

From the department of Women's and Children's Health  
Karolinska Institutet, Stockholm, Sweden

# **INCREASING ACCESS TO ABORTION- PERSPECTIVES ON PROVIDER AVAILABILITY FROM DIFFERENT SETTINGS**

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**Karolinska  
Institutet**

Stockholm 2017

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Published by Karolinska Institutet.

Printed by AJ E-print AB

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ISBN 978-91-7676-363-6

# INCREASING ACCESS TO ABORTION- PERSPECTIVES ON PROVIDER AVAILABILITY FROM DIFFERENT SETTINGS THESIS FOR DOCTORAL DEGREE (Ph.D.)

By

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To my family









# ABSTRACT

**Background:** Unsafe abortion is estimated to cause around 23000 maternal deaths yearly, most of those deaths are preventable by proper use of contraception and access to safe abortion. Barriers to access to safe abortion include legal frameworks, infrastructure and shortage of eligible and trained providers. Lack of knowledge, stigma and cultural aspects influence women's abortion-seeking behavior.

**Aim:** The overall aim of this thesis is to study factors that influence access to comprehensive abortion care focusing on increasing provider availability in different settings.

## Materials, methods and results

**Study I:** A cross sectional survey including 1996 medical students found that disallowing attitudes and misconceptions were common. Very few had any clinical practice in abortion care. It is important to improve medical education and clinical training in abortion care services to influence medical student's attitudes and ensure their future abortion provision.

**Study II:** In-depth interviews were conducted with 23 medical students using a topic guide. Thematic analysis with an inductive approach was used to analyze data. Participants described a fear to provide abortion in their future practice, and their understanding of the law was limited. They also had limited clinical experience and were influenced by societal tradition and norm. Improved medical education including clinical practice is needed to increase the possibility that today's medical students will become tomorrow's abortion providers.

**Study III:** A cost-effectiveness analysis was conducted alongside a randomized controlled equivalence trial to determine the cost-effectiveness of nurse-midwife provision of medical abortion compared with physicians. Average direct costs were EUR 45 for the nurse-midwife group and EUR 58 for the physician group. Increased effectiveness of the intervention gave an ICER at EUR -831 for direct costs and of EUR-1769 for total costs per avoided surgical intervention.

**Study IV:** A systematic review was undertaken assess the effectiveness, safety and acceptability of non-physician provision of early medical abortion care including medical treatment for incomplete abortion. Electronic databases were searched using a search strategy based on PICO. Six publications were included. Medical abortion by non-physicians using misoprostol regimens is equally effective as treatment by physicians. Acceptability among women, measured as overall satisfaction, is similar between groups. Quality of evidence range from low to moderate.

**Conclusion:** Provider availability is an important component for abortion access. It is important to focus on curricula for medical students and include abortion care to reduce stigma and ensure future provider availability. Midlevel provision of medical abortion is cost-effective, effective and acceptable to women. Thus task-shifting is a way to increase access to safe abortion. In order to truly improve access to safe abortion care, increased knowledge is needed among providers and women.



## LIST OF SCIENTIFIC PAPERS

- I. **Medical Student's attitudes and Perceptions on Abortion: a cross-sectional survey among medical interns in Maharashtra, India**  
Sjöström S, Essén B, Sydén F, Gemzell-Danielsson K, Klingberg Allvin M  
*Contraception*, 2014, 90, 42-46
- II. **Medical students are afraid to include abortion in their future practices: in-depth interviews in Maharashtra, India**  
Sjöström S., Essén B., Gemzell-Danielsson K., Klingberg-Allvin M.  
*BMC Medical Education*, 2016, 16:8
- III. **Medical abortion provided by nurse-midwives or physicians in a high resource setting: a cost-effectiveness analysis**  
Sjöström S., Kopp-Kallner H., Simeonova E., Madestam A., Gemzell-Danielsson K. *PLoS ONE* 2016 11(6): e0158645. doi:10.1371
- IV. **Effectiveness, safety and acceptability of non-physician provision of first trimester medical abortion: a systematic review.**  
Sjöström S., Dragoman M., Fønhus M.S., Ganatra B., Gemzell-Danielsson K.  
*Manuscript*



# CONTENTS

|       |   |    |
|-------|---|----|
| 1     | Introduction .....  | 1  |
| 1.1   | History .....   | 1  |
| 1.1.1 | Family planning .....                                     | 1  |
| 1.1.2 | Overview of the development of contraceptive methods..... | 2  |
| 1.1.3 | Abortion.....   | 3  |
| 1.2   | Maternal mortality.....                                   | 5  |
| 1.2.1 | Measuring maternal mortality.....                         | 5  |
| 1.2.2 | Abortion and contraception.....                           | 6  |
| 1.3   | Abortion.....   | 6  |
| 1.3.1 | Medical methods of abortion .....                         | 6  |
| 1.3.2 | Midlevel providers .....                                  | 8  |
| 1.4   | Barriers to safe abortion .....                           | 8  |
| 1.4.1 | Legal aspects .....                                       | 9  |
| 1.4.2 | Administrative barriers .....                             | 10 |
| 1.4.3 | Infrastructure .....                                      | 10 |
| 1.4.4 | Costs .....   | 10 |
| 1.4.5 | Women .....   | 11 |
| 1.4.6 | Stigma.....   | 11 |
| 1.4.7 | Providers.....  | 12 |
| 1.5   | India.....  | 13 |
| 1.5.1 | Maternal mortality.....                                   | 13 |
| 1.5.2 | Sex selection.....  | 13 |
| 1.5.3 | Legal regulation of abortion.....                         | 13 |
| 1.5.4 | Medical education in India.....                           | 14 |
| 1.6   | Access to safe abortion A conceptual framework .....      | 15 |
| 1.7   | The future .....  | 18 |
| 2     | AIMS.....   | 19 |
| 3     | Material and Methods .....                                | 21 |
| 3.1   | Study I and study II .....                                | 21 |
| 3.1.1 | Research process .....                                    | 21 |
| 3.1.2 | Setting.....  | 22 |
| 3.1.3 | Study I .....   | 24 |
| 3.1.4 | Study II .....  | 25 |
| 3.2   | STUDY III.....  | 26 |
| 3.2.1 | Efficacy measures .....                                   | 26 |
| 3.2.2 | Cost calculations .....                                   | 26 |
| 3.2.3 | Cost-effectiveness analysis .....                         | 27 |
| 3.3   | STUDY IV .....  | 28 |
| 3.3.1 | Inclusion criteria.....                                   | 28 |
| 3.3.2 | Search strategy and data collection.....                  | 29 |
| 3.3.3 | Data analysis .....                                       | 29 |

|            |  |    |
|------------|--|----|
| 3.3.4      | Quality of evidence .....                                  | 29 |
| 3.4        | Ethical considerations .....                               | 29 |
| 4          | Results .....  | 31 |
| 4.1        | Study I.....   | 31 |
| 4.2        | Study II .....   | 33 |
| 4.2.1      | Lack of deeper understanding of the legal regulation ..... | 34 |
| 4.2.2      | Experience from the clinic .....                           | 35 |
| 4.2.3      | Influence of traditional norms and values .....            | 36 |
| 4.2.4      | Attitudes to midlevel provision.....                       | 36 |
| 4.3        | Study III.....   | 37 |
| 4.4        | Study IV.....  | 38 |
| 4.4.1      | Search results.....  | 38 |
| 4.4.2      | Characteristics of included studies .....                  | 38 |
| 4.4.3      | Outcome measures .....                                     | 39 |
| 5          | Discussion .....   | 41 |
| 5.1        | Conceptual framework revisited .....                       | 41 |
| 5.1.1      | Context .....  | 42 |
| 5.1.2      | Supply side aspects on abortion access .....               | 43 |
| 5.1.3      | Acceptability .....  | 43 |
| 5.2        | Miscellaneous observations .....                           | 44 |
| 5.3        | Methodological considerations .....                        | 45 |
| 5.3.1      | Study I .....  | 45 |
| 5.3.2      | Study II.....  | 46 |
| 5.3.3      | Study III.....   | 47 |
| 5.3.4      | Study IV .....   | 49 |
| 6          | Conclusion.....  | 51 |
| 7          | Populärvetenskaplig sammanfattning.....                    | 52 |
| 8          | Acknowledgements.....                                      | 54 |
| 9          | References .....   | 57 |
| Appendix A |  |    |



## LIST OF ABBREVIATIONS

|             |   |
|-------------|---|
| AYUSH       | Indian system of medicine                                 |
| CAC         | Comprehensive Abortion Care                               |
| CEA         | Cost Effectiveness Analysis                               |
| CI          | Confidence Interval                                       |
| CMA         | Cost Minimization Analysis                                |
| CO          | Conscientious Objection                                   |
| ICER        | Incremental Cost-Effectiveness Ratio                      |
| IUD         | Intra Uterine Device                                      |
| IUS         | Intra Uterine System                                      |
| KAP         | Knowledge Attitude Practice, or Perception                |
| GNM         | General Nurse Midwife                                     |
| HABs        | Husbands and Boyfriends                                   |
| ITT         | Intention to treat  |
| MBBS        | Bachelor of Medicine and Bachelor of Surgery              |
| MLP         | Midlevel Provider   |
| MMR         | Maternal Mortality Rate                                   |
| MTP-act     | Medical Termination of Pregnancy Act, Government of India |
| NGO         | Non-Governmental Organization                             |
| NMW         | Nurse Midwife   |
| PC-PNDT-act | Pre-Conception Pre-Natal Diagnostic Techniques Act        |
| PP          | Per Protocol  |
| QUALY       | Quality Adjusted Life Years                               |
| RCT         | Randomized Controlled Trial                               |
| SDG         | Sustainable Development Goal                              |
| SRHR        | Sexual and Reproductive Health and Rights                 |
| TFR         | Total Fertility Rate                                      |
| WHO         | World Health Organization                                 |
| uHCG        | Urinary Human Chorionic Gonadotropin                      |

## DEFINITIONS

|                                   |   |
|-----------------------------------|---|
| Comprehensive Abortion Care (CAC) | Comprehensive safe abortion care encompasses the provision of elective abortion services at the request of the woman, along with counseling for contraceptive use, medical after-care, and attention to other issues that are relevant to the woman's health              |
| Fecundity                         | The ability to produce offspring  |
| Maternal death                    | Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (WHO 2012) |
| Maternal Mortality Ratio          | Number of deaths per 100000 live births   |
| Sex ratio                         | Number of females per 1000 males  |
| Total Fertility Rate              | the average number of children that would be born to a woman over her lifetime should she survive from birth to the end of her reproductive life  |
| Unmet need (for family planning)  | Fecund and sexually active women wishing to limit or postpone child birth, but don't use contraception  |
| Unsafe abortion                   | The termination of an unwanted pregnancy, either by persons lacking the necessary skills or in an environment lacking minimal medical standards or both (WHO)   |

# 1 INTRODUCTION

Women have been subject to unplanned pregnancies since the beginning of times. Dealing with such pregnancies has caused substantial morbidity and mortality. During the last centuries women have been increasingly empowered in most societies and important advances have been made to enhance women's rights and life conditions. Important scientific advances have also been made in the field of reproductive health and rights with development of contraceptive methods as well as methods of safe abortion. This increased knowledge and awareness as well as changes in the legal framework has contributed to decreased maternal mortality caused by unplanned pregnancies and unsafe abortion, especially in high income countries and where the legal framework is permitting, but also increasingly so in lower income settings. Despite this progress access to abortion and contraception remains controversial in a global perspective and numbers of preventable maternal deaths are still high. Access to safe abortion has yet to reach its full potential.

## 1.1 HISTORY

### 1.1.1 Family planning

For as long as there are records, societies have wished to limit number of pregnancies for the individual, and to regulate population growth on a societal level. Ancient Greeks were worried that limitations of pregnancies would endanger population growth. Aristotle stated that a nation should not have more people than it can provide for. In 1798 an English clergyman, Thomas Malthus, stated that the world's population needed to be limited, for instance by delayed marriage or celibacy, otherwise food supplies would run out. He believed natural disasters, disease, and war are needed to limit population growth. Although massively criticized, his theory laid ground for the modern discourse about population growth. During the industrial revolution from approximately 1750 to 1900, populations grew immensely in the industrialized world, and the population of England increased from 6 to 33 million. The second half of the 19<sup>th</sup> century saw a decline in fertility rates in England most likely due to increased practice of traditional methods of birth control such as abstinence and withdrawal (Drife, 2010) (Schenker et al., 1993). The birth control movement was started in 1831 by Robert Owen and the first family planning clinics were opened by Margret Sanger in the US in 1916 and Marie Stopes in the United Kingdom.

Entering the second half of the 20<sup>th</sup> century, concerns about a growing global population and the threat of decreasing food supplies set the tone of the global debate. Population reduction was seen as necessary means to limit poverty and enhance economic growth. These thoughts fueled the medical development of contraception and abortion (Green). Women's rights groups were positive to contraception and recognized its potential to reduce maternal mortality, but questioned the population control thoughts. At the time of the International Conference on Population and Development (ICPD) in Mexico City in 1984 the abortion climate changed as the United States administration declared prohibition of funding for organizations outside of the US providing abortions (Boyle et al., 2015).

The ICPD in Cairo 1994 was the start of a new era of relationships between population, development and individual well-being (UNFPA, 2014). The conference defined and accepted a concept of reproductive rights. The agreement was signed by 179 countries showing their commitment to prevent unsafe abortion.

The United Nations has declared access to sexual and reproductive health and contraception a human right interrelated to other basic human rights, including the right to life and the right to health.

### **1.1.2 Overview of the development of contraceptive methods**

The use of contraception and protection against sexually transmitted disease was a privilege of the upper classes until the beginning of the 19<sup>th</sup> century. That population declined during the Roman Empire declined despite ample supplies of food suggests methods of fertility control was used. Coitus interruptus is mentioned at least twice in the Old Testament and was likely to have been practiced in the Greek as well as Roman societies (Genesis 38:8-10). The use of male protection was first described by the Persian physician Al-Akhawayni, and a condom made from sheep intestines was described as means to protect oneself against Syphilis by the English physician Turner in 1717. With the discovery of vulcanization, that turns crude rubber into an elastic material, condoms became increasingly popular and from around 1870s more widespread in the western society (Amy et al., 2015).

In the early 19<sup>th</sup> century several vaginal devices were developed, and in 1846 the first US patent for a pessary was granted. The intrauterine device (IUD) was first described in 1909 and an intrauterine ring was developed in Germany by Dr Gräfenberg in the late 1920s. Further development of the intra uterine ring was undertaken in Japan by Dr Ota. Plastic IUDs were developed in the 1940s which improved insertion and retrieval. In 1969, copper IUDs were introduced and in 1977 the first gestagen intrauterine device was introduced (Thiery, 1997). This was followed by the Population Council's development of the levonorgestrel releasing intrauterine system, which was first approved in Finland in 1990. In 1937 it was shown that progesterone inhibits ovulation in rabbits and in 1951 the first synthetic progesterone norethindrone was registered, shortly thereafter followed by Norethynodrel in 1953. In 1955 scientists Pincus and Chang announced successful inhibition of ovulation using those substances in women at a meeting of the International Planned Parenthood Federation. Clinical trials with a combined pill containing Norethynodrel and estrogen started in Puerto Rico, where the legislation allowed information on prevention of conception. In 1957 Enovid, the first combined oral contraceptive pill was sold in the United States to treat "menstrual disorders" (Connell, 1999). In 1964 the combined pill was registered in Sweden also for treatment of menstrual disorders.

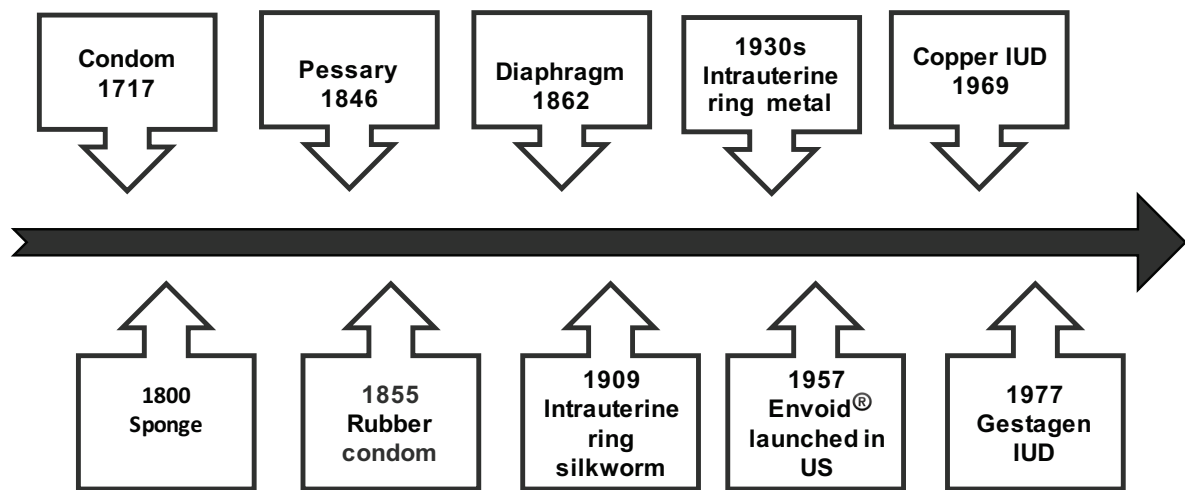


Figure 1.1.2 Development of modern contraceptives, adapted from (Connell, 1999).

### 1.1.3 Abortion

#### 1.1.3.1 Methods

Reports from ancient societies describe an array of medical methods of abortion including vaginal use of honey and dates in ancient Egypt and herbs or mercury in China. It is unclear how effective the methods were (Drife, 2010). However, recent studies from rural low-income settings have shown that traditional herbs used to provoke abortion have strong uterotonic properties (Nikolajsen et al., 2011). Hippocrates suggested that physical exercise could cause abortion. Surgical methods using dilators made of wood, bone or ivory were described in the 2nd century. In 1844 Laminaria, a Japanese seaweed, was introduced as a cervical dilator, and in 1723 Garengot described the first curette. Recamier, who is considered the founder of Gynecology, used the curette to evacuate the uterus for the first time in 1843 (Lund, 1953). Women and backstreet abortionists have used sharp objects and instruments in the uterus since the middle ages (Public Health Currents, 1971). In the 19<sup>th</sup> century the practice of Dilatation and Curettage started, and the Irish physician James Young Simpson described vacuum aspiration. The latter was developed in Russia during the period with liberal abortion laws in the 1920s, and the introduction of the flexible Karman cannula in the 1970s reduced the risk of perforation of the uterus.

In 1970 intravenous and subcutaneous prostaglandin was reported to have abortive effect in the second trimester (Roth-Brandel et al., 1970). Shortly thereafter high effects of the prostaglandin in early pregnancy was reported, and the effect was ameliorated after intrauterine administration of the prostaglandin was introduced (Wiqvist et al., 1970). The progesterone antagonist Mifepristone (RU 486) was shown to potentiate the effect of prostaglandin in the early 1980s. The combined method resulted in 94% complete abortions for gestational lengths of 49 days or less (Bygdeman et al., 1985).

#### 1.1.3.2 Attitudes to abortion

Attitudes toward abortion have varied in different societies and over time. Aristotele stated that abortion was acceptable until “quickening” i.e. feeling of fetal movement. This view was

common until the early 19<sup>th</sup> century. During the middle ages women's status declined, midwives providing abortion services could be procured as witches(Joffe, 1999).

