland	1V
Bender, S. Geirsson, R. Kosunen, E. (2003)		24	Iceland, Nordic countries	1V
Bettarini, S. D'Andrea, S. (1996)		15 11	Italy	111-3
Chan, A. Keane, R. (2004)		30 26	Australia	1V
Chan, A. Sage, L. (2005)		19	Australia	1V
Chan, A. Scott, J. Nguyen, A. Sage, L. (2005)		34	Australia	1V
Government Statistical Service for the Department of Health, England Wales (2005)		37 11	England, Wales	1V
Dickson, N. Rimene, C. Paul, C. (2000)		17	New Zealand	111-3
Filakti, H. (1997)	6		England, Wales	111-3
Goto, A. Fujiyama-Koiyama, C. Fuko, A. Reich, M. (2000)		21	Japan	111-3
Haldre, K. Karro, H. Tellmann, A. (2005)		10	Estonia	1V
		25 21 20 13		
Hamilton B, Ventura, S. (2006)		11	USA	1V
Henshaw, S. K. Singh, S. Haas, T. (1999)		22	54 countries	1V
Hudson, G. Hawkins, R. (1995)	6		Australia	111-2
Kosunen, E. Rimpela, M. (1996)		18	Finland	1V
Peiro, R. Colomer, C. Alvatez-Dardet, C. Ashton, J. (2001)	9	22	Spain	111-3
SA Abortion Reporting Committee. (2004)		35	Australia	1V
		15		
Scottish Statistics. (2004)	8	10	Scotland	1V
Semjidmaa, C. (1999)	5	11	Mongolia	1V
Singh, K. Fai, F. Prasad, R. Ratman, S. (1996)		25	Singapore	111-3
Singh, S. Darroch, J. (2000)		16	25 developed countries	111-3
Singh, S. Sedgh, G. (1997)		16	Brazil, Colombia, Mexico	111-2
Socolov, R. Pricop, F. Socolov, D. Anton, A. Slanina, A. (1999)		10	Romania	1V
Statistics New Zealand. (2005)		17	New Zealand	1V
Strauss, L. Herndon, J. Chang, J. Parker, W. Bowens, S. Berg, C. (2005)		30 13	USA	1V
Straton J, Godman K, Gee V (2005)	5		Australia	1V
Van de Klis, K. Chan, A. Dekker, G. Keane, R. (2002)		31 15	Australia	111-3
Whitcomb, D. (2004)		28	USA	1V
	6	25	28	

NB Some papers had more than 1 study period

Table 3. Literature search articles – Termination of pregnancy characteristics studied.

Author/s	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	17. Complications	18. Fertility rate	19. Type of termination of pregnancy	20. Births	21. Employment	22. Education level	23. Number live children	24. Mortality
Addor, V. et al (2003)	1								1		1			1										
Bender S Geirsson et al (1996)	1									1				1	1			1		1				
Bettarini, S. D'Andrea, S. (1996)	1										1		1	1				1						
Chan, A. Sage, L. (2005)	1										1													
Chan, A. Keane, R. (2004)	1					1				1	1				1			1						
Chan, A. Scott, J. et al (2005)	1									1	1									1				
Dickson, N. et al. (2000)	1								1	1	1				1			1		1				
Filakti, H. (1997)	1	1						1			1	1		1				1						
Goto, A. et al (2000)	1							1		1	1													
Government Statistical Service for the Department of Health, England Wales (2005)	1						1	1		1	1	1	1	1				1						
Haldre, K. Karro, H. Tellmann, A. (2005)	1							1	1	1	1	1		1						1				
Hamilton, B. Ventura, S. (2006)	1								1	1	1							1		1				
Henshaw, S. K. Singh, S. Hass, T. (1999)	1											1			1									
Hudson, G. Hawkins, R. (1995)	1	1	1	1	1	1	1	1		1														
Kosunen, E. Rimpela, M. (1996)	1										1			1				1		1				
Peiro, R. Colomer, et al (2001)	1										1	1		1	1									
Scottish Executive. (2004)	1							1		1	1	1	1	1				1						
Semjidmaa, C. (1999)	1										1	1									1	1		
Singh, S. Darroch, J. (2000)	1										1	1			1					1				
Singh, K. Fai, F.Y. et al (1996)	1					1	1	1		1	1	1	1										1	
Singh, S. Sedgh, G. (1997)	1	1									1			1	1	1	1	1			1			
Socolov, R. Pricop, F. et al (1999)	1										1				1					1	1			1
South Australian Abortion Reporting Committee. (2004)	1										1	1												
Statistics New Zealand Abortions. (2005)	1					1	1	1		1	1				1					1				1
Straton J, Godman k. Gee, V (2005)	1							1																
Strauss, L. et al. (2005)	1							1	1	1	1		1	1	1			1	1					
van de Klis, K. Westenberg, L. et al (2002)	1										1		1	1	1			1		1	1			
Whitcomb, D. (2004)	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 4. Termination of pregnancy literature search articles - Summary of age groups studied