Attitudes to abortion fluctuate over time. By the turn of the 18<sup>th</sup> century abortion was legal, or at least not illegal, in the UK as well as in the United States. During the Victorian era many countries undergoing industrialization limited abortion (Potts, 1979).

Religion is an important factor influencing attitudes to abortion in a society. In *Judaism* abortion is accepted if the woman's life is threatened or if she has been subject to rape. In *Roman Catholicism* all abortion is considered termination of human life. This belief stems from the theory that the purpose of sexuality is reproduction. In the 1930 Pope Pius XI declared total prohibition of birth control methods, a view that still persists. David Maguire, theologian and professor of ethics recalls that the catholic church has a long history of accepting abortions under certain circumstances influenced by the idea of 'ensoulment'. In the 13<sup>th</sup> century, St Thomas Aquinas, a proponent of the 'natural law' theory of Aristotle, agreed that populations should be limited to those that it can provide for. In the 15<sup>th</sup> century, St Antoninus, the arch-bishop of Florence, said abortion was justified to save the woman's life. The Jesuit Thomas Sanchez, who was the leading catholic theologian in the mid 16<sup>th</sup> century, wrote important works on matrimony. He considered that abortion could be accepted in case there were physical threats to the woman. Abortion was also justified should an unmarried woman risk ruined reputation, (Catholics for Choice, 2014). In November 2016, the current pope Francis gave all catholic priests permission to forgive abortion. *Protestantism* generally allows a couple to decide in matters of family planning and contraception. Abortion is generally accepted if the mother's life is threatened and liberal protestants accepts abortion at the woman's discretion (Pinter et al., 2016).

The *eastern orthodox church* recognizes sexual intercourse as an expression of love and allows a married couple to make decisions regarding contraception although abortion and permanent sterilization has been condemned. In *Islam* there are many interpretations of what is acceptable in relation to abortion and contraception. A sexual relationship to satisfy a couple's needs is permitted in a legitimate relationship. Contraception is permitted under certain circumstances including spacing and where there is a fear of the mental and physical well-being of the mother as well as personal reasons. Vasectomy is prohibited but female sterilization is permitted should the woman's health be endangered. Early abortion is broadly acceptable if there is a legitimate reason (Shapiro, 2014). In *Sikhism* contraception is broadly accepted but abortion prohibited except to save the mother's life or in case of rape. *Hinduism* permits all methods of contraception, and abortion is legal in India on broad grounds. *Buddhism* is open to family planning and contraception, abortion can be accepted depending on the motive, it can be a means to save the mother (Christopher et al., 2006).

#### 1.1.3.3 Legalization of abortion

In 1803 Great Britain expanded its anti-abortion law to include surgical abortion and during the 19<sup>th</sup> century many countries followed suit and implemented anti-abortion laws where

abortion previously had been permitted or at least not regulated (Drife, 2010). Russia was the first country to legalize abortion, the law was reversed in 1935, but in 1955 it became legal again in most former USSR states. During the second half of the 20<sup>th</sup> century abortion became legal in most Western European countries, but not until the first decade of the 21<sup>st</sup> century was abortion legal in Switzerland, Portugal and Spain (Gissler et al., 2012). Abortion was legalized in Japan in 1948 and India in 1971 (Public Health Currents, 1971).

## **1.2 MATERNAL MORTALITY**

### **1.2.1 Measuring maternal mortality**

The WHO defines maternal mortality as death of a woman while pregnant or within 42 days of termination of pregnancy, regardless of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. Pregnancy-related death is a wider definition to facilitate detection of maternal deaths, according to this definition all deaths of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death should be included.

Despite specific goals to reduce maternal mortality set by the global community since 1987, there is a lack of reliable measurement tools. Many countries lack reliable data and misclassifications and sampling errors are common (Kassebaum et al., 2014). Two sources reported a total maternal mortality between 275 300 and 303000 in 2015 (Alkema et al., 2016; Global Burden of Disease Study Group, 2016) with annual reduction rates of 2,6 and 1,8% respectively. Global estimates on maternal mortality still lack comparable data to evaluate how family planning services, modern contraception and access to safe abortion services influences maternal mortality (Global Burden of Disease Study Group, 2016).

Assessing abortion related maternal mortality is even more complicated and estimates differ between studies. Four primary tools are used to estimate abortion related deaths including confidential enquiries, vital registration data, verbal autopsy and facility based data. Since abortion related maternal mortality is usually reported as a proportion of total maternal mortality these numbers say little about whether abortion has become more safe or not (Gerdtts et al., 2015). and although numbers of annual abortions per 1000 women decreased from 40 in 1990 to 35 in 2014, the total numbers of abortion globally increased due to population growth (Sedgh et al., 2016). Unsafe abortion is estimated to have caused 7.9% of the maternal deaths in 2015 (Alkema et al., 2016). The global burden of disease report of 23000 maternal deaths attributable to abortion, miscarriage and ectopic pregnancy in 2015, a decline by 23% since 2005 (Global Burden of Disease Group, 2016).

Around 25 per cent of all pregnancies are estimated to have ended in abortion between 2010-2014(Sedgh et al., 2016). Unintended pregnancies are directly linked to maternal mortality and morbidity as they may lead to unsafe abortion with related consequences, and also because unintended births have negative impact on the mothers and children's future socio-economic status and mental health (Herd et al., 2016). One study using regional estimates and survey data reported that 40% of all pregnancies were unintended in 2012(Sedgh et al., 2014). Although rates of unintended pregnancies have declined since 2008, nearly half (45%) of all



pregnancies were unintended in the US in 2011. Young and poor women were at a higher risk. 42% of unintended pregnancies ended in abortion (Finer et al., 2016).

### **1.2.2 Abortion and contraception**

Use of contraception is interrelated with abortion and maternal mortality. Yet the unmet need for family planning, defined as women who are fecund and sexually active and don't want any more children or to delay the next child, but are not using contraception, is generally high. Unmet need describes the gap between women's use of contraception and their intentions to reproduce. Fear of side effects, opposition from a partner, or the partner's fear of infidelity, are common reasons for not using contraception. Those reasons are relatively similar independent of the setting. The gap between knowledge and uptake of contraception leads to a high proportion of women at risk of unplanned pregnancy (Wulifan et al., 2016)

In 2015 the Global Strategy for Women's, Children's and Adolescents' Health 2016-2030 was launched. This strategy aims to end all preventable deaths of women, children and adolescents, and to create an environment in which these groups not only survive, but thrive (WHO, 2016). The global community also adopted 17 sustainable development goals (SDGs) as targets for the global development from 2015 to 2030. SDG 3.1 target for all countries to lower the maternal mortality rate (MMR) to 70 by 2030, and SDG 3.7 target the global access to sexual and reproductive healthcare.

The SDGs replace the previous Millennium Development Goals (MDG) of which the fifth goal aimed to lower the MMR by 75% from 1990 to 2015. A target for universal access to reproductive health care including contraceptive prevalence and family planning services was added in 2005.

The Global Burden of Disease (GBD) was initially commissioned by the World Bank to measure disability and death from different causes worldwide. It involves more than 500 researchers in different disciplines. The GBD considers the prevalence of a disease or risk factor and the harm it causes. Data on maternal mortality is also provided by the WHO, of which GBD has been a part, over the years data has differed between the two institutes, mainly in data selection, quality appraisal, data processing and adult mortality

## **1.3 ABORTION**

### **1.3.1 Medical methods of abortion**

Following the discovery of the highly efficacious abortifacient properties of the combined mifepristone-prostaglandin analogue treatment, medical abortion successively became an established abortion method. Initially the method was approved in France in 1988 for abortions up to 49 days of gestation using an intramuscular preparation of progesterone. Gemeprost, a prostaglandin for vaginal administration was developed in collaboration with the WHO and approved in the UK in 1991 followed by Sweden in 1992 for abortion up to 63



days, and in 1994 for second trimester abortion. Today, misoprostol has replaced gemeprost in the recommended regimes.

A multitude of studies have shown that using the recommended regime of 200 mg mifepristone followed by 800 µg misoprostol vaginally or sublingually after 24 to 48 hours, complete abortion is attained in more than 95% of cases (Bettahar et al., 2016). Neither ultrasound nor prophylactic antibiotics are needed before treatment, and medical abortion is recommended also for use in the case of a pregnancy of unknown location (PUL) provided the woman is informed about the risk of ectopic pregnancy (Bizjak et al.).

Today medical abortion using mifepristone and misoprostol, or misoprostol alone where mifepristone is not available, is recommended not only for abortion in the early first trimester, but also for abortion in gestational week 9-13 and for termination of pregnancy in the second trimester (WHO, 2012a).

#### *1.3.1.1 Misoprostol globally*

Given the advantages of medical abortion, such as not requiring hospital settings or access to anesthesia, it has a huge potential to reduce abortion-related maternal mortality should it be approved worldwide. Misoprostol is represented on WHO's list of essential medicines for treatment of induced abortion, incomplete abortion, labor induction, and prevention and treatment of post-partum hemorrhage (WHO, 2015b). In addition, it is recommended for cervical priming prior to surgical abortion. Misoprostol a synthetic PGE1 analogue, is inexpensive and relatively stable at room temperatures, as well as widely available under the brand name Cytotec® for prevention of gastric ulcer. In settings where maternal mortality due to unsafe abortion is high, it has been estimated that if 60% of abortions are induced with misoprostol, the reduction in mortality would be around 45% (Harper et al., 2007). Today, while the approval of mifepristone is limited to 61 countries, misoprostol is approved in most middle and high income countries, and also in many countries in sub-Saharan Africa. The current status of misoprostol approval and updated clinical guidelines is available at <http://www.misoprostol.org>.

#### *1.3.1.2 Incomplete abortion and post-abortion care*

Post-abortion care (PAC) is a method to treat complications of unsafe abortions. The model includes treatment for incomplete abortion, contraceptive counse

ling, and management of sexually transmitted diseases when needed (Rasch, 2011). Treatment for PAC by midlevel providers is equally effective and safe as treatment by physicians in low resource settings (Klingberg-Allvin et al., 2015). High success rates for complete abortions are reported using recommended doses of sublingual (400 mcg) or oral (600 mcg) misoprostol (Huber et al., 2016).

### 1.3.2 Midlevel providers

Task shifting and sharing of medical services with trained non-physician providers has become an important strategy to ensure medical services where there is shortage of healthcare providers and has the potential to increase access to safe abortion. The World Health Organization (WHO) has recently developed guidelines recommending that medical abortion and treatment for incomplete abortion in the first trimester using clinical interventions that have been recommended as safe and effective, can be managed by trained auxiliary nurse midwives, nurses, midwives and associate clinicians (WHO, 2015a).

A government supported program to train non-specialist doctors (MBBS) in India in Comprehensive Emergency Obstetric Care (CEmOC) including abortion and post-abortion care, following a 16 week course, improved antenatal care in a rural area by 43% (Bhushan et al., 2015).

## 1.4 BARRIERS TO SAFE ABORTION

A multitude of barriers influence availability of safe abortion, most interacting with each other (Culwell et al., 2013). Some of them are discussed in further detail below.

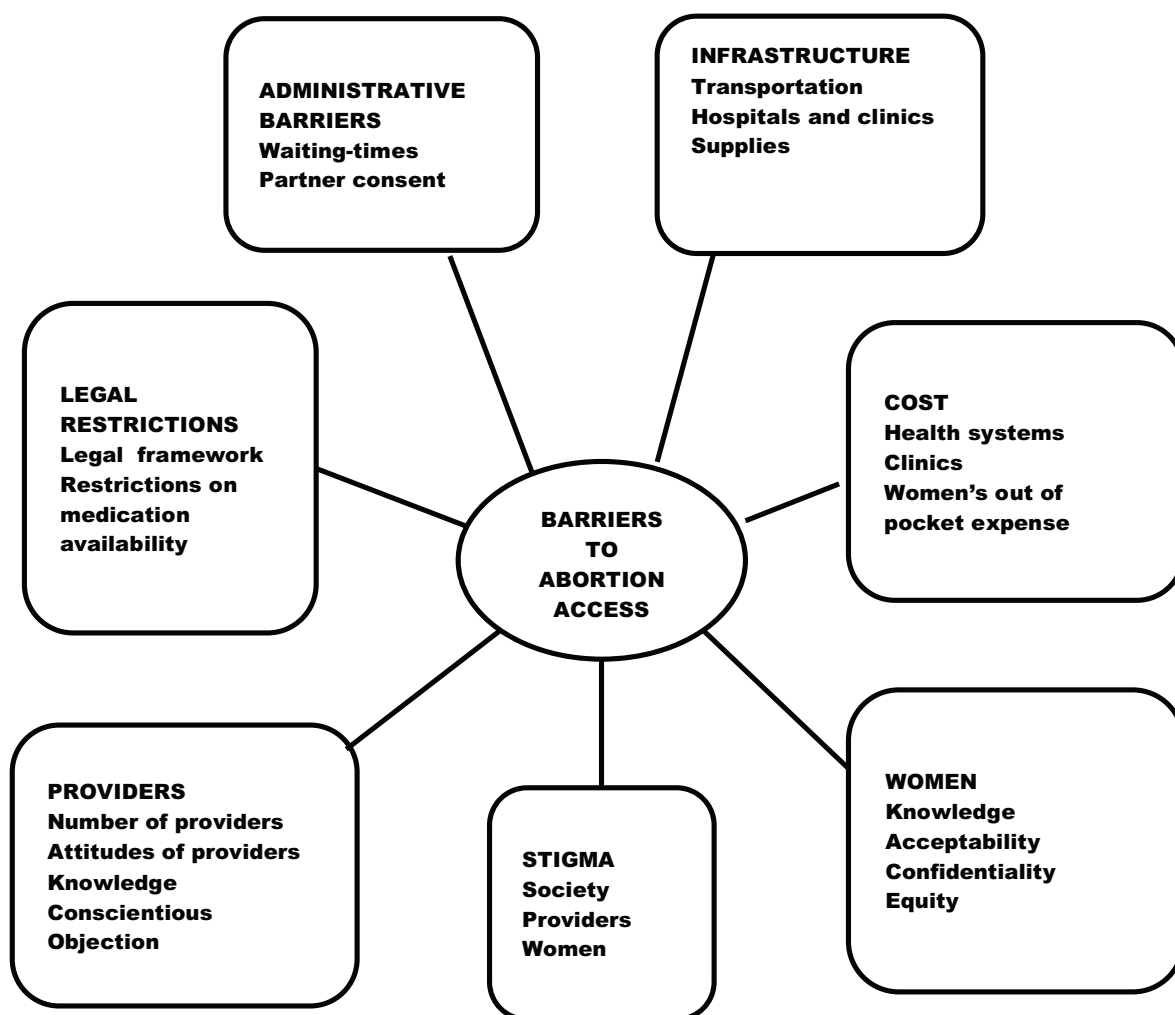


Figure 1.4 Abortion access: an overview of barriers

### 1.4.1 Legal aspects

In a global perspective, abortion rates are not significantly different in countries where abortion is highly restricted than in those where abortion is broadly legal (Sedgh, Bearak et al. 2016). In fact, the lowest abortion rates are seen in some of the countries with the most liberal abortion laws. Even in settings where abortion is legal, regulations such as legally imposed waiting-times between consultation and treatment, or restrictions on the availability or use of misoprostol affects access to abortion. In Alabama the state regulations require in-person consultation after which women need to wait for 48 hours before treatment. Here, many women report not being able to reach an abortion provider in time due to work obligations, long travel times and limited opening hours at clinics (White et al., 2016). Legal restrictions limiting abortion provision to gynecologists or gynecologists with special certifications are common. Restricting off-label use of misoprostol is another way to legally restrict access to safe abortion (Dzuba et al., 2013).

#### 1.4.1.1 Abortion laws globally

Around one quarter of the worlds' population live in 66 countries where abortion is either prohibited or permitted when needed to save a woman's life. Fifty-nine countries permit abortion to save a woman's life and health. In these countries abortion is generally permitted on therapeutic grounds in, this is the level of access for 13.8% of the world's population. In thirteen countries, including Great Britain, Belize and Zambia, abortion is permitted for socioeconomic reasons and the laws are generally liberal. These countries are home to 21.3% of the world's population. There are 61 countries, home to 39.5% of the global population, where abortion laws are liberal, most of those apply a gestational limit for abortion. Figure 1.4.1.

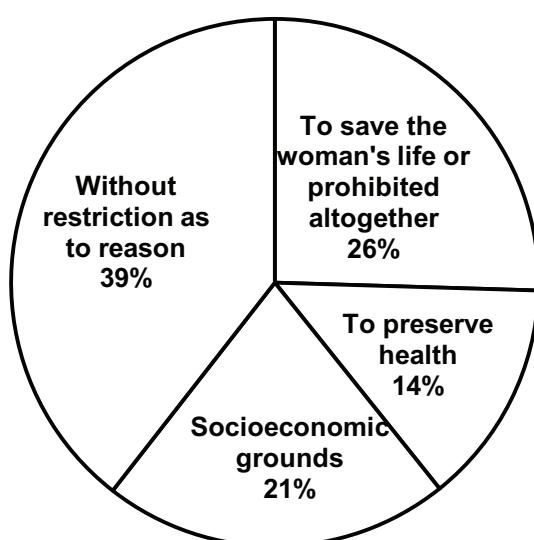


Figure 1.4.1 The global populations' access to abortion. Population in 199 countries grouped per legal status, 199 countries 2014. Adapted from Center for Reproductive Rights.

The Center for reproductive rights provide an interactive and updated map of the world's abortion laws at <http://worldabortionlaws.com>.

#### **1.4.2 Administrative barriers**

Even in settings where abortion is legal there may be administrative barriers obstructing and delaying access to abortion. Such barriers can include obligatory counseling aiming at persuading the woman to keep the pregnancy, requirements for two-doctors signatures to approve the indication for abortion, requirements to limit facilities approved to do abortions, regulations on clinical use of misoprostol, obligatory in clinic follow-up, requests on waiting times between consultation and decision about abortion, requests for partner or parental consent, administrative fees, and augmented prices on medication (Hirve, 2004).

#### **1.4.3 Infrastructure**

Infrastructure has impact on health care availability in all types of settings. It includes a variety of factors such as availability of health care facilities and women's access to transportation (Margo et al., 2016). Even in settings where there are hospitals and clinics, women are not guaranteed treatment. For instance, it is becoming increasingly common that hospitals in the United States don't provide abortions. It is reported that more than one out of nine hospitals in the United States claim religious affiliation. Other reasons for hospitals not to perform abortions include marketing reasons, and wanting to avoid negative press that might ultimately impinge hospital finances (Eisenberg et al., 2016).

#### **1.4.4 Costs**

The cost of providing or obtaining an abortion has the potential to limit availability of abortion care services, as well as women's possibility to access abortion care.

A study conducted at public hospitals in South Africa reports that women seeking care for second trimester abortion lost income and had to pay for transportation, sanitary pads and doctors' fees. A way to minimize those costs was to simplify the procedure by reducing numbers of visits to the hospital. Other measures to reduce women's out of pocket expense include provision of sanitation products and pregnancy tests for free (Lince-Deroche et al., 2015). A study from Zambia, that has a permitting legal framework for abortion, states that around 70% of abortions were unsafe in 2009. Numbers of doctors are low, especially in rural areas, and women lack knowledge about the legal status of abortion and how to access abortion services. In addition to putting themselves at risk while seeking treatment for unsafe abortions, the women paid up to 70% more than had they sought care at a government hospital (Leone et al., 2016). Another study from the same setting concluded that many women opted to seek an unsafe abortion in order to avoid disclosure (Coast et al., 2016).

It is difficult to generalize about health system and hospital costs for abortion and treatment for incomplete abortion due to great variation in organization of health facilities, methods,

and settings. A systematic review with data from 1985 to 2007 estimated that hospital and health system costs for post abortion care, using surgical or medical methods, per case was US\$392 in Africa and US\$430 in Latin America respectively (2007 US\$)(Shearer et al., 2010)

#### **1.4.5 Women**

Women both in high and low resource settings experience barriers to abortion. Barriers are interlinked with previous themes and include administrative barriers such as difficulties in obtaining appointments and delayed or non-referral, transportation difficulties especially in rural areas as well as stigma (Heller et al., 2016). Lack of knowledge about sexual and reproductive health including abortion and contraception, legal rights and where to seek treatment for safe abortion influence women's abortion-seeking behavior. Acceptability of the provider, including perceived quality of services, and feeling treated with respect and in confidentiality are other factors that influence abortion seeking behavior (Culwell et al., 2013).

#### **1.4.6 Stigma**

Abortion is highly affected by stigma which has consequences both women, their care-seeking behavior, and providers' willingness to perform abortions. Stigma is a social phenomenon that stems from perceived human differences, and from over simplifying complex situations. Studies from different settings confirm that women are subject to social- and self-judgement and experience a need for secrecy during and after the abortion process (Hanschmidt et al., 2016). One reason for stigma being so strongly associated with abortion may be that abortion challenges womanhood. A cycle of silence stands model for production and fueling of abortion stigma. It builds on the perception that abortion is uncommon, which in turn leads to women under-reporting abortions which in turn reinforces discrimination and fear (Kumar, Hessini et al. 2009). Figure 1.4.5

Stigma is also a reflection of social inequalities and more apparent in societies where women's status is low.

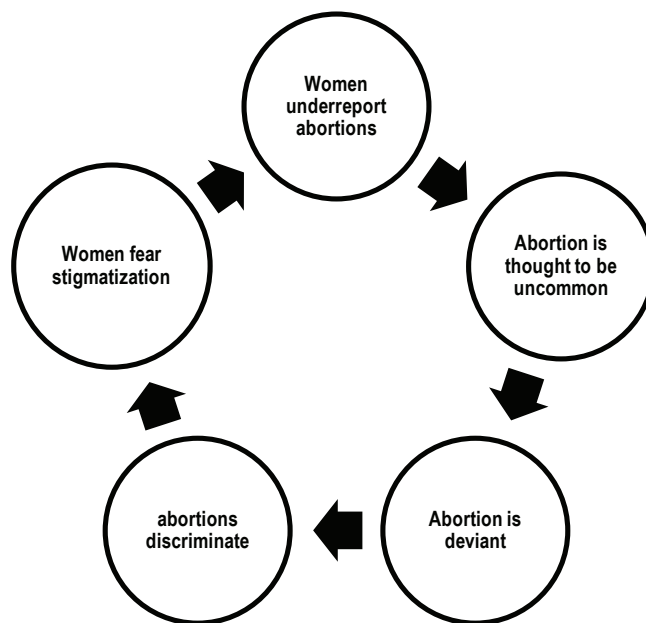


Figure 1.4.4 The cycle of silence: the social construction of deviance despite high incidence of abortion, adapted from (Kumar et al., 2009).

Abortion providers are subject to stigma on a more daily basis than abortion-seeking women. It may include repercussions from colleagues as well as harassments and fear of disclosing one's work in social settings leading to stress and professional difficulties (Norris et al., 2011).

### 1.4.7 Providers

Availability of abortion providers is limited in many regions. In developed countries many potential abortion providers are unwilling to provide services. This may be due to lack of training and negative attitudes, but also because of perceived threats to themselves or their families (Doran et al., 2015). In low-resource settings there is a ubiquitous scarcity of health-care providers. Although potential providers are sympathetic with abortion seeking women, and aware of the positive impact safe abortion services have on women's lives and overall maternal mortality, many are reluctant or unwilling to provide abortions claiming moral or religious reasons, or negative attitudes at the workplace (Harries et al., 2009). Training and practice in comprehensive abortion care has been shown to influence provider attitudes and increase the likelihood that they will include abortion and PAC in their practice (Wheeler et al., 2012).

#### 1.4.7.1 Conscientious objection

Claiming conscientious objection (CO), refusal to provide services included in your profession, is becoming increasingly common. Estimates from the UK state that 10% of obstetrician-gynecologists claim conscientious objection while refusing to provide abortions. In Italy the corresponding number is 70% (Chavkin et al., 2013). Such actions stigmatize women, especially those living in precarious circumstances and in settings where abortion rights already are limited, and reduces access to health care services, thus aggravating

inequities in health systems. Conscientious objection also impairs access to abortion and thus contributes to morbidity and mortality from unsafe abortion (Kassebaum et al., 2014). Countries that don't permit CO, including Sweden, Finland and Iceland have high levels of gender-equality and religious influence is limited. Although birthrates are slightly higher than in other western European countries, teenage birthrates are low. Advantages for a society that doesn't allow CO includes that women are guaranteed that all obstetrician-gynecologists will perform abortion within the limits of the law, and that clinicians are guaranteed that professional duties are shared equally (Fiala et al., 2016).

## **1.5 INDIA**

### **1.5.1 Maternal mortality**

The MMP in India was reported to be 178 maternal deaths (per 100 000 live births) in 2012. This corresponds to 19% of the global maternal mortality (Joe W, 2015). Data from 2003 suggests 8% of the maternal deaths are caused by abortion (RGI Registrar General India, 2006).

### **1.5.2 Sex selection**

The gender imbalance among newborns in India continued to increase from 2011-2012 to 2012-2013 reports the civil registration system of India. Sex selective abortion is an increasing problem in South East Asia since pre-natal sex-determination through ultrasound and blood testing became available. Factors associated with son-preference is patrilinear inheritance, farm-dependent economies and the dowry system practiced in many countries in the region. In order to limit the practice of sex selective abortions societies have taken measures such as banning pre-natal ultrasounds to determine the sex of the fetus (Ganatra, 2008). Such moves have not been successful, instead they have led to impairment of access to safe abortion for other reasons.

Official statistics for India reported a sex-ratio of 909 in 2011 and 898 in 2013. It is estimated that 85.6% of all births were reported in 2013 (Registrar General and Census Commissioner India, 2015). The global sex-ratio among infants is reported to be 1.13% (90%CI 1.12 to 1.15%)(Alkema et al., 2014).

### **1.5.3 Legal regulation of abortion**

Abortion became legal in 1971 under the Medical Termination of Pregnancy (MTP) act. It permits abortion provided by a registered medical practitioner up to 12 weeks of gestation, and after recommendation from a second registered practitioner up to 20 weeks. The conditions are that continuing the pregnancy would involve a risk to the life of the pregnant woman, or to her physical or mental health; or that there is a substantial risk that the child would suffer from physical or mental abnormalities leading to a serious handicap (Government of India, 1971). The law was amended in 2002 to permit medical abortion. The pre-conception pre-natal diagnostic techniques act (PC-PNDT) regulates the use of diagnostic techniques to determine the sex of the fetus. In order to increase access to safe



reproductive health care there is an ongoing process to further amend the regulation of abortion to allow non-physician providers to perform abortions (MoHFW, 2014).

#### **1.5.4 Medical education in India**

Medical education in India is rigorously regulated by the Medical Council of India with several amendments, mostly regarding admission criteria (Medical Council of India, 1997). Selection of students is based on merit and requires a qualifying examination. The qualifying exam is usually the Higher Secondary Examination or the Indian School Certificate which includes science subjects, mathematics and English. Both national and institutional goals govern undergraduate medical education.

The theoretical education is 4,5 years. *Phase I* (2 semesters) consist of pre-clinical subjects, *phase II* (3 semesters) of para-clinical and clinical subjects, and during *phase III* clinical subjects (medicine, surgery, gynecology and obstetrics and community medicine) are taught. It is stipulated that maximum one third of the tuition time should consist of regular lectures, and the remaining two thirds should include practical and clinical sessions as well as group discussions. The council suggests that clinical postings of three hours daily take place from semester three through semester nine.

The tuition in Obstetrics and Gynecology, which includes maternity training, family planning and family welfare planning, adds up to a total of twenty-four weeks after which the student shall have acquired knowledge including understanding of contraception, methods of medical termination of pregnancy, sterilization and its complications, and skills in pelvic examination. The student should also have assisted in insertion and removal of intrauterine devices. Attendance levels of 80% are required in the non-lecture teaching including hospital postings and bed-side clinics.

After the final theoretical examination, the medical students are required to participate in a rotational internship for one year during which the student is supposed to practice medicine and health care under supervision. The internship should take place at different levels of the health system from primary health centers to teaching hospitals. During internship the student should acquire experiences corresponding to two months of clinical practice in Obstetrics and Gynecology and Family Welfare Planning. The curriculum in Obstetrics and Gynecology includes knowledge about reversible and irreversible contraceptive methods ranging from “rhythm methods” through condoms, contraceptive pills, intrauterine devices to tubal ligation and vasectomy. The curricula should also include contra-indications to contraceptives and “toxic” effects of contraceptives. Training is assessed by a record of work and “situation tests” of knowledge, skills and attitudes. The Dean or Principal of the college issues a certificate of satisfactory completion, and the university grants the student the MBBS degree.

Internship has been criticized for not providing enough skills. A majority of medical students aim to seek post graduate education and many students use the time during internship to study for the entrance exam (Bansal, 2004; Chaturvedi et al., 2001). A more recent study shows that medical students knowledge in clinical pharmacology with emphasis on treatment



of tuberculosis and malaria decreased from phase II/III in medical education to internship and concludes that classroom teaching is insufficient and clinical teaching needs to be reinforced (Desai et al., 2016).

## **1.6 ACCESS TO SAFE ABORTION A CONCEPTUAL FRAMEWORK**

The overall aim of this thesis is to explore factors that influence access to comprehensive abortion care focusing on provider availability in different settings.

A common definition of access is the freedom or ability to obtain or make use of something (Marriam-Webster). How to define and improve access to health care has eluded scientists since the mid-20<sup>th</sup> century.

A conceptual framework is defined as a model to organize and describe research evidence, design, and methods that explains what is to be studied (key factors, concepts, or variables) and their interrelation (Maxwell, 2013). Different models, or conceptual frameworks have been developed to describe health care access. The basis for most models of access to health care are a supply side, availability of services, and a demand side, utilization of services. A multitude of factors have been added to emerging models, usually increasing complexity. Factors that may facilitate or impede the uptake of services are for instance geographical, organizational and financial but also personal, social and cultural influences. Other factors that are considered to influence access to healthcare are the appropriateness of services, and the services effectiveness at achieving desired health outcomes (Gulliford et al., 2002).

The *behavioral*, or utilization, model of access, was first presented by Anderson et al in 1968 to predict and explain use of health services. In this model, which has been extensively used, utilization of healthcare is determined by population characteristics on one side described as predisposing, enabling and need components. On the other side are health system characteristics: resources and organization. The concept of “the system” which includes health care policy in addition to resources and organization was introduced in the second version of this model. This version describes how the outcomes “utilization of health care” and “satisfaction with health care services” evolves from the objectives of the health policy through the characteristics of the health care system (resources and organization) and the populations’ predisposing characteristics (gender, age, values), enabling characteristics (financial and regional means to use the services) and their need for healthcare (Aday et al., 1974). Figure 1.6.1

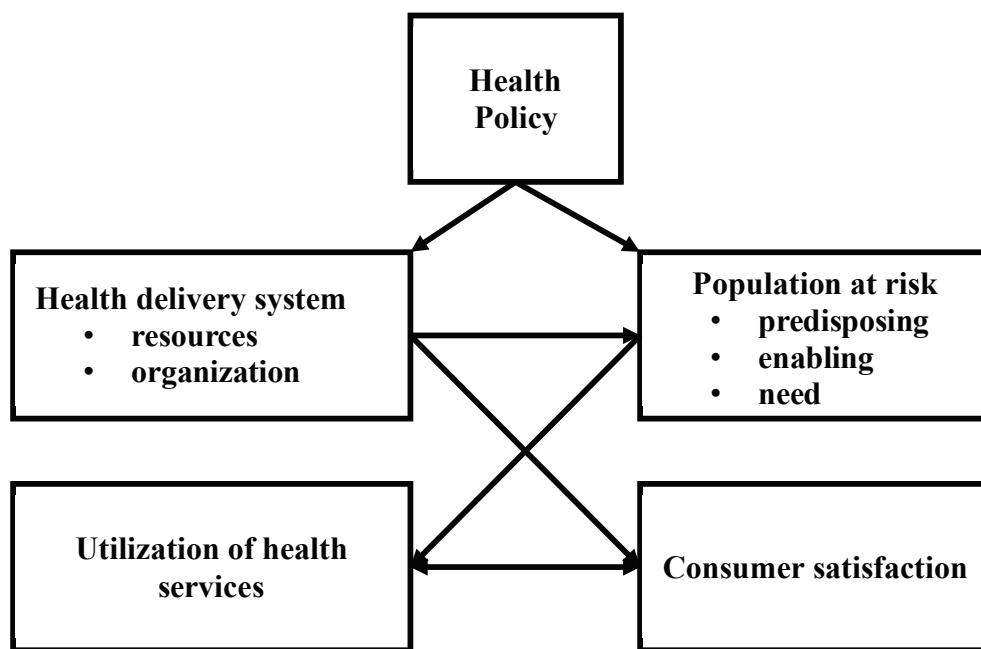


Figure 1.6.1. Framework for study of access, adapted from Aday & Andersen 1974

The later versions of the behavioral model are multilevel models that incorporate both individual and contextual determinants of health services use. They build on the three major components, predisposing factors, enabling factors and need factors, identified in the original model. A systematic review of the use of the behavioral model showed that the model's complexity had not been adequately operationalized, and that statistical methods, such as testing of multivariate models, was not employed. Therefore, the explanatory power of the results is restricted and is often limited to single indicators (Babitsch et al., 2012).

*Pechansky and Thomas* aimed to operationalize the concept of access, which they defined as the “degree of fit” between patients and health-care services. They identified five areas of “fit” between the health care system and the patient: availability, accessibility, accommodation, affordability and acceptability. These areas are related to, but not identical with, the enabling variables described by Andersen et al (predisposing factors, enabling factors and need) (Penchansky et al., 1981).

Access to health care is defined as the empowerment of an individual to use health care by *McIntyre* and coworkers (McIntyre et al., 2009). This model reflects the individual's capacity to benefit from services given the individual's circumstances and experiences in relation to the health care system. Access is described as a three-dimensional concept where availability, affordability and acceptability interact. According to this theory, decision-makers need both to make health care services available and to empower individuals to use health care services when needed. Differences in use of healthcare depends on empowerment and individual's choices.

The three dimension of access are defined as:

- Availability: are the right health care providers available in the right place and at the right time? And are providers able and willing to serve the patients at the facility.
- Affordability: the full cost to the patient and his/her ability to pay. This includes direct costs but also indirect costs such as travel and waiting times.
- Acceptability: refers to provider and patient attitudes and expectations towards each-other. Acceptability is also influenced by beliefs and perceptions, factors that may lead patients to self-care or traditional healing.

In this model, access is influenced by unequal power relations that impair provider-patient communication. Those relations are in turn affected by medical training. The authors summarize their conceptualization as “the right health service being available in the right place at the right time”.

*Levesque* and coworkers have synthesized the most cited frameworks of access to further develop and define access as “the opportunity to reach and obtain appropriate health care services in situations of perceived need for care”(Levesque et al., 2013). Access occurs in the process between the demand side (persons, households, social and physical environment) and the supply side (health systems, organizations and providers). Process factors, that describe how access is realized, are also considered.

Accessibility is described as five-dimensional (affordability, acceptability, availability and accommodation, affordability and appropriateness). Here, acceptability relates to cultural and social factors that determine peoples’ acceptability of the provided services and their

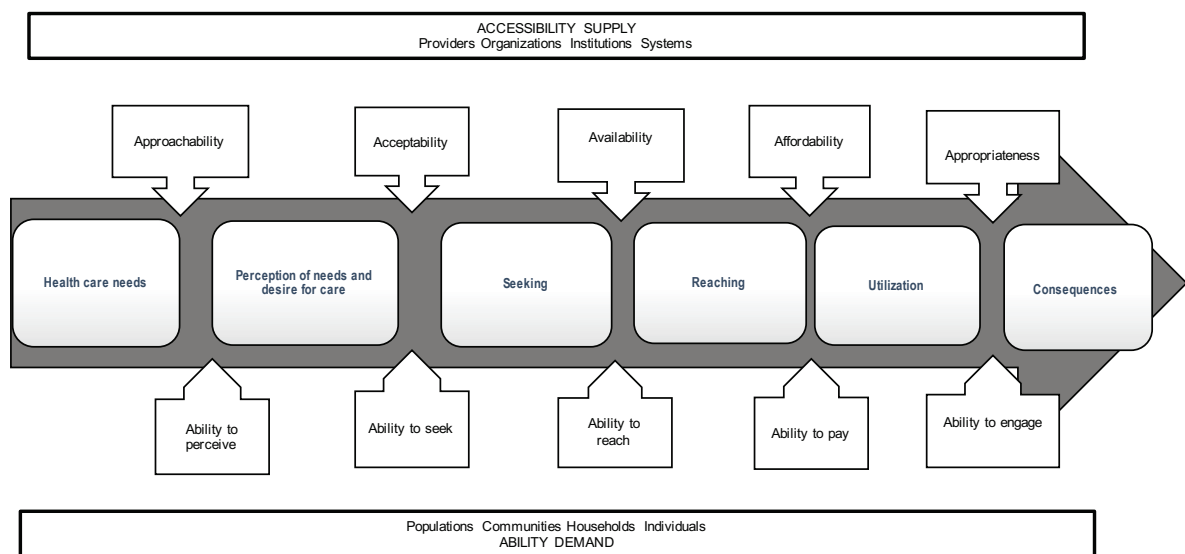


Figure 1.6.3 Access framework, adapted from Levesque et al 2013.

On the demand side five corresponding abilities relating to the individual’s capacity to choose and seek care are introduced.

*Gilson* discusses the importance of acceptability and trust to diminish the socio-cultural distance between health-care systems and the individuals (Gilson, 2007). The concept of equity is introduced and discussed in terms of systematic differences in the experience of health care between population groups. Three elements of acceptability are identified:

- The fit between health beliefs held by individuals and health-care providers. This fit influences care seeking behaviour and depends on lay beliefs about health and healing and the perceived competence of providers.
- The engagement and dialogue between patient and provider which is a function of power and trust.
- The organization of provided health-care which can enable or disable the patient's access to health services.

In this thesis, access to comprehensive abortion care is explored from the supply side aspects of provider's attitudes and willingness to provide services and the cost-effectiveness of task shifting provision of medical abortion from physicians to nurse-midwives, and the demand side aspect of acceptability of services.