Author/s	Type of measurement	Trends in age groups	Total Years of Study	Country of study
Dickson, N. et al. (2000)	1	under 20 ↑	1981-1997	New Zealand
Haldre, K Karro, H Tellmann, A (2005)	3	14, 15-17, 18-19 15-19 all ↓	1992-2001	Estonia
Kosunen, E. Rimpela, M. (1996)	1	15-19, 16-17, 18-19, all ↓	1976-1993	Finland
Singh S, Darroch, J. (2000)	1, 2, 4	teenagers 15-17, 18-19 *	1970's-1990's	25 developed countries
van de Klis, K. Westenber, L et al (2002)	1, 2, 3	teenagers 13-19 by individual years ↑	1970-2000	Australia
Bender, S Geirsson, R Kosunen, E (2003)	2, 3	15-19 ↑, 20-24 ↑, 25-29 ↑, 30-34 =, 35-39 =, 40-44 =	1976-1999	Iceland, Nordic countries *
Bettarini, S. D'Andrea, S. (1996)	1	14, 15, 16, 17, 18, 19, all ↓, 15-49 ↑↓, 15-19 =, 20-24 ↓, 25-29 ↓, 30-34 ↑, 35-39 ↑, 40-44 =, 45-49 =	1979-1993	Italy
Filakti, H (1997)	1, 3, 5	under 20 =, 20-24 ↑, 25-29 ↑, 30-34 =, 35-39 ↓, 40 and over ↓	1990-1994	England Wales
Goto, A. et al (2000)	1, 2, 4	<20 ↑, 20-24 ↑, 25-29 ↓, 30-34 ↓, 35-39 ↓, 40-44 ↑	1976-1995	Japan
Hamilton, B Ventura S 2006	1	15-44 ↑↓, 10-14 ?, 15-19 ?, 20-24 ↓, 25-29 ↓, 30-34 ↑, 35-39 ↑, 40-44 ↓	1960-2002	USA
Scottish Executive (2004)	1, 2, 3	under 20 ↓↑, 20-24 ↓, 25-29, 30-34 ↑, 35-39 ↑, 40 and over =	1985-1999	Scotland
Semjidsmaa, C (1999)	1, 6	15-44 ↑↑↑, under 20 ↑↑, 20-24 ↓, 25-29 ↓, 30-34 ↓↑, 35-39 ↓↑, 40-44 ↓↑, 45+ ↓↑	1985-1995	Mongolia
Socolov, R. Pricop, F. etal (1999)	1, 3, 4	<16 =, 16-19 =, 20-24 ↓, 25-29 ↓, 30-34 ↓, 35-39 ↓, 40-44 =, >45 =	1988-1997	Romania
Statistics New Zealand Abortions (2005)	2, 3	15-19 =, 20-24 =, 25-29 ↓, 30-34 ↓, 35-39 ↑, 40-44 ↑	1988-2004	New Zealand
Addor, V. et al (2003)	1	14-19 =, 20-29 =, 30-39 =, 40-49 ↓	1990-1999	Switzerland
Singh, K Fai, Prasad, R Ratman, S (1996)	2, 3	<19 ↑, 20-29 ↑, 30-39 ↓, >40 ↓	1965-1994	Singapore
Chan, A. Sage, L. (2005)	1	15-44 ↑↓	1985-2003	Australia
Chan, A. Scott, J. et al (2005)	1, 3	15-19 =, 15-44 ↑=↓	1971-2003	Australia
Government Statistical Service for the Department of Health, England Wales (2005)	1, 3	15-44 ↑	1969-2004	England Wales
Henshaw, S. Singh, S. Haas, T. (1999)	1	15-44 ↓	1975-1996	54 countries
Peiro, R. Colomer, C. et al (2001)	1, 3	15-44 ↑	1974-1995	Spain
Singh, S. Sedgh, G. (1997)	1, 4	15-49 ↑↓=	1977-1992	Brazil Colombia, Mexico
South Australian Abortion Reporting Committee (2004)	1, 3	15-44 ↑↓	1970-2004	Australia
Straton J, Godman K, Gee V (2005)	1	15-44 =	1999-2004	Australia
Whitcomb, D (2004)	1, 3, 4	15-44 ↓	1973-2000	USA
Chan, A. Keane, R. (2004)	1, 5	individual years of age from 15 to 44 ?	1971-2000	Australia
Hudson, G. Hawkins, R. (1995)	2, 3	13-44 ?, <25 ?, >26 ?	1988-1993	Australia
Stauss, L et al. (2005)	2, 3, 5	<15 ↓, 15-19 ↑↓, 20-34 ↓, 35-39 ↓, >40 ↑ ↓	1990-2002	USA