## **1.7 THE FUTURE**

Despite years of scientific progress unsafe abortion is still the cause of substantial maternal mortality. Modern abortion methods are effective and safe, but women don't get access to treatment when needed. During recent decades the scientific community and activists have developed new methods for distribution of medical abortion aiming to bridge the access gap.

Simplified medical abortion, or home use and self-assessment of abortion outcome, is available from clinics in an increasing number of countries. Most often such regimes include an initial visit to a clinic to assess eligibility and gestational age. Abortion is then initiated with 200 mg oral mifepristone and women continue the treatment using oral or vaginal misoprostol at home. Simplified treatment is equally effective and acceptable as clinic use (Iyengar et al., 2016; Kopp Kallner et al., 2012; Oppegaard et al., 2015).

For women in settings where abortion is restricted the internet has opened new possibilities. Organizations such as women on web provide home-treatment for medical abortion using self-assessment of eligibility. Internet-based home abortion is effective safe and acceptable to a majority of women (Aiken et al., 2016; Gomperts et al., 2008). Internet self-assessment tools are also used in settings where abortion is legal but where access is limited due to other reasons such as long travel times. (Momborg et al., 2016).

## **2 AIMS**

The overall aim of this thesis is to study factors that influence access to comprehensive abortion care focusing on increasing provider availability in different settings.

The specific aims of the studies are:

### **Study I:**

To explore attitudes toward abortion held by medical interns in the state of Maharashtra, India, and also to determine whether those attitudes differed between groups of interns defined by sociodemographic backgrounds and study program characteristics.

### **Study II:**

To explore the attitudes and perceptions toward abortion care services, medical abortion and task shifting in abortion care among medical students in their internship year, in Maharashtra, India.

### **Study III:**

To conduct a cost-effectiveness analysis of medical abortion provided by nurse-midwives or physicians in a high resource setting.

### **Study IV:**

To review the efficacy, safety, and acceptability of non-physician provision of first trimester medical abortion including medical treatment for incomplete abortion.



### 3 MATERIAL AND METHODS

The studies included in this thesis cover different factors influencing access to and provision of abortion care, and medical abortion in particular in different settings. Quantitative and qualitative methodologies were used to cover different perspectives on abortion access and to obtain an overview, as well as in depth knowledge. A summary of included studies is provided below in Table 3.1.

| Study  | Location   | Time of data collection     | Design and method   | Type and number of participants  |
|--|--|-----------------------------|---|--|
| I. Medical Student's attitudes and Perceptions on Abortion: a cross-sectional survey among medical interns in Maharashtra, India | 27 medical colleges  | February 2011               | Cross-sectional survey  | Medical Interns (5 <sup>th</sup> year of study) n= 1996  |
| II. Medical students are afraid to include abortion in their future practices: in-depth interviews in Maharashtra, India         | 6 medical colleges   | December 2012 to April 2013 | Inductive approach using In-depth interviews. Thematic analysis                 | Medical Interns (5 <sup>th</sup> year of study) n=53   |
| III. Medical abortion provided by nurse-midwives or physicians in a high resource setting: a cost-effectiveness analysis         | Outpatient clinic at University hospital in Stockholm Sweden | Feb 2011 to July 2012       | Cost effectiveness analysis alongside a randomized controlled equivalence study | Healthy women seeking treatment for medical abortion (n=1180). Nurse-midwives (n=2), physicians (n=34) |
| IV. Effectiveness, safety and acceptability of non-physician provision of first-trimester medical abortion: a systematic review  | Worldwide  | Inception to April 2016     | Systematic review   | Electronic databases were searched using selected search terms for provider types and medical abortion |

Table 3.1 Overview of included studies

#### 3.1 STUDY I AND STUDY II

Study I and II aimed to explore attitudes and perceptions toward abortion and contraception among medical students and were conducted in Maharashtra, India.

##### 3.1.1 Research process

The first two studies were conducted among medical students in Maharashtra, India using a quantitative and qualitative approach. Study I was a cross-sectional survey conducted among undertaken before a workshop in comprehensive abortion care held by a local NGO. We

found that misconceptions about the law were common, one quarter of the respondents considered abortion to be morally wrong and one fifth stated that abortion should not be accepted for unmarried women. These findings informed the second study that aimed to further explore the findings about poor attitudes toward abortion. The studies were conducted in the same setting, which is introduced below. The first study was initiated as a project conducted by a Swedish medical student in his last year during a student-exchange with the local NGO. I became involved after the data collection, went through all the collected questionnaires, cleaned the data-base and performed all subsequent analysis together with the co-authors.

As Indian medical education has a focus on family-planning the results rose a lot of questions, and we decided to explore the subject further through in-depth interviews in the same population, medical students in their last year in Maharashtra, India.

The interviews were conducted in English by me, a Swedish-Obstetrician Gynecologist. At the time of the studies I had been living in India for one year (Study I) and two and a half years (Study II). After three years in India I had become somewhat familiar of Indian culture. I had become accustomed to the local use of English, “Hinglish”, and I had acquired some understanding of basic Hindi.

Although the tuition language at all the colleges was English, the spoken languages among students as well as teachers was either “Hinglish”, a denomination that describes a mixture of languages combining English and Hindi, or local languages such as Maharati. Hinglish is described as an informal language of the Indian middle class and the aspirational language of the upwardly-mobile classes (Orsini 2015). As I had previously noticed when communicating in various Indian settings, students tended to use complicated English words, that I am unsure they understood, in cover lack of understanding and/ or knowledge of the question or topic. Thus paraphrasing and explanation of the topic was often needed during interviews to ensure the respondents understanding of the question, as well as repetition and rephrasing of his or her answers to ensure that my understanding was correct. My relatively long experience as a westerner in India supported my understanding of the meaning of what was being said.

India is a country of authority and being older and, as an Obstetrician-Gynecologist, in a superior position within the medical system, I took great care to establish trust and an open dialogue to minimize the risk that students may become intimidated and/ or refrain from expressing their true views due to respect. I had specifically requested to be able to conduct interviews in a private environment, but I believe the common understanding of privacy is different in a populous country such as India compared to my Scandinavian background. I was always allocated a room in which to conduct the interviews, but we were often interrupted by people coming into the room for different reasons.

### **3.1.2 Setting**

India is a country with a vast rural population experiencing limited access to safe abortion services. Unsafe abortion is estimated to cause 8 % of maternal mortality despite decades of



legal abortion (Joe W, 2015). There is a lack of registered facilities and providers in rural areas, and implementation of medical abortion has been slow due to lack of medicines and low awareness among physicians (Creanga, Roy et al. 2008, Acharya and Kalyanwala 2012).

Maharashtra is India's second largest state by population, and the third largest by area. It had 112 million inhabitants at the time of the survey figure 3.1.2. Mumbai is the state capital and the largest city in India with around 13.3 million inhabitants, but a more than half of the state's population live in rural areas. In 2010-2012 the Maternal Mortality Rate (MMR) in Maharashtra was 87 (95%CI 52,138) which was around half of the average in India of 178 (Joe W, 2015). A more recent report from verbal autopsies in 31 purposive sampled of 10 states in India find that around 4% of maternal deaths are due to complications of abortion (Subha Sri B, 2014). Male and female literacy was 90% (82%) and 75% (65%) respectively (national average). The 2011 census found child sex ratio (0-6 years) to be 883 females per 1000 males, compared to the national average of 914, and this gender gap increased in the decade 2001-2011 (Government of India, 2011 #57). The state of Maharashtra has actively implemented the PC-PNDT act and had, until 2013, cancelled the highest number of medical practitioner licenses, 37, for violation of the law in India.

The medical council of India regulates medical education, and it is conducted at either public or private colleges. The medical education curriculum is national and stipulates that the theoretical part of the studies should cover Comprehensive Abortion Care (CAC), contraception and counseling (Supe et al., 2006). At the time of the studies there were 5945 medical students in Maharashtra attending 44 medical colleges offering the MBBS degree. Nineteen of the colleges were run by the government (India).



Figure 3.1.2 Map of Maharashtra, adapted from [www.mapsofopen.com](http://www.mapsofopen.com)

### **3.1.3 Study I**

#### *3.1.3.1 Instrument*

A structured questionnaire was developed to measure medical students attitudes towards contraception and abortion based on a previously tested instrument Klingberg-Allvin et al. (2007). The questionnaire consisted of three sections covering sociodemographic background (5 questions), educational background including the respondent's assessment of their own knowledge and training in the field of sexual and reproductive health (7 questions), and attitude statements on abortion and contraception (15 and 13 statements respectively) (Appendix A). Responses were marked on a five-point Likert scale (Spector, 2004). Positively and negatively worded statements were included to reduce bias. One question in the training section "What do you think are the special problems within sexual and reproductive health today in India" was open-ended and not included in the analysis. The survey-development and data collection was undertaken as a medical student degree project by the third author and took place before I got involved in the project. Results regarding contraception are presented in another paper (Hogmark et al., 2013).

#### *3.1.3.2 Study population and sampling*

Medical students in their fifth and final year of education (internship) were eligible for participation in the studies. Study I was conducted in February 2011 at 27 colleges, of which eight were government and 19 were private, where a CAC workshop covering aspects of abortion care included in the curricula of medical education was conducted. The included colleges were a convenience sample from 43 medical colleges in the state of Maharashtra at the time of the study and in total 2006 students participated.

The three hour CAC orientation workshop was held by a non-government organization partnering with the government. The objective of the workshop was to impart correct knowledge on various aspects of abortion care including the magnitude of unsafe abortions, the legal aspects of abortion care according to the Medical Termination of Pregnancy Act, abortion techniques and post-abortion contraception included in the curricula of medical education (Government of India, 1971; Ipas). Out of 2006 eligible medical students 1996 participated.

#### *3.1.3.3 Analysis*

All questionnaires with at least one answer were included in the data-analysis. Ten questionnaires were blank and therefore excluded. Descriptive statistics were applied to determine frequencies and proportions, any difference with a 95% confidence interval (CI) was regarded as significant. The alternatives disagree completely and disagree as well as agree and agree completely, were aggregated to calculate proportions and frequencies. Intergroup differences for gender, type of college and place of birth, as well as for how students assessed their education in and knowledge of sexual and reproductive health, was analyzed and cross-tabulations were made. Statistical Package for Social Studies (SPSS) 21

software was used.

### **3.1.4 Study II**

#### *3.1.4.1 Topic guide*

To further explore and complement the findings from Study I we conducted a qualitative study using in-depth interviews. A topic guide to explore students' attitudes and perceptions toward comprehensive abortion care was developed using with open-ended questions and probes. An emergent approach was employed and the interview guide was constantly revised as information from one interviewee influenced the interviewer's knowledge of the subject (Kvale et al., 2009).

#### *3.1.4.2 Study population and sampling*

Study II was conducted at between December 2012 and April 2013. Purposive sampling of six colleges among the 28 colleges that had previously participated in Study I took place. Eligible students were sought out by a key-informant, usually the head of the department at each college. Sampling of students aimed to create maximum-variation in representation with regards to socio-geographical-cultural backgrounds. Interviews were conducted with 23 medical students until theoretical saturation was reached. The interviews lasted between 30 min to one hour. All interviews were tape-recorded and field notes were taken.

#### *3.1.4.3 Analysis*

The interviews were transcribed verbatim. Between interviews initial analysis and further development of interview guides and probes was conducted. Thematic analysis with an inductive approach was used to evaluate data. This approach provides a qualitative, detailed account of the data that includes a systematic element characteristic but also permits the researcher to combine analysis of their meaning with their particular context (Vaismoradi et al., 2013). All transcribed material was read through several times, and I listened to the tapes for clarification which also took me back to the interview setting and added to contextual immersion. During this process I also went back to my field notes and research diary to further re-familiarize with the data. In the process of identifying meaning units I considered manifest (what the text says) and latent (underlying) ideas and assumptions. Data was coded and organized into units of analysis to identify patterns, subthemes and themes that were reviewed and refined until no new information was added (Braun et al., 2006). Meaning units, patterns and themes were discussed and agreed upon within the research team.

To ensure anonymity of the respondents, the informants identification numbers were re-coded so that the number presented alongside the quotes in the paper doesn't correspond to the chronological order of the interviews.

Although the interviews were conducted at colleges where English was the official tuition language, and quotes generally are reported verbatim in qualitative papers, some of the presented quotes were edited to assure readability and ensure the reader's understanding of

the meaning of what was said. The editing included conversion of spelling to standard English, and in certain cases changes of wording and grammar. During this process discussions with co-authors took place so that the transcripts represents the true meaning or veracity. Common transcription conversions such as [ ] to indicate material added by the author, and ... to indicate material omitted by the author (Green 2009).

## **3.2 STUDY III**

The third study was a cost-effectiveness analysis comparing provision of early medical abortion by nurse-midwives or physicians. It has previously been shown that non-physicians provide medical abortion as effectively and safely as physicians in a different setting, but the cost-effectiveness of such task shifting remains to be established. The study was conducted alongside a previously published randomized controlled equivalence study from a university hospital in Stockholm, Sweden (Kopp Kallner et al., 2014).

### **3.2.1 Efficacy measures**

In the RCT, 1180 healthy women seeking treatment for abortion at an outpatient clinic between February 2011 and July 2012 were randomized to treatment by a nurse-midwife (n=597) or a physician (n=583). The intervention was treatment by nurse-midwives who counseled, examined and performed dating by vaginal ultrasound, and treated the women independently. The standard treatment consisted of counseling and physical examination including ultrasound by a physician, additional information and medication was given by a nurse-midwife. The allocated care-giver provided contraceptive counseling and prescription. The treatment regime was mifepristone 200mg orally at the clinic on the first day, one to two days afterwards 800 mcg misoprostol was given vaginally, at home or in the clinic. Follow-up took place approximately three weeks after the mifepristone administration using a low sensitivity urinary human chorionic gonadotropin (u-hCG) test. Efficacy was defined as complete abortion without need for surgical intervention. Safety, complications and women's acceptability of the procedure were also assessed. The duration of the patients' visit to the clinic, and the allocated provider's need for a second opinion from a doctor, was recorded.

### **3.2.2 Cost calculations**

Direct costs were calculated for the woman's first visit to the clinic according to allocation. Indirect costs evaluated were the costs of the next patient's reduced waiting time and the cost of complications. The treatment on day two (24–48 hours after mifepristone) and follow-up did not differ between groups and were not included as costs were the same between groups.

Cost for salaries and examination rooms were obtained from Karolinska University Hospital, Stockholm, Sweden in 2011. The costs were dependent on treatment time which was mean 60 minutes in the physician group, and 42 minutes in the nurse-midwife group ( $P<0.001$ ). Consultation costs was calculated using the average consultation time and the average salary of participating physicians. Costs of time of the treated women and the next patients' reduced waiting time was estimated from the average income among women in the corresponding

age-group in Stockholm county. Training costs for the nurse-midwives were calculated using the cost of an ultrasound course for midwives providing medical abortion and included the salary costs of the participating midwives and supervising doctors. The reimbursement according to the diagnostic related group system (DRG) was used estimate the cost of complications. There was no difference in costs of disposables, ultrasound, or medication. Cost were calculated per procedure in Swedish Krona (SEK) and converted to 2011 Euro (EUR) (average exchange rate 2011; 1 Euro € = SEK 9.0298).

### 3.2.3 Cost-effectiveness analysis

Cost-effectiveness analysis (CEA) is an economic evaluation where costs and consequences of a health program or treatment are examined.

To compare the cost for a complete abortion without surgical intervention we calculated the incremental cost effectiveness ratio (ICER) for the intervention and standard treatment. The ICER considers changes in effectiveness as well as cost of treatment and is established using the formula:

$$\frac{[\text{Cost of Intervention} - \text{Cost of Standard treatment}]}{[\text{Effectiveness of Intervention} - \text{Effectiveness of Standard treatment}]}$$

We calculated the ICER for different cost measures: direct costs, direct costs including reduced waiting time, and total indirect and direct costs. The risk difference, stating that 1,6 fewer women needed surgical interventions per 100 treated women in the nurse midwife group, was the effectiveness measure.

The cost-effectiveness plane is a tool to illustrate ICER. It was initially developed by (Black, 1990) to illustrate cost-effectiveness and its' relevance to medical decision-making. The horizontal axis represents the difference in effect, or impact of the intervention on health outcomes and the vertical axis depicts net costs (Santerre RE, 2007). The origin (0) represents the standard treatment and slope of the diagonal line represents the maximum acceptable cost effectiveness ratio (Drummond MF, 2005). The first quadrant represents a situation where the intervention is more expensive and less effective than the intervention treatment, the intervention is then said to be dominant. Quadrant two depicts the situation where the intervention is more expensive and more effective than the standard treatment. Whether the new treatment is worth adopting depends on how much money one is willing to pay for the improved health. The third quadrant shows the opposite case: the intervention is less costly but also less effective. In this case it is important to establish whether the savings are worth the decrease in health. Until today the major emphasis in healthcare has been improving health and extending life, thus this alternative has been paid little attention in the literature. The fourth quadrant illustrates a situation where the intervention is cheaper and more effective, thus the ICER becomes negative (Figure 3.2.3)

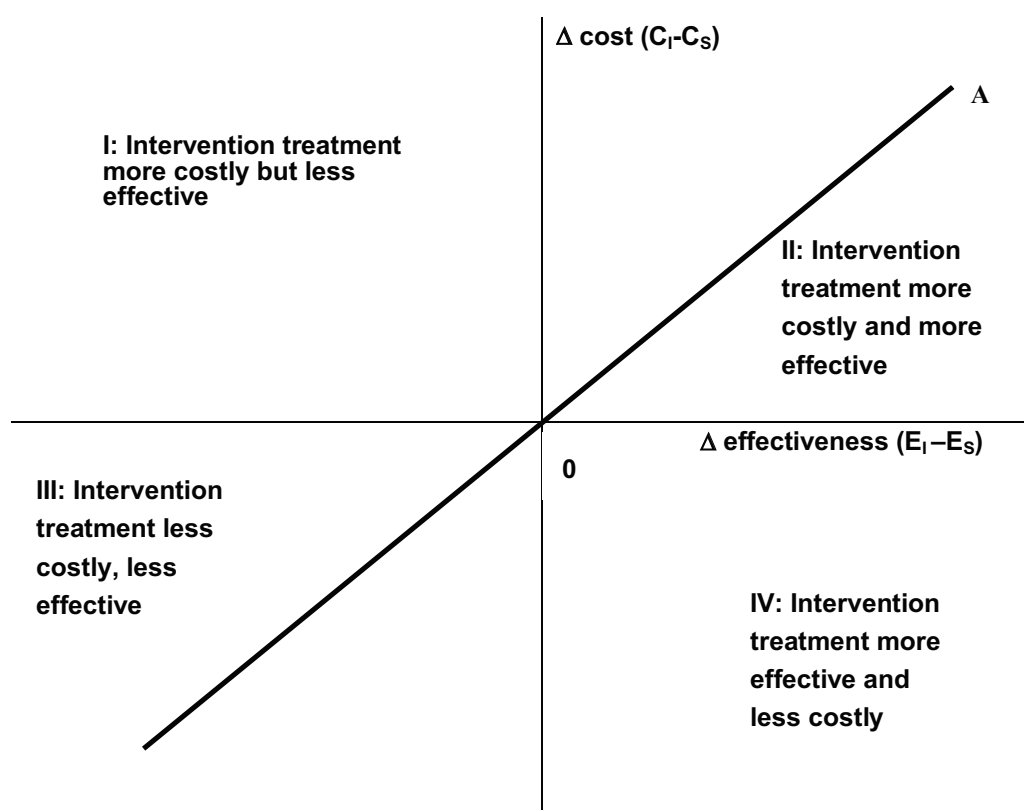


Figure 3.2.3 The cost effectiveness plane adapted from (Black, 1990)

### 3.3 STUDY IV

The fourth study was conducted to review the effectiveness, safety and acceptability of non-physician provision of first trimester medical abortion and medical treatment for incomplete abortion. This review was initiated as part of the evidence syntheses for the WHO guideline on health worker roles in safe abortion care and post-abortion contraception, that considered different cadres of non-physician providers separately (WHO, 2015a).

The systematic review was conducted according to WHO's principles for guideline development while following PRISMA guidelines (Moher et al., 2009; WHO, 2012b).

Previously published systematic reviews on midlevel provision of abortion neither include medical treatment of incomplete abortion or assess acceptability (Barnard et al., 2015; Ngo et al., 2013; Renner et al., 2013).

#### 3.3.1 Inclusion criteria

PICOs (participants, interventions, comparisons, outcomes and study designs) were defined by WHO at scoping meetings in 2011, where experts from all regions attended. The PICO's were finalized by the WHO steering group and by the WHO guideline development group in 2014.

- Participants were pregnant women seeking medical abortion up to 12 weeks of gestation, or medical treatment of incomplete abortion.

- Intervention was medical abortion or medical treatment of incomplete abortion provided by non-physician providers
- Comparisons were medical abortion or treatment of incomplete abortion provided by physician.
- Outcomes were effectiveness, safety and acceptability.
- Study designs were randomized controlled trials (RCTs), equivalence and non-inferiority trials, and comparative observational studies including cohort and case-control studies

### **3.3.2 Search strategy and data collection**

Medical subject headings (MeSH) and free text words (tw) were used to develop search strategies for the databases PubMed, EMBASE, CINAHL, POPLINE, Global Index Medicus, Cochrane database, and ClinicalTrials.gov. Searches were conducted in July 2014 and completed in April 2016

We initially reviewed titles and abstracts, and if needed the full article. Additional information was collected from reference lists and other reviews. Researchers in the field were contacted.

### **3.3.3 Data analysis**

The findings were summarized using standardized abstraction forms to identify PICOs. Risk of bias assessment was also systemized in standardized forms.

### **3.3.4 Quality of evidence**

Meta-analyses were conducted using The RevMan 5.3 software (Collaboration Cochrane, 2014). The GRADE system was used to assess the quality of evidence (GRADEpro, 2015).

## **3.4 ETHICAL CONSIDERATIONS**

All studies were conducted in accordance with the World Medical Association Declaration of Helsinki (World Medical, 2013).

Study I: The principal at each college gave permission to conduct the study in connection to the workshop. Before questionnaires were handed out, oral information about the study was given to all eligible participants, and it was explained that participation was anonymous and voluntary including information that non-participation would not affect their future studies or careers. Written consent was given by filling out the questionnaires.

Study II: Permission to conduct the study and to disseminate the results was granted in writing from each of the participating colleges. Oral and written information was given about the study to all participants, and it was explained that participation was voluntary and anonymous and that participation or non-participation would not influence further studies or future career. All participants gave written informed consent before the interviews started. All interviews were conducted in privacy.



Ethical approval was obtained from the regional ethical committee in Stockholm, Sweden (2013/415-31/4)

Study III: Ethical permission was granted by the National Board of Health and Welfare and by the regional ethical committee in Stockholm (permission number 2010/1828-31/3, 23 December 2010) to allow midwives to independently provide medical abortion, according to the study protocol. After approval by the regional ethics committee at Karolinska Institutet all applications were publicly available. The study was registered with Clinicaltrials.gov NCT01612923.



## 4 RESULTS

### 4.1 STUDY I

The first study showed that disallowing attitudes and misconceptions about the law were common among the surveyed medical students. Only thirteen percent had clinical practice in abortion care services. A slight majority believed that trained general nurse midwives (GNM) would have the capacity to provide abortions.

Almost 2000 (1996) medical students participated in the survey on knowledge and attitudes to abortion, the response rate was 99%. The number of missing answers was low and ranged from 1.1%-2.1%. Numbers of “neither” answers ranged from 0.9 to 26.3% where the highest numbers stem from statements requiring specific knowledge such as “Women prefer to have surgical rather than medical abortion” (26.3%) and surgical abortion is more harmful than medical abortion (19.3%).

The respondents socio-demographic background was relatively homogenous, 43% of the participants were women and 71% attended private colleges. Almost three quarters of the interviewees found that the reproductive health had been sufficiently covered in their education, and 69% percent assessed their own knowledge of the subject SRHR to be good. However, practical experience was rare, only 13% of respondents had any clinical training.

|   | Disagree (%) | Neither (%) | Agree (%) | Missing (%) |
|---|--------------|-------------|-----------|-------------|
| <b>Unsafe abortion is a serious health problem in India</b>             | 67 (3)       | 19 (1)      | 1898 (95) | 22 (1.1)    |
| <b>Abortion among unmarried is acceptable</b>                           | 397 (20)     | 183 (9)     | 1388 (65) | 38 (1.9)    |
| <b>Abortion is morally wrong</b>  | 1208 (60)    | 294 (15)    | 470 (23)  | 34 (1.7)    |
| <b>A woman should always have the right to an abortion</b>              | 197 (10)     | 109 (5)     | 1694 (83) | 36 (1.8)    |
| <b>A woman needs to have her partner's approval to have an abortion</b> | 1301 (65)    | 172 (9)     | 494 (25)  | 39 (1.9)    |
| <b>Specially trained GNMs can provide abortions in India</b>            | 706 (35)     | 232 (12)    | 1027 (51) | 41 (2.0)    |

Table 4.1.1 Attitudes to abortion among medical students (n=1996) in Maharashtra, India, including missing data.

Most students agreed that unsafe abortion is a serious health problem in India (95%), but almost one quarter (23%) found that abortion is morally wrong. Most acknowledged that pre-marital sexual relationships are increasing (91%) and the majority also agreed that abortion among unmarried is raising (91%), but still one fifth 20% found that abortion among unmarried was unacceptable. See table 4.1.1

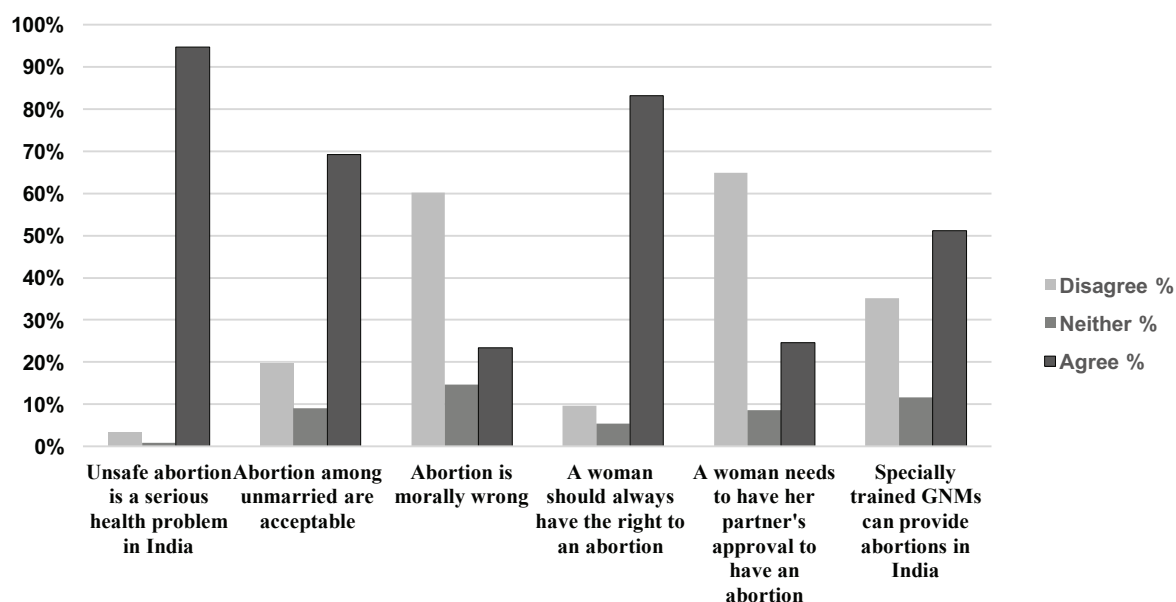


Figure 4.1.1 Medical students' attitudes towards different aspects of abortion

One quarter of the students (n= 494 (25%), 56 missing) stated that “A woman needs her partner, or spouses’, approval to have an abortion”. A smaller proportion of female respondents (n=168 (19.7%), 95% CI 17.1-22.6) than male students (n=326 (29.2%), 95% CI 26.6–32.0) agreed to this common statement. The intergroup analysis for place of birth showed that respondents born in urban areas (23.2; 95% CI 20.1-24.4) were less likely than students born in rural areas (32.7; 95% CI 28.7-37.0) to hold this misconception. The same was true for students attending private colleges (23.2; 95%CI 21.0-25.5) versus respondents attending government colleges (29.9; 95% CI 26.2-33.9). See Figure 4.1.2

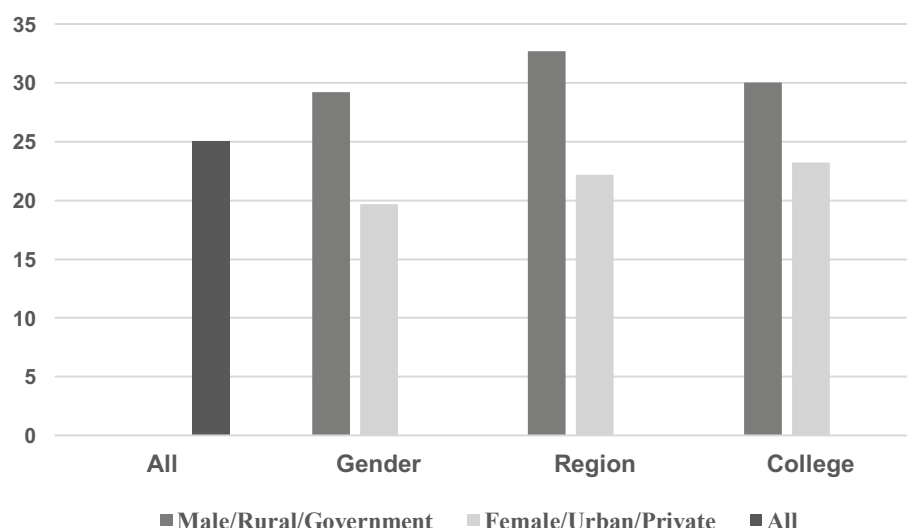


Figure 4.1.2 Student's disagreeing to the statement “A woman needs to have her partner or spouse's approval to have an abortion” inter-group analysis, %.

Female students (n=761, 89.3%, 95% CI 87.0-91.3) were more likely to agree that a woman should always have the right to an abortion than male students (n=932, 83.5%, 95% CI 81.5-85.6).

Students who found that the topic of sexual and reproductive health had been sufficiently included in their education demonstrated higher awareness of the health impact of unsafe abortion, were more likely to agree that abortion at unregistered clinics is more harmful, and that unmarried women are more likely to seek abortion at unregistered clinics than students who had stated that their education in sexual and reproductive health was not sufficient. Students who assessed their own knowledge to be good or very good were more likely to agree that abortion at unregistered clinics is more harmful, and that a woman always should have the right to have an abortion than students who didn't assess their own knowledge as sufficient. See table 4.1.2

| Statements  | Has the topic of sexual and reproductive health been included in your programme? |   | How do you assess your knowledge of sexual and reproductive health? |  |
|---|--|---|---|--|
|   | Not/ Some<br>(n = 495)<br>n (%)<br>95% CI  | Adequately<br>(n = 1475)<br>n (%)<br>95% CI | Poor/ Fair<br>(n = 582)<br>n (%)<br>95% CI                          | Good/ Very good<br>(n = 1382)<br>n (%)<br>95% CI |
| Unsafe abortion is a serious health problem in India                                      | 451 (91.5)<br>88.7–93.8  | 425 (97.0)<br>96.0–97.8                     |   |  |
| Abortion at unregistered clinics are more harmful than at registered clinics              | 419 (85.3)<br>81.8–88.3  | 1,363 (93.2)<br>91.7–94.4                   | 508 (87.9)<br>84.9–90.4   | 1,269 (92.6)<br>91.1–94.0                        |
| Abortion clients are treated in privacy in India  | 304 (62.3)<br>57.8–66.6  | 1,087 (74.8)<br>72.4–77.0                   |   |  |
| A woman should always have the right to have an abortion in case of an unwanted pregnancy | 398 (81.6)<br>77.8–84.9  | 1,276 (87.5)<br>85.6–89.1                   | 476 (82.5)<br>79.1–85.5   | 1,195 (87.6)<br>85.7–89.3                        |
| Unmarried women have more complication from abortion than married                         |  |   | 372 (64.2)<br>60.2–68.2   | 991 (72.3)<br>69.8–74.6                          |
| Unmarried women prefer to have abortions outside of public health clinics                 | 422 (85.8)<br>82.4–88.7  | 1,345 (91.7)<br>90.2–93.1                   |   |  |
| Abortion among unmarried are rising in India  | 433 (87.8)<br>84.6–90.6  | 1,366 (93.1)<br>91.6–94.3                   | 514 (88.6)<br>85.8–91.1   | 1280 (93.1)<br>91.6–94.4                         |

Table 4.1.2. Differences in attitudes to abortion related to the respondent's assessment of education in sexual and reproductive health and assessment of own knowledge in the subject

Slightly more than half (n= 1027(52%)) of the surveyed students agreed that trained nurse-midwives can provide abortion in the future.

## 4.2 STUDY II

We found that medical students in Maharashtra are afraid to provide abortion in the future. This theme is supported by three subthemes: limited understanding of the laws regulating termination of pregnancy and how it is different from the law regulating the use of ultrasound for prenatal diagnostic purposes, experiences from the clinical setting and the influence of

traditional norms and values. The themes are illustrated in Figure 4.2.1. We also probed for students' views on expanding the provider-base for abortion to non-physicians.

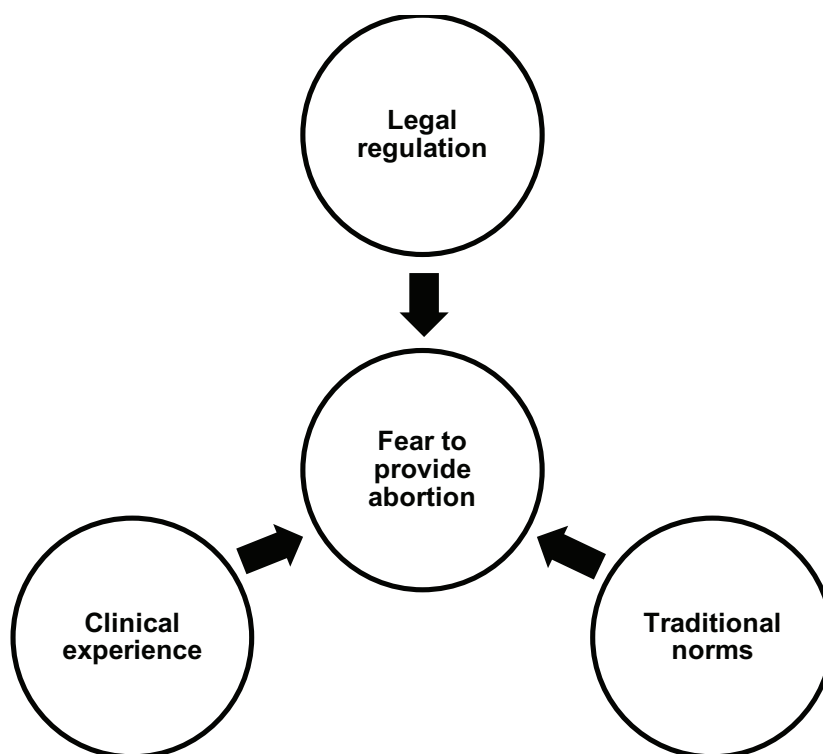


Figure 4.2.1 Overview subthemes supporting the main finding that medical students in Maharashtra are afraid to include abortion in their future practice.

The below statement illustrates the conception of a common fear among doctors and in the society.

*Yah, there is a fear in the society, and even a fear in the mind of doctors. . . Maybe the fear in the mind of doctors comes from hearing about doctors being punished [ for doing abortions], therefore they are afraid to be caught doing abortions. Doing abortions can also harm our status in the society . . .For the woman, having an abortion, it does not affect the female negatively [. . .in a medical way . . .] but the woman fears that if she does this she will be accused and her family will also be accused. Informant 3, female, private college*

#### **4.2.1 Lack of deeper understanding of the legal regulation**

Interviewees were often aware about the content in the MTP act allowing abortion on many indications, but yet most concluded that abortion is illegal in Maharashtra. Students were aware of the declining sex ratio in Maharashtra, and of the existence of the PC-PNDT law, but the contents of the two laws were intertwined. Government actions to limit sex-selective abortions were well known, and the students described a general fear among doctors to be prosecuted for illegal actions. The discourse was generally held from a physicians' perspective not questioning the need to protect oneself from being accused of illegal actions. Only occasionally did students reflect on how the widespread fear among

physicians could have negative consequences for women and ultimately impact on maternal mortality and one student expressed . . . *it is a fear but it should be removed.* . . .

The students described the use of common, or convenient, interpretations of the law that limited the woman's possibility to have an abortion. Such delays could for instance occur by asking for permission from the woman's partner or parents, or by reporting the situation to the police or government.

*For example, if a mother wants to do an abortion, the MTP act says that there is no necessity of asking her husband. But still, in India, even in hospitals, we ask the husband and we take the signature of husband too, because the husband may go to court and say that 'they did not ask me'. So even though the law says that after 18 years old a woman can come and she have the right to take abortion medicines from the doctor but still we search for the guardians and parents. Informant 17, man, private college.*

#### **4.2.2 Experience from the clinic**

This subtheme is generated from of three underlying themes, that doctors are afraid to provide abortion, that students lack clinical skills and confidence and misconceptions about medical abortion.

A dominating perception was that individual physicians avoid taking independent action. Many students described observing physicians doing nothing, especially in rural areas. One respondent described that "physicians don't do their job...". Reasons stated by the interviewees were fear of wrongdoing and lack of skills. In India respect for authority is high, and several accounts were about reports to the hospital authorities or even the police, especially in cases where unmarried women sought treatment for unintended pregnancies.

*I: Ok: so the doctors in the rural areas just say that they are providing, but they are not actually telling the woman that yes, you can come and we help you with this?*

*R: Yes, they just tell the seniors that 'we are doing this' but really it is not done.*

*R: I have seen rural areas where there are MBBS doctors... They also refer to this government hospital 'go to the city and do thi's. They just give painkiller, just diclofenac.*

*Yes, but 2 to 3 doctors are there, they don't pay attention that much. Informant 9, male, government college.*

The respondents own clinical experience was very limited. Students described discomfort and insecurity in contact with patients. Male students experienced that they had particular difficulties in communicating with female patients, especially in matters related to pregnancy and abortion. They also described an insecurity should they perform a vaginal exam on a female patient without the partner's consent. The students' talked openly about skipping postings, especially in rural areas, in order to study for the upcoming exams to gain access to medical specialization.