Key: ↑ - Trend incline, ↓ - Trend decline, = - Steady rate, ? - Trend not stated or shown, * - Trend varied on country or region, 1 - Rate of termination of pregnancies per thousand women, 2 - Percentage calculated out of women having pregnancy terminations, 3 - Number of women who had termination of pregnancy, 4 - Ratio is number of termination of pregnancies per 100 births excluding miscarriages. 5 - Percentage of all conceptions leading to termination of pregnancy, 6 - ratio termination of pregnancies per 1000 live births

Table 5. Termination of pregnancy literature search articles - Summary of contraception studied.

Author/s	Country	Years of study	Contraception studied
Filakti, H (1997)	England & Wales	1990-1995	At time of conception = OCP, condom, sterilization, nil or other method
Hudson, G. Hawkins, R. (1995)	Australia	1988-1993	Prior to conception = Nil, regular use of condoms, missed OCP, irregular use condoms, failed condoms, failed OCP, gastro & OPC, NFP & regular use diaphragm, withdrawal, antibiotics and OCP, irregular use diaphragm, NFP, missed POP, IUD insitu, failed POP, unconfirmed vasectomy or other partner, failed vasectomy confirmed on sperms analysis, irregularly use condoms and NFP, injection, breast feeding, cervical cap, failed laparoscopic sterilization, suppressed infertility (either partner). Post Abortion = OPC, condoms, injection, Diaphragm, IUD, POP, Nil, Laparoscopic sterilization, NFP, Vasectomy, Rhythm method
Singh, S. Sedgh, G (1997)	Brazil, Colombia, Mexico	Brazil = 1980, 1986, 1991. Colombia = 1976, 1986, 1990. Mexico = 1977, 1987, 1992	<ol style="list-style-type: none"> 1. current use of any method among women in union 2. current use of a modern method among women in union 3. current use of any method among all women of reproductive age 4. current use of a modern method among women of reproductive age

Key: Nil - No contraception use, ECP - Emergency Contraceptive Pill, OCP - Oral Contraceptive Pill, IUD - Intra-uterine Device, NFP - Natural Family Planning method, POP - Progesteron Only Pill,

Table 6 Characteristics, limitations and gaps in current literature

Characteristic	Limitatons	Gaps
Age	Too specific or too broard age groups e.g. teenagers, under 25 years/over 26 years, collective of all women age groups Measurements varied eg rates/1000, percentages, numbers, ratio's Time periods varied greatly from 5 years to 30 years, so not able to compare Trends varied according to country studied Minimal comparisons with other characteristics	Unable to be assessed
First Ever Pregnancy	No trend research in last 11 years	No trend research in last 11 years
Contraception at time of conception	limited research, 3 articles found 1article 13 years ago 1 article not related directly to termination of pregnancy 1 article did not examine individual contraception methods	No research in last 11 years of individual methods of contraception usage at time of conception
Contraception choices post-operative	Only 1 article, data 13 years ago Trends varied according to country studied	No trend research in last 11 years
Referral Source	Only 1 article, data 13 years ago	No trend research in last 11 years