*I: So have your met any women seeking abortion in your practice so far?*

*R: I have just done my OBS-GYNE posting for 25 days, for exam purpose I skipped one month posting, so I have not come across that. Informant 14, female, government college.*

Medical abortion was regarded with suspicion and although most interviewees were aware of the mifepristone-misoprostol regime, they confused medical methods of abortion with emergency contraception. Many stated that mifepristone and misoprostol was illegal in Maharashtra.

*Mam, it is banned in Maharashtra, mifepristone and misoprostol. Informant 18, man, private college.*

Despite concluding that women prefer medical methods of abortion the students did not trust women to be able to handle regimes or come for follow-up at the clinic. Fear of adverse events and complications was common. Dilatation and curettage was considered the method of choice should an abortion be provided.

#### **4.2.3 Influence of traditional norms and values**

This subtheme was built from the underlying themes that pre-marital sex is illegal in society and the respondents expressions of negative attitudes towards the rural community.

The interviewed medical students stated that pre-marital sex and abortion are illegal in India, and as a consequence neither contraception nor abortion was available in India. The students explained that unmarried women were dependent on their partners to get access to contraception. Societal values affected physicians decision-making and were equaled with the law. This especially concerned unmarried women. Even though interviewed female students were highly educated and about to start their career in the medical profession, they described that their families influenced their choice of partner and also of future career. They expressed a concern about not disgracing their families.

*Abortion is illegal for unmarried women there should be more awareness and more knowledge about the contraceptive methods. Informant 13, male, government college.*

*I don't think a girl should come alone in the first place. I think someone should accompany the girl because it is a medical procedure an all. Informant 21, male, government college.*

The interviewed students experienced a social distance from the rural community. The people in rural areas were believed to lack knowledge and to hold poor attitudes. Students described being afraid of treating women as they might be threatened or punished by their family members. No student wished to work in the rural areas, especially not more than the stipulated year that might give them priority to further education.

#### **4.2.4 Attitudes to midlevel provision**

Most students stated that something has to be done to reduce abortion related mortality in India. Many held positive attitudes towards non-physician provision of medical abortion. Some students had experienced that nurses provided care, especially in rural areas and they

acknowledged nurses for their skills. Also, the nurses often had local connection, which was seen as an advantage. Although the question about future non-physician provision of abortion was seen as abstract at first, many students agreed that trained nurse-midwives could provide abortion.



Figure 4.2.4 Medical student's thoughts about non-physician providers of abortion

*In India I think it is good thing, because we can educate the nurses and social workers about the different methods, then they can definitely go to the people and tell them about different methods, or people can ask them about different methods instead of going to any quack they can prefer to go to the nurse it will definitely help them. I think it is good. Informant 6, female, government college.*

Some students however were skeptical of nurse-midwives ability to provide such services safely.

### 4.3 STUDY III

In the RCT, the risk difference for effectiveness, complete abortion without surgical intervention, was 1.6% (95% CI; 0.2–3.6%,  $p = 0.027$ ). This means that for every 100 treated women, the patients in the nurse-midwife group will undergo 1.6 fewer surgical abortions at follow-up than the patients treated by physicians. This can also be expressed as 0.016 fewer surgical interventions per procedure in the intervention arm.

Direct costs were calculated using the information from the hospital for salaries, payroll tax and time of treatment. Costs for consultation with physicians were calculated based on physician salaries. Consultations occurred in 26% of the cases handled by nurse-midwives and they lasted for six minutes on average. Senior physicians were consulted in four per cent of the cases in the standard treatment group, those consultations lasted for an average of 14 minutes. An assessment of the cost for patients' time was made using the time the women spent with their provider. Training costs for nurse midwives was calculated using the price of an ultrasound course for midwives, the midwives' salary loss and the cost of physician supervision of 50 subsequent ultrasounds. Thus the total direct cost per procedure was EUR 58.3 in the standard treatment group and EUR 45 in the intervention group.



Although there were no significant differences in safety parameters (need for hospitalization or blood transfusion) between groups, we calculated the costs for complications at a per-procedure level. In the intervention group they were 37€ per procedure, and in the standard care group they were 48€ per procedure. Those costs were added to the most conservative estimate, that took the assessed saving in waiting time for the next-coming patient.

ICER was calculated for total direct costs (-831,2), direct costs including the reduced waiting time for the next patient (-1081.2) and for total direct and indirect costs (-1768.8) using the risk difference per procedure as denominator.

To obtain a sensitivity estimate we calculated the ICER for the upper and lower range of the 95% CI (95% CI; 0.2–3.6%). The results all fell within quadrant IV in the cost-effectiveness plane. Figure 4.3.1

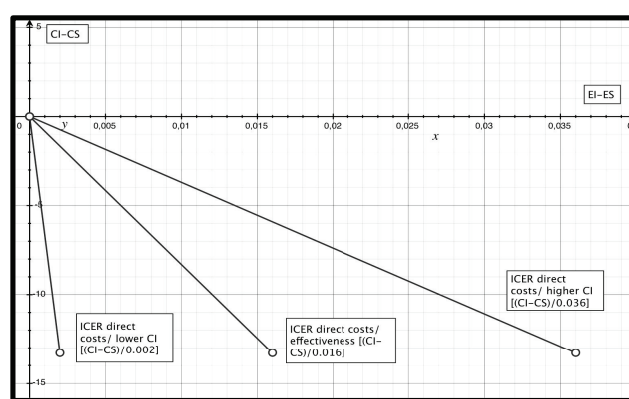


Figure 4.3.1 Illustration of sensitivity analysis using upper and lower limits for 95% CI for the risk difference of efficacy.

An important finding from the parent study was that there was a significantly higher number of women randomized to nurse-midwives (290/532) than randomized to physicians (241/528) that had a long-acting reversible contraceptive inserted within three weeks of the abortion (95% CI 3.2 to 15.2%).

## 4.4 STUDY IV

### 4.4.1 Search results

The search identified 8939 unique citations. After screening for titles, abstracts, and in 20 cases full articles, five papers from four randomized controlled studies (Cleeve et al., 2016; Klingberg-Allvin et al., 2015; Kopp Kallner et al., 2014; Olavarrieta et al., 2015; Warriner et al., 2011) and one article from a prospective cohort study (Jejeebhoy et al., 2012) were included.

### 4.4.2 Characteristics of included studies

The studies were conducted in varying settings and included different provider types. All studies on medical abortion used a mifepristone and misoprostol regimen, and the



randomized controlled trial on medical treatment of incomplete abortion used 600mcg misoprostol orally. All providers in one study used the same treatment.

### **4.4.3 Outcome measures**

#### *4.4.3.1 Effectiveness*

The definition of effectiveness used in all studies was complete abortion without need for vacuum aspiration. Completion was determined by clinical assessment of, in addition one study also used a urinary pregnancy test (Kopp Kallner et al., 2014), and one study abdominal ultrasound (Olavarrieta et al., 2015).

Intention to Treat (ITT) risk estimates (RR 0.99, 95% CI 0.96 to 1.02) reported in three RCTs were used to conduct meta-analyses for effectiveness (Klingberg-Allvin et al., 2015; Olavarrieta et al., 2015; Warriner et al., 2011). Effectiveness is equivalent between provider groups. Subgroup analyses indicate that complete abortion rates may be similar between provider groups regardless of whether women are being treated for induced or incomplete abortion. The certainty of evidence is moderate.

#### *4.4.3.2 Safety*

Only one serious adverse event was registered (Olavarrieta et al., 2015). The included studies were large but as adverse events due to abortion are rare, they were not powered to detect safety differences. Clearly defined safety outcomes were only reported in one study, and one recorded adverse events for reporting on safety (Kopp Kallner et al., 2014; Olavarrieta et al., 2015). The prospective cohort study reported on hemorrhage requiring blood-transfusion or hospitalization.

#### *4.4.3.3 Acceptability*

Acceptability and/ or satisfaction with treatment and/or services was reported by three RCTs (Cleeve et al., 2016; Kopp Kallner et al., 2014; Olavarrieta et al., 2015). The meta-analysis shows an effect estimate (RR1.11, 95%CI 0.90 to 1.36) for women treated by non-physicians who would recommend treatment/ provider to a friend or prefer the same provider should she need a treatment in the future. The certainty of evidence is low.

The meta-analysis for overall satisfaction, two RCTs (Cleeve et al., 2016; Olavarrieta et al., 2015) show that women probably are equally satisfied regardless of provider allocation (RR 0.99, 95% CI 0.93 to 1.06). The certainty of the evidence is moderate. Figure 4.4.3.3.2.

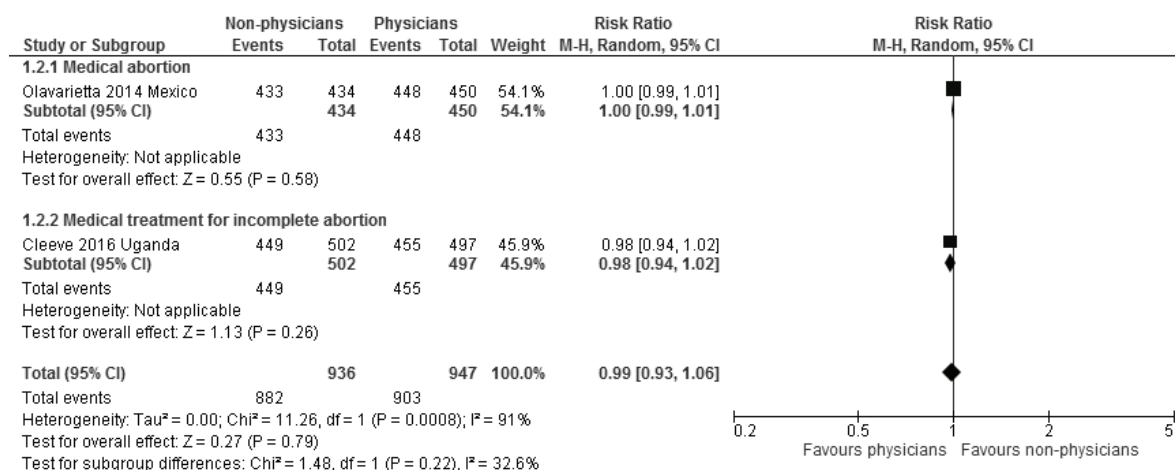


Figure 4.4.3.3.2 Analysis 2B. Acceptability. Overall satisfaction

#### 4.4.3.4 Conclusion

This study confirmed that the effectiveness of non-physician provision of medical abortion and medical treatment of incomplete abortion is probably similar as the effectiveness of treatment by physicians. Also, women's overall acceptability with the provider was probably similar for non-physician and physician providers.

## 5 DISCUSSION

The overall aim of this thesis is to study factors that influence access to comprehensive abortion care focusing on increasing provider availability in different settings. Each of the four included studies explored factors influencing provision of, and treatment for abortion including post abortion care.

The first study showed that disallowing attitudes and misconceptions about the law were common among medical students in Maharashtra India. Despite the curriculum emphasis on practical education only thirteen percent had any clinical practice in abortion care services. General nurse midwives (GNMs) were believed to have the capacity to provide abortions by a slight majority (Sjostrom et al., 2014). Those attitudes were confirmed by in-depth interviews performed among medical students in Maharashtra. The interviewees were afraid to include abortion provision in their future practice and lacked ability to independently interpret the law regulating abortion, confusing it with the law regulating pre-natal determination of fetus sex. The students perceived a social distance from future patients, especially from rural areas, and their views and actions were influenced by traditional norms and values (Sjostrom, Essen, et al., 2016).

The cost-effectiveness analysis of nurse-midwife treatment for first-trimester medical abortion showed that the direct cost per procedure was EUR13.3 cheaper than the standard treatment by physicians. Applying incremental cost effectiveness ratios showed a saving of EUR 831 per avoided surgical intervention(Sjostrom, Kopp Kallner, et al., 2016).

The fourth study concluded that the effectiveness and women's acceptability of non-physician provision of medical abortion and medical treatment of incomplete abortion was similar as when treated by physicians (Sjöström et al. Manuscript)

These findings all illuminate important aspects on access to safe abortion care that are important to consider in all types of settings ranging from low income contexts with restrictive legal frameworks to high income settings where abortion is permitted on wide indications.

### 5.1 CONCEPTUAL FRAMEWORK REVISITED

Considering the multitude of previously suggested definitions of access to healthcare, and their associated conceptual frameworks presented in the limited overview of frequently used frameworks in chapter 1.6, the difficulty to develop a comprehensive model that includes all aspects that may influence access is apparent. It is, however, important to distinguish between supply side factors that are generally easier to understand and influence using health systems and policies, and demand side factors that are broader in scope and include aspects such as equity and acceptability that are more immediately related to the context thus may be more difficult to pinpoint. In the light of the above overview of contextual frameworks, I present a

simplified model to illustrate how the findings of this thesis contributes to the evidence of needs for improvement to ensure access to comprehensive abortion care. Figure 5.1

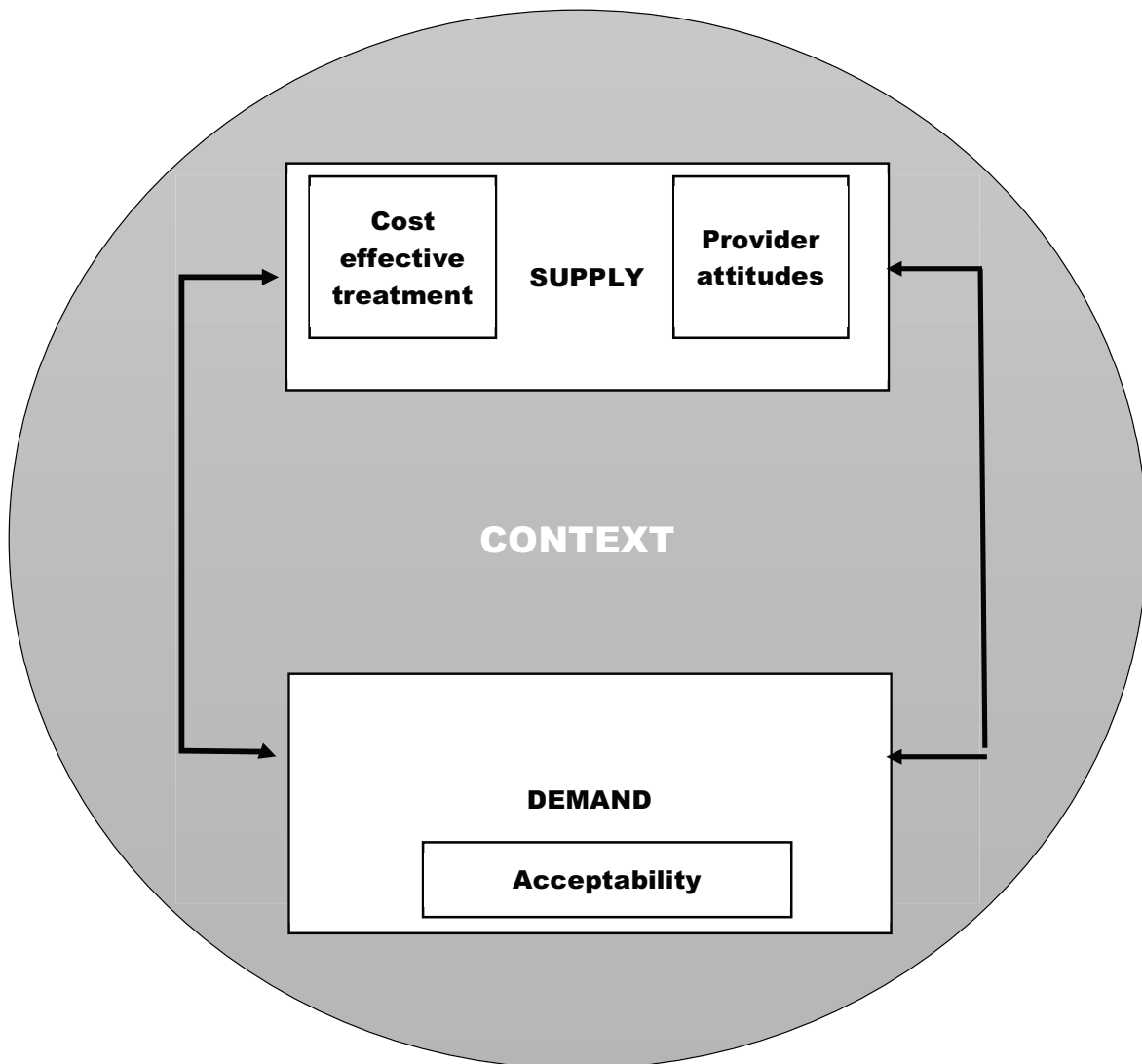


Figure 5.1 A simplified framework for access

The context is the most important determinant of whether access is achieved and it affects both the supply and the demand of abortion care. The supply side is influenced by “hard” as well as “soft” factors. Hard factors, such as implementing more cost-effective health-care units using nurse-midwife providers of abortion, are relatively easy for the health system to implement. But the existence of such clinics does neither imply that service is provided, nor that patients seek care. Acceptability of services is probably the most important factor from the demand side perspective and determines care seeking behavior for comprehensive abortion care. In order to reach through the contextual framework and change care-giving and care-seeking behavior policymakers need to focus on education of care-givers as well as women.

### 5.1.1 Context

To study access to health care you have to understand the context. The context includes

factors that influence care-seekers and providers alike such including geography and religion, social structures, power-hierarchies, levels of education. Studying a specific area of access such as abortion, the importance of the context is augmented due to gendered structures and stigma. Equity can be seen as a function of the context reflecting real or perceived social distances as well as education levels and differences between the sexes.

We found that medical students in Maharashtra perceived a social distance between themselves and people in rural areas (Sjostrom, Essen, et al., 2016). Such social barriers are grounded in the context and have negative impact on access to health care. However, access can be increased by reducing the distance between care-givers, health care systems and their users. A study among sex-workers in Uganda found that measures at the community-level, including a support network among women where they can speak openly about abortion, training of peer educators and community outreach workshops on abortion increased the probability that women would access safe abortion services. On the health facility level the same study concluded that it is important to ensure that providers treat women with care and respect, allowing them to be accompanied within the facility and guaranteeing their confidentiality (Marlow et al., 2014).

### **5.1.2 Supply side aspects on abortion access**

There are many perspectives on provision of abortion. The evidence confirming that nurse-midwife provision of medical abortion in the first trimester is cheaper than provision by physicians' form a base on the supply side of access (Sjostrom, Kopp Kallner, et al., 2016). Adding the results from the studies on medical students' attitudes toward abortion showing that although students were aware of the substantial impact of unsafe abortion on maternal mortality, they were not willing to provide abortions due to fear of consequences and stigma makes it easy to conclude that a shift toward non-physician provision is needed (Sjostrom, Essen, et al., 2016). Non-physician provision has become a means to increase the provider-base for comprehensive abortion care, especially where availability of physicians is scarce but also in settings where there is an unwillingness among physicians to provide reproductive health services but there is no evidence confirming that non-physicians hold more permitting attitudes toward provision of abortion. On the contrary a literature review from sub-Saharan Africa and South-east Asia identified nine themes that influenced health-care providers of different cadre's, including physicians, nurses and midwives, attitudes and perceptions toward abortion. Providers were generally supportive of abortion in case of rape or in order to save the woman's life, but there was a widespread uncertainty about abortion laws. Women were condemned and nurses and midwives stated that they disliked providing abortion services. Medical abortion was preferred by providers in some studies as less involvement from the care-giver was needed (Rehnstrom Loi et al., 2015).

### **5.1.3 Acceptability**

The systematic review showed that women's acceptability of treatment for medical abortion by non-physician providers probably is similar to provision by physicians. Acceptability is a

multi-dimensional component of care seeking behavior and based on patient-provider trust. The WHO concludes that acceptability requests all health facilities, goods and services to be respectful of medical ethics and culturally appropriate as well as sensitive to gender and life-cycle requirements (WHO). Acceptability reflects the contextual adaptation of services, the patient-provider relationship and the judged appropriateness of care (Cleeve et al., 2016)

Barriers caused by low acceptability and trust are more likely to affect the care-seeking behaviors, and thus access to care, of socially disadvantaged groups in different settings (Gilson, 2007). Despite the importance of acceptability for access to health care, it is a poorly conceptualized component of access to health care (Dillip et al., 2012).

Gilson includes the importance of a shared interface of health-beliefs, communication and infrastructure (Gilson, 2007). A factor that affects the relationship between care-giver and care-taker is perceived or real social distance. We hypothesize that the social distance between abortion seeking women in relation to nurse- midwives may be smaller in relation to their distance to physicians, thus increasing the fit, but evidence of this is scarce. Women's level of education influences their understanding about when to seek care and empowers them in the patient-provider relationship thus increasing acceptability.

## **5.2 MISCELLANEOUS OBSERVATIONS**

Although determining cost-estimates for the differences in prescription and administration of long acting reversible contraception between nurse-midwives and physicians was beyond the scope of our cost-effectiveness study, it is a very important finding. Providing contraception and especially long acting contraception at the time of an abortion or treatment for post-abortion care is often neglected. Despite years of advocacy, maternal mortality due to unplanned pregnancies and abortion is still high. In order to reduce maternal mortality, it is important to work with preventive measures and use the opportunity when women seek care to educate and inform about contraception. In addition to the reduction in unplanned pregnancies and related maternal mortality, the health system cost of LARCs is lower compared to other contraceptives (Trussell et al., 2015).

A recent retrospective cohort study reviewed medical records of 987 women who sought an abortion in 2009. Twenty-four percent of the included women requested a repeat abortion before the end of the follow-up period, the end of December 2012. Those who had chosen long-acting reversible contraception (LARC) when they underwent the first abortion had fewer repeat abortions (Kilander et al., 2016). The importance on immediate or early start of a LARC method post medical abortion in reducing subsequent unplanned pregnancy have also confirmed in randomised controlled trials (Hognert et al., 2016; Saav et al., 2012).

A component of access that is not discussed in any frameworks I have studied is the role of the industry. The industry can take a lead on making contraceptives available at affordable prices in all settings. Representatives from the industry also has the power to influence governments. As the interest for CSR is increasing in the business community, As the interest

for CSR is increasing in the business community, the scientific community needs to collaborate with the pharmaceutical industry also in this aspect.

### **5.3 METHODOLOGICAL CONSIDERATIONS**

#### **5.3.1 Study I**

The large number of respondents representing 47.5% of students at private colleges and 26% of students at government colleges and the 99% response rate is the major strength of the first study. Also the students' recorded knowledge, perceptions and attitudes reflect the content of their basic education program.

*Reliability*, whether results are consistent over time, is confirmed by the qualitative results from Study II.

*External validity*, whether the results be generalized to settings beyond the original study, is difficult to confirm, even within India, due to its' diverseness. However, in this study, the sociodemographic background of the respondents was relatively homogenous which may make results transferable at least to medical students within the state of Maharashtra.

*Internal validity* describes how well a study measures what it is supposed to measure, and may have been affected by the design of the study instrument and the selection of participants. The questionnaire had previously been developed, tested and used in Vietnam using the Knowledge Attitude Perceptions (KAP) tool format. The original study aimed to measure midwifery students' values and attitudes on adolescent sexuality and abortion. It was altered to suit the Indian setting and to measure medical students' attitudes to sexual and reproductive health with a special focus on contraception and abortion. Evaluation of practices were not included in the questionnaire as the students were not involved in any independent practice. Pre-testing or piloting of the adapted survey was not deemed possible since the workshop in CAC only took place once yearly.

The KAP survey format has been used in the field of family planning since the 1950s as data collection is anonymous and thus suitable for sensitive topics. Within the UN, KAP surveys are often used to reveal misconceptions and misunderstandings that may indicate potential barriers to implement behavior change. One reason KAP surveys are popular is the relatively simple design and analysis. It can be questioned whether KAP survey results are truly valid and generalizable. One limitation of KAP surveys is that respondents tend to give answers that they believe are correct, acceptable or appreciated (Launiala, 2009). This may have biased our results as students in India are unaccustomed to question seniors or teachers. To avoid such bias we used positively and negatively worded statements. A strength was that the questionnaires were answered anonymously and in writing without the use of an interpreter.

Using scales in surveys have limitations and our results may be affected by bias due to social desirability as well as cultural factors. Cultural differences in how responses are marked on a Likert scale has previously been shown to influence responses when comparing respondents



with different sociodemographic backgrounds (Lee et al., 2002). Also the use of a “neutral” statement may influence results negatively.

A clear sectioning of questions designed to measure attitudes, perceptions and knowledge was not made for the final version of the instrument, and specific statements designed to measure knowledge were only available for the topic contraception. on abortions were mainly designed to measure attitudes, defined as “ the way you feel or think about someone or something” (Marriam-Webster), whereas perceptions “the way you think about or understand someone or something” (Marriam-Webster).

Additional questions in the study instrument could have further clarified matters such as the importance of family values, the influence of relatives on women's and practitioners' decision making, and practitioners' perceptions of legislation regulating abortion.

*Selection bias* may have occurred as we included colleges where the local collaborating NGO was represented, and the questionnaire was distributed before a lecture covering the subject of reproductive health.

### **5.3.2 Study II**

The second study was initiated and planned after the first results from Study I became available. A topic guide was developed using an emergent design. All interviews were performed by myself, in English, which gives the study unique strength. The collaborating NGO facilitated contact with presumptive colleges and their administration. I also visited the NGO’s local office in Maharastra and acquired additional information regarding the CAC workshop and the participating colleges.

*Trustworthiness*, described as credibility, dependability and transferability, was sought throughout the research process (Lincoln et al., 1985). *Credibility* reflects the focus of the research. It can be strengthened by ensuring a selection of participants with different perspectives as well as through the use of an appropriate method for data collection and the accumulation of a correct amount of data. Credibility is also strengthened by the use of suitable meaning units and ensuring that categories and themes cover data. How similarities and differences within and between themes and categories are judged are other factors that affect credibility (Graneheim et al., 2004). A key-informant was used ensure that the sampled students represented as different socio-demographic, cultural and religious backgrounds as possible. Selection bias can have occurred due to the key informant, and at one college the dean told me I was lucky because I was to meet with their top student. Data collection continued until saturation, when occurs when no additional information is generated. This strategy ensures that the correct amount of data is gathered. Meaning units, categories and themes were discussed and agreed upon by all co-authors. The meaning of what was said was summarized and confirmed with the respondent, this approach was chosen since the students were in transition to other postings and would be unreachable for member check Quotes were used to illustrate the different themes.



*Confirmability*, the degree to which results can be confirmed by others, was sought by summarizing and re-confirming the meaning of what was said with the respondent at the time of the interview. *Dependability* describes how data changes over time and reflects changes in the researcher's decisions throughout the process of analysis. We used an emergent design and applied new insights from one interview in the next to deepen the knowledge. Changes in the topic guide was discussed and confirmed within the research team including aspects regarding how similarities and differences of content is consisting over time.

*Transferability* refers to whether findings can be transferred to other settings or groups. Considering the diversity of Indian states, it is impossible to draw conclusions about the transferability of results, even within the country. To facilitate and enlighten the process of transferability we included descriptions of the present culture and context, selection process and characteristics of participants, data collection and analysis. Although heterogeneous sampling was conducted the results of our study only reflect the present context.

*Construct and content validity* was assured through the main researchers pre-understanding of the context and use of field notes to add richness to data and constructs, as well as the emerging study design with constant revision of the study instrument.

*Reflexivity* reflects how the researcher's personal characteristics influences the results (Green 2009). Although I had spent several years in India at the time of the interviews and was familiar with language and culture, I was still a middle aged, blonde, Caucasian woman and as an Obstetrician-Gynecologist, in a superior position to the students, which probably, but not necessarily, affected the results. I perceived that it was intimidating to some interviewees at first to speak openly to me, especially as hierarchies are very important in Indian society. However, I believe I managed to have an honest and open dialogue with most respondents through an open and permitting conversation. Possibly bias was reduced because I did not come from the context, and one dean told me that the interviewed students were very happy after the interviews and had said that no-one had talked with them like this before, implying that they were invited to an open dialogue and listened to with respect.

### **5.3.3 Study III**

The purpose of health economic evaluation is a to provide information to help decision-makers in situations with limited resources. Over the years increasingly sophisticated methods have been developed, which in turn has made interpretation of findings more complicated. It has been shown that economic evaluations have limited influence on health care decisions, which is due to complexity (Eddama et al., 2008).

*Sampling:* The strength of the present study is the solid assessment of both the cost and the effectiveness component. The simplicity of calculations of costs and effectiveness adds to easy understanding of the evidence for decision-makers and other stakeholders.

One can argue that effectiveness, assessed in trials that are conducted in routine clinical practice on outcomes essential for clinical decisions and analyzed Per Protocol (PP), are a

better denominator than efficacy describing the effect of an intervention observed under ideal circumstances and analyzed according to Intention To Treat (ITT) (Gerald Gartlehner, 2006). The present study was based on an efficacy trial, that trial was conducted in a real clinical setting but analyzed for ITT. In this case, the distinction between efficacy and effectiveness was deemed to be subordinate and not considered for the outcome of the study.

*Method:* Cost effectiveness analysis (CEA) is an established method to compare costs and effects of interventions when there is a difference in effectiveness. It is recommended to report results as incremental cost-effectiveness ratios (ICER) National Institute of Health and Care Excellence guidelines (NICE). A criticism against the use of ICER's is that ratios does not inform on the number of treatments considered. In addition, the ICER for the case when both the cost and the efficacy of an intervention are increased (Quadrant II in the CE plane, figure 3.2.3) may have the same numeral value as in the opposite case, when the intervention is cheaper and less efficacious, which is represented in the diagonally opposite quadrant (quadrant III). These two scenarios have a different interpretation and implication (Drummond MF, 2005). It has been argued that in cases where the intervention dominates, ie where the intervention is more effective and less costly than the standard treatment, applying ICER produces no additional information (Stinnett et al., 1997). Other sources consider such results to be part of the findings and should be reported to illustrate the full picture (Sacristan et al., 1997).

Using cost-minimization (CMA) analysis could have been considered as the study was conducted alongside a randomized controlled equivalence study, but whenever there is difference in clinical effectiveness, it is deemed necessary to estimate incremental cost-effectiveness, one argument being that a substantial proportion of studies reporting 'negative' results really have insufficient power to detect differences in treatment effect (A. H. Briggs et al., 2001) (Dakin et al., 2013).

Should a cost-utility analysis have been conducted? A cost utility analysis considers the quality-adjusted life years (QUALY) added by an intervention. QUALYS are determined using a health-utility index developed from rating-scales, standard gamble or time trade-off (Santerre RE, 2007). Using such estimates add complexity and insecurity to the economic evaluation (Brousselle et al., 2011). Furthermore, when looking at treatment for abortion, there is no evidence that such treatment affects a woman's life negatively in the long run. On the contrary, longitudinal birth-cohort study found no association between abortion under the age of 18 and common psychiatric disorders or adverse health outcomes related to risk-taking behavior. Women who had undergone a first trimester abortion were not more likely to seek psychiatric care than women who had not undergone abortion (Munk-Olsen et al., 2011). Also, women who had undergone abortion were more well educated and less likely to be dependent on welfare than those who gave birth (Leppalahti et al., 2016). A longitudinal study covering 60 years and including North-American women concluded that unintended pregnancies were strongly associated with mental health disorders later in life (Herd et al., 2016).

The economic burden of abortion seeking women was not considered. The conduct such an evaluation would have required collection of socio-economic data as well as direct costs such as costs for transportation and childcare but also opportunity costs such as days of missed work or education. On the other hand, such costs would have been the same across groups.

The economic consequences of the finding that women randomized to doctors were significantly more likely to choose home administration of misoprostol was not evaluated, nor was the economic consequences related to that women in the nurse-midwife group had LARCs inserted significantly more often than women in the physician group.

Given the simplicity of the included parameters we could also have used a simplified method such as an estimate of cost, which is recommended by the NICE guidelines in cases where an intervention is associated with better health outcomes and fewer adverse effects (NICE).

*Sensitivity analysis* is generally recommended in health economic calculations. It is also argued that such analyses does not resolve methodological issues due to assumptions made in the model such as bias in scores used to calculate parameters such as (QUALYs), and rates for discounting of costs and effects (Brousselle et al., 2011). While confidence intervals for cost-effectiveness ratios are a valid approach to addressing uncertainty in CEA, presentation becomes difficult when the ICER is negative (Stinnett et al., 1997). To illustrate this the uncertainty can be presented on the cost-effectiveness plane (Altman et al., 1995; A. Briggs et al., 1998),

#### **5.3.4 Study IV**

The study was conducted in accordance with the WHO guideline development tool using the Cochrane handbook for systematic reviews (Higgins JPT) and the PRISMA guidelines.

The quality of evidence was assessed using the GRADE system for each outcome (Grades of Recommendation, Assessment, Development and Evaluation Working Group). This approach defines the quality of a body of evidence considering methodological quality, directness, heterogeneity, precision of the effect and risk of publication bias. Four levels of quality are specified. The highest rating “high”, can only be given to evidence from randomized controlled trials. The evidence can be downgraded for each of the factors defined by the GRADE criteria. The lowest level of quality “very low” is given to studies with critical problems and unsystematic clinical observations.

Bias implicates that a study contains a systematic error. Imprecision on the other hand means that random errors may have occurred. As a study might be unbiased despite a systematic error, it is common practice to assess risk of bias. *Selection bias* is systematic differences between study groups. Such differences can be avoided by sequence generation and blinding which was undertaken in all included RCTs, thus there was no risk of selection bias in included studies. No included studies were blinded by provider type, neither were outcome assessors, thus there is risk of *performance bias*, systematic differences in the care between

groups, and *detection bias*, differences in outcome assessment between groups. *Attrition bias*, incomplete outcome data, was adequately addressed in three RCTs (four reports).

*Selective reporting bias* occurs when dissemination of research findings is influenced by the nature and direction of results. It is equally important to report from studies with non-significant results are as important. Bias due to such incomplete reporting can be reduced by asking trial authors open-ended questions. In this study the WHO guideline development group had close collaborations with experts in the field from all regions which might have increased the possibility that all unpublished studies were accounted for. Not blinding the authors when assessing studies might also have influence on risk of bias.

## 6 CONCLUSION

Despite of decades of efforts to reduce maternal mortality it is estimated that almost 300 000 women die each year due to complications related to pregnancy and childbirth, around eight percent of those deaths are caused by unsafe abortion. This proportion of maternal deaths is easily preventable using contraception and comprehensive abortion care, but progress in reducing those deaths is slow.

The context is an important determiner of access to comprehensive abortion care. When communicating research findings, it is important to reflect on who the audience is. Developing increasingly complex explanation models is not necessarily a way to create understanding among stake holders such as politicians and health system executives and clinicians.

Our studies of medical student attitudes, although not necessarily generalizable to other settings, show that attitudes influence intentions to provide abortions and we conclude that it is necessary to educate and conduct values clarification in order to secure future abortion providers. Increasing knowledge and improving attitudes is a continuous process and continued education in peer networks is important also for established health care providers.

The systematic review of midlevel provision of medical abortion and medical treatment of incomplete abortion added the evidence that such treatment is as acceptable to women as provision by physicians. Women's acceptability of services is crucial when aiming to increase access to comprehensive abortion care and provides further support for implementation of midlevel provision of comprehensive abortion care.

In order to improve access to safe abortion care, it is necessary to increase knowledge among providers and women. Further expansion of the provider base for safe abortion is possible by including trained non-physicians or midlevel providers. This approach is cost-effective, effective and acceptable to women.

## 7 POPULÄRVETENSKAPLIG SAMMANFATTNING

Oplanerade graviditeter har förekommit sedan urminnes tider och kvinnor har använt sig av en rad olika metoder för att avbryta en oönskad graviditet. Trots att det idag finns mycket kunskap om både om abort och preventivmetoder dör uppskattningsvis 23000 kvinnor till följd av osäkra aborter årligen i världen, de flesta i världens fattigaste områden framförallt i Afrika söder om Sahara.

Abort är en direkt följd av oplanerade graviditeter som kan förebyggas om det finns tillgängliga preventivmedel. Medicinsk abort och medicinsk behandling för inkomplett abort med prostaglandinanalogen misoprostol är säkert, billigt och fungerar bra även där tillgången till sjukvård är begränsad. Misoprostol är tillgängligt i de flesta områden i världen för behandling av magsår, och så kallad ”off-label” användning för behandling av gynekologiska och obstetriska tillstånd är vanligt. Icke-läkare kan, efter träning, på säkert sätt tillhandahålla abort och behandling för inkomplett abort.

Tillgängligheten till säker sexuell och reproduktiv hälsa är avhängig av en mängd faktorer som berör både tillgång och efterfrågan på hälsovård, nedan presenteras några av dessa.

Indien har en stor andel av världens mödradödlighet trots att man länge arbetat för att förbättra förhållandena. För att säkra tillgången till familjeplanering, preventivmedel och abort är det fastställt att läkarutbildningen skall ha ett fokus på teoretisk och praktisk kunskap i familjeplanering och sexuell och reproduktiv hälsa. Trots det saknade läkarstudenter i Maharastra i västra Indien praktisk erfarenhet och kunskap. Det leder bland annat till missuppfattningar om regelverket för abort och okunskap om tillgängliga metoder. Många uppfattar att abort är moraliskt fel, framförallt för unga och ogifta kvinnor. När dessa brister i utbildningen vägs samman med traditionella värderingar och rädsla för att göra fel väljer studenterna att avstå att tillhandahålla abortvård.

Vi gjorde en kostnadseffektivitetsanalys som visade att abortvård i Sverige tillhandahållen av barnmorskor är billigare än när den tillhandahålls av läkare. En tidigare studie från samma sjukhus visade att vården som tillhandahålls av barnmorskor är lika säker och effektiv som när patienten träffar en läkare. Eftersom de flesta länders hälso- och sjukvårdssystem har begränsade budgetar är det viktigt att kunna påvisa billigare metoder med samma effektivitet.

En systematisk översikt visade att medicinsk abort och medicinsk behandling för inkomplett abort tillhandahållen av sjuksköterskor och barnmorskor är lika acceptabel för kvinnor som läkarvård. Att en medicinsk behandling är acceptabel för patienten är en viktig komponent i tillgängligheten, om kvinnor uppfattar behandlingen eller vårdgivaren som oacceptabel riskerar man att de söker vård hos utbildade eller traditionella vårdgivare vilket kan medföra allvarliga hälsokonsekvenser.

Ökad tillgänglighet till säker abortvård är ett sätt att snabbt minska den globala mödradödligheten. Att öka antalet vårdgivare är ett steg för att åstadkomma förbättring. Våra

studier pekar på hur viktigt det är med utbildning och kunskap för att säkra tillgängligheten till säker abortvård. Att kvinnor upplever vården som acceptabel är en förutsättning för att de skall söka vård på etablerade kliniker. Eftersom tränade sjuksköterskor och barnmorskor kan tillhandahålla abortvård som är lika effektiv och acceptabel för kvinnor som läkarvård mer kostnadseffektivt är det viktigt att utöka vårdgivarbasen och därmed tillgängligheten av säker abortvård i olika miljöer.

## 8 ACKNOWLEDGEMENTS

I want to express my sincere gratitude to everyone who has contributed to making this project possible, and to everybody who's made sure I have a life outside the research bubble:

My main supervisor Professor Kristina Gemzell Danielsson. You are the brightest shining star and role model. Always enthusiastic, kind, professional, full of new research ideas, and despite a huge workload always finding time to help out and look for solutions to even the smallest problems. So proud to be on your team. A special thanks for all your help finalizing this thesis.

My co-supervisor Professor Birgitta Essén, for your scientific perspective, generosity, giving me insights in anthropology and all the inspiring conversations over a glass of wine.

My co-supervisor Professor Marie Klingberg-Allvin for always being structured, pro-active and solution oriented. For friendship and all the inspiring dinner conversations.

Co-author and friend, always enthusiastic Helena Kopp Kallner.

Co-authors Emilia Simeonova for always answering and finding ways to move the project forward, and Andreas Madestam for good advice.

Co-author Bela Ganatra, Department of Reproductive Health and Research, WHO, Geneva for giving me the possibility to visit WHO in Geneva and participate in the guideline development for "Health Worker Roles in Providing Safe Abortion Care and Post-Abortion Contraception", and conducting the forth study. Co-author Monica Dragoman at the Department of Reproductive Health, WHO, for initiating me to the work at WHO, teaching me how to conduct a systematic review, and inviting me to share good times in Geneva. Co-author Marita Sporstøl Fønhus at the Norwegian Knowledge Center for the Health Services for your impeccable scientific approach and input.

Co-author Filip Sydén for the intial data collection for the first study.

Carl Gornitzki at the KI library for helping out with database searches and solving end-note problems.

All the participating medical students and college authorities in Maharastra, India, for making the studies possible.

Vinoj Manning, Avindra Mandval, Garima Mathias and Abhijit Pandurang Sonawane and all other colleagues at Ipas New Delhi for facilitating the studies in India.

Yasmin Zaveri Roy in her role as Senior National Advisor, Embassy of Sweden New Delhi, for all support and understanding and guiding through the administrative work at the Swedish Embassy, New Delhi.



Jestina, Vidhika, Ravi, and Vinod for support and help with practical arrangements conducting study I and II.

All my friends and colleagues at the WHO center Karolinska Institutet, especially Elin Larsson for your always structured and “let’s do this” approach, Karin Emtell-Ivarsson and Eva Broberg for all support and. Catharina Karlsson for solving every last minute practical problem. And of course Annette Aronsson and Lalit Kumar for reflections and support.

My past and present doctoral student colleagues Amanda Cleeve, Cecilia Berger, Karin Andersson di Claudio, Mandira Paul, Isabella Bizjak and Inga-Maj Anderson. Let’s keep the party going.

Lena Marions, my clinical mentor during residency, for being calm and wise and introducing me to research.

Birgitta Mörlin for the trust and for employing me at Karolinska after the shortest interview ever, way back when.

Sissel Saltvedt for inspiring me to become an Obstetrician-Gynecologist.

Former colleagues at the Division of Gynecology and Obstetrics at Karolinska University Hospital: Sofie Graner, Lotta Lindblad-Wollman, Kiki Papaikonomou, Emelie Wallin, Ingrid Sääv, Ingela Stackenäs. And my favourite “mellanjourer” during residency Ulrika Joneborg, Olof Stephansson, Yakoub Kanou and Marie Hofling. My x- roomies Katarina Remaeus and Malin Holzman. Residency would not have been the same without you all. And so many more of you: THANK YOU ALL!

Gunilla Herlitz for being such a wonderful employer, Mona-Lill the best clinical assistant a medical office can get, and all the midwives at Sundbybergs barnmorskor.

Colleagues and friends at Stockholm Urogyn: Caroline Elmer the best clinical role-model with immensely good judgement, and Daniel Altman for all the ideas and good times. Anna Kyndel, friend and sounding-board in the clinic and in research.

UMO Mörby Agneta and Ehva, it is so nice to work with you.

Ameli Norling, Anna Sandström, Marija Simic, Nathalie Roos, My VOV’s, the best and most fabulous support group anyone could ever wish for. Your inspiration and knowledge goes beyond all limits. Queens you are!

All my shining funny, intelligent, supportive and loving girls:

Matilda for knowing me since forever, for always being there, and always giving the best advice, for “eat the elephant in pieces”.

Sirpa, for always being so cool and calm and providing spot-on observations and advice throughout the years. For all the inspirational lunches and AW’s and dinners. For introducing me to gym-classes, running and hiking in Åre.

Marianne all the way from that first beer at Stamenco's through a lot of red wine and AW's to Champagne and Trangia at Hummelstugan on a cloudy day. What's next?

Monica W so full of cheer and always ready for good times

Kajsa for your immense wisdom, wit and kindness, and for triggering the best from my writing.

Katarina for sharing the agony of an overdue research project, keeping your feet on the ground with rock-solid fundament, generosity and fun times.

The Frankfurt girls: Ellen-Marie, Ewa, Malin, Monica for all the laughs and travels through thick and thin.

Pernilla my best training buddy, how many times would I miss class if you were not going?

Maria for always having the solutions in difficult times.

And all my girls' wonderful, funny and intelligent HABs' and families too!

And so many other friends like the Hedenskog family, the Håkansson-Rissler family, the Lundberg family

All my Dilli-wallas and their families including Rossana, Magali, Cecilia, Anne, Karin, Pernilla, Simone, Per and many more, for making the India years such great ones

The Bagge family, Anna and Peter, my second parents. Jonas and Elisabeth. For all the unconditional love and support throughout the years

My in-law family Margareta and Gösta, Peter, and Christina and their families for love and support, and Anna-Lena Rigneus-Näsström too.

My brother Micael and his family, for kindness and generosity.

My father Andrew for always believing in me, supporting me and for helping out with everything, always. I love you. And Ann Kristin thank you too for all kindness, help and support.

My wonderful, talented, beautiful and funny children, Oskar, Erik and Klara. You are my everything. I love you to the stars and back, and I hope you will let me be a part of your lives for as long as I live.

Jörgen. My love. Thank you for all the support and for encouraging me not to give up on this project, for taking me around the world and making this possible. To many more years!

Sigge who has faithfully slept by my feet during long nights of thesis-writing always providing unconditional love.

And everyone that I might have forgotten, it is completely unintentional. I love you too!

This project was funded by the Swedish Research Council, Stockholm City Council/ Karolinska Institutet (ALF), the Swedish Council for Working life and Social Research and the Swedish International Development Agency (SIDA).

## 9 REFERENCES

- Aday, L. A., & Andersen, R. (1974). A framework for the study of access to medical care. *Health Serv Res*, 9(3), 208-220.
- Aiken, A., Gomperts, R., & Trussell, J. (2016). Experiences and characteristics of women seeking and completing at-home medical termination of pregnancy through online telemedicine in Ireland and Northern Ireland: a population-based analysis. *Bjog*. doi:10.1111/1471-0528.14401
- Alkema, L., Chao, F., You, D., Pedersen, J., & Sawyer, C. C. (2014). National, regional, and global sex ratios of infant, child, and under-5 mortality and identification of countries with outlying ratios: a systematic assessment. *Lancet Glob Health*, 2(9), e521-530. doi:10.1016/s2214-109x(14)70280-3
- Alkema, L., Chou, D., Hogan, D., Zhang, S., Moller, A. B., Gemmill, A., . . . Say, L. (2016). Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *Lancet*, 387(10017), 462-474. doi:10.1016/s0140-6736(15)00838-7
- Altman, D. G., & Bland, J. M. (1995). Absence of evidence is not evidence of absence. *Bmj*, 311(7003), 485.
- Amy, J. J., & Thiery, M. (2015). The condom: A turbulent history. *Eur J Contracept Reprod Health Care*, 20(5), 387-402. doi:10.3109/13625187.2015.1050716
- Babitsch, B., Gohl, D., & von Lengerke, T. (2012). Re-revisiting Andersen's Behavioral Model of Health Services Use: a systematic review of studies from 1998-2011. *Psychosoc Med*, 9, Doc11. doi:10.3205/psm000089
- Bansal, R. K. (2004). Need for strengthening of internship (rotatory housemanship) training in India. *Educ Health (Abingdon)*, 17(3), 332-338. doi:10.1080/13576280400002528
- Barnard, S., Kim, C., Park, M. H., & Ngo, T. D. (2015). Doctors or mid-level providers for abortion. *Cochrane Database Syst Rev*, 7, Cd011242. doi:10.1002/14651858.CD011242.pub2
- Bettahar, K., Pinton, A., Boisrame, T., Cavillon, V., Wylomanski, S., Nisand, I., & Hassoun, D. (2016). [Medical induced abortion]. *J Gynecol Obstet Biol Reprod (Paris)*. doi:10.1016/j.jgyn.2016.09.033
- Bhushan, H., & Bhardwaj, A. (2015). Task shifting: A key strategy in the multipronged approach to reduce maternal mortality in India. *Int J Gynaecol Obstet*, 131 Suppl 1, S67-70. doi:10.1016/j.ijgo.2015.03.016
- Bizjak, I., Fiala F., H., K.-K., I., S., & K., G.-D. *Efficacy of very early medical abortion*. Paper presented at the FIAPAC, Lisbon.
- Black, W. C. (1990). The CE plane: a graphic representation of cost-effectiveness. *Med Decis Making*, 10(3), 212-214.
- Boyle, E. H., Kim, M., & Longhofer, W. (2015). Abortion Liberalization in World Society, 1960-2009. *Ajs*, 121(3), 882-913.

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. doi:10.1191/1478088706qp063oa
- Briggs, A., & Fenn, P. (1998). Confidence intervals or surfaces? Uncertainty on the cost-effectiveness plane. *Health Econ*, 7(8), 723-740.
- Briggs, A. H., & O'Brien, B. J. (2001). The death of cost-minimization analysis? *Health Econ*, 10(2), 179-184. doi:10.1002/hec.584
- Brousselle, A., & Lessard, C. (2011). Economic evaluation to inform health care decision-making: promise, pitfalls and a proposal for an alternative path. *Soc Sci Med*, 72(6), 832-839. doi:10.1016/j.socscimed.2011.01.008
- Bygdeman, M., & Swahn, M. L. (1985). Progesterone receptor blockage. Effect on uterine contractility and early pregnancy. *Contraception*, 32(1), 45-51.
- Catholics for Choice (Producer). (2014). The Secret History of Sex, Choice and Catholics. Retrieved from <http://www.catholicsforchoice.org/the-secret-history-of-sex-choice-and-catholics-3/>
- Chaturvedi, S., & Aggarwal, O. P. (2001). Training interns in population-based research: learners' feedback from 13 consecutive batches from a medical school in India. *Med Educ*, 35(6), 585-589.
- Chavkin, W., Leitman, L., & Polin, K. (2013). Conscientious objection and refusal to provide reproductive healthcare: a White Paper examining prevalence, health consequences, and policy responses. *Int J Gynaecol Obstet*, 123 Suppl 3, S41-56. doi:10.1016/s0020-7292(13)60002-8
- Christopher, E., & (2006). Religious aspects of contraception. *Reviews in Gynaecological and Perinatal Practice*, 6, 192-198.
- Cleeve, A., Byamugisha, J., Gemzell-Danielsson, K., Mbona Tumwesigye, N., Atuhairwe, S., Faxelid, E., & Klingberg-Allvin, M. (2016). Women's Acceptability of Misoprostol Treatment for Incomplete Abortion by Midwives and Physicians - Secondary Outcome Analysis from a Randomized Controlled Equivalence Trial at District Level in Uganda. *PLoS One*, 11(2), e0149172. doi:10.1371/journal.pone.0149172
- Coast, E., & Murray, S. F. (2016). "These things are dangerous": Understanding induced abortion trajectories in urban Zambia. *Soc Sci Med*, 153, 201-209. doi:10.1016/j.socscimed.2016.02.025
- Collaboration Cochrane. (2014). Review Manager (RevMan) 5.3. Copenhagen: The Nordic Cochrane Centre.
- Connell, E. B. (1999). Contraception in the prepill era. *Contraception*, 59(1 Suppl), 7s-10s.
- Culwell, K. R., & Hurwitz, M. (2013). Addressing barriers to safe abortion. *Int J Gynaecol Obstet*, 121 Suppl 1, S16-19. doi:10.1016/j.ijgo.2013.02.003
- Dakin, H., & Wordsworth, S. (2013). Cost-minimisation analysis versus cost-effectiveness analysis, revisited. *Health Econ*, 22(1), 22-34. doi:10.1002/hec.1812
- Desai, M. K., Panchal, J. R., Shah, S., & Iyer, G. (2016). Evaluation of impact of teaching clinical pharmacology and rational therapeutics to medical undergraduates and interns. *Int J Appl Basic Med Res*, 6(3), 205-210. doi:10.4103/2229-516x.186967
- Dillip, A., Alba, S., Mshana, C., Hetzel, M. W., Lengeler, C., Mayumana, I., . . . Obrist, B. (2012). Acceptability--a neglected dimension of access to health care: findings from a

- study on childhood convulsions in rural Tanzania. *BMC Health Serv Res*, 12, 113. doi:10.1186/1472-6963-12-113
- Doran, F., & Nancarrow, S. (2015). Barriers and facilitators of access to first-trimester abortion services for women in the developed world: a systematic review. *J Fam Plann Reprod Health Care*, 41(3), 170-180. doi:10.1136/jfprhc-2013-100862
- Drife, J. O. (2010). Historical perspective on induced abortion through the ages and its links with maternal mortality. *Best Pract Res Clin Obstet Gynaecol*, 24(4), 431-441. doi:10.1016/j.bpobgyn.2010.02.012
- Drummond MF, S. M., Torrance GW, O'Brien BJ. (2005). *Methods for the economic evaluation of health care programmes* (third ed.). New York, US: Oxford University Press.
- Dzuba, I. G., Winikoff, B., & Pena, M. (2013). Medical abortion: a path to safe, high-quality abortion care in Latin America and the Caribbean. *Eur J Contracept Reprod Health Care*, 18(6), 441-450. doi:10.3109/13625187.2013.824564
- Eddama, O., & Coast, J. (2008). A systematic review of the use of economic evaluation in local decision-making. *Health Policy*, 86(2-3), 129-141. doi:10.1016/j.healthpol.2007.11.010
- Eisenberg, D. L., & Leslie, V. C. (2016). Threats to reproductive health care: time for obstetrician-gynecologists to get involved. *Am J Obstet Gynecol*. doi:10.1016/j.ajog.2016.10.037
- Fiala, C., Gemzell Danielsson, K., Heikinheimo, O., Guethmundsson, J. A., & Arthur, J. (2016). Yes we can! Successful examples of disallowing 'conscientious objection' in reproductive health care. *Eur J Contracept Reprod Health Care*, 21(3), 201-206. doi:10.3109/13625187.2016.1138458
- Finer, L. B., & Zolna, M. R. (2016). Declines in Unintended Pregnancy in the United States, 2008-2011. *N Engl J Med*, 374(9), 843-852. doi:10.1056/NEJMsa1506575
- Ganatra, B. (2008). Maintaining Access to Safe Abortion and Reducing Sex Ratio Imbalances in Asia. *Reprod Health Matters*, 16(31), 90-98. doi:10.1016/s0968-8080(08)31394-9
- Gerald Gartlehner, R. A. H., Daniel Nissman, Kathleen N Lohr, Timothy S Carey. (2006). *Criteria for Distinguishing Effectiveness From Efficacy Trials in Systematic Reviews* (06-0046). Retrieved from Rockville MD:
- Gerds, C., Tuncalp, O., Johnston, H., & Ganatra, B. (2015). Measuring abortion-related mortality: challenges and opportunities. *Reprod Health*, 12, 87. doi:10.1186/s12978-015-0064-1
- Gilson, L. (2007). Acceptability trust and equity. In D. McIntyre, and Mooney, Gavin, eds. (Ed.), *The Economics of Health Equity*. Cambridge, GB:: Cambridge University Press,. Retrieved from
- Gissler, M., Fronteira, I., Jahn, A., Karro, H., Moreau, C., Oliveira da Silva, M., . . . Hemminki, E. (2012). Terminations of pregnancy in the European Union. *Bjog*, 119(3), 324-332. doi:10.1111/j.1471-0528.2011.03189.x
- Global Burden of Disease Group. (2016). Global, regional, and national levels of maternal mortality, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*, 388(10053), 1775-1812. doi:10.1016/s0140-6736(16)31470-2



- Global Burden of Disease Study Group. (2016). Global, regional, and national levels of maternal mortality, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*, 388(10053), 1775-1812. doi:10.1016/s0140-6736(16)31470-2
- Gomperts, R., Kleiverda, G., Gemzell, K., Davies, S., & Jelinska, K. (2008). Re: Using telemedicine for termination of pregnancy with mifepristone and misoprostol in settings where there is no access to safe services. *Bjog*, 115(12), 1578-1579. doi:10.1111/j.1471-0528.2008.01923.x
- The Medical Termination of Pregnancy Act (1971).
- GRADEpro. (2015). GRADEpro Guideline Development Tool: McMaster University (developed by Evidence Prime, Inc.). Retrieved from <http://www.gradepr.org/>,
- Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today*, 24(2), 105-112. doi:10.1016/j.nedt.2003.10.001
- Green, J. T., N. (2009). *Qualitative Methods in Health Research* (2 ed.). Great Britain: Sage Publications Ltd.
- Green, M. (1993). The evolution of US international population policy, 1965-92: a chronological account. Retrieved from <http://www.poline.org/node/328139>
- Gulliford, M., Figueroa-Munoz, J., Morgan, M., Hughes, D., Gibson, B., Beech, R., & Hudson, M. (2002). What does 'access to health care' mean? *J Health Serv Res Policy*, 7(3), 186-188.
- Hanschmidt, F., Linde, K., Hilbert, A., Riedel-Heller, S. G., & Kersting, A. (2016). Abortion Stigma: A Systematic Review. *Perspect Sex Reprod Health*. doi:10.1363/48e8516
- Harper, C. C., Blanchard, K., Grossman, D., Henderson, J. T., & Darney, P. D. (2007). Reducing maternal mortality due to elective abortion: Potential impact of misoprostol in low-resource settings. *Int J Gynaecol Obstet*, 98(1), 66-69. doi:10.1016/j.ijgo.2007.03.009
- Harries, J., Stinson, K., & Orner, P. (2009). Health care providers' attitudes towards termination of pregnancy: a qualitative study in South Africa. *BMC Public Health*, 9, 296. doi:10.1186/1471-2458-9-296
- Heller, R., Purcell, C., Mackay, L., Caird, L., & Cameron, S. T. (2016). Barriers to accessing termination of pregnancy in a remote and rural setting: a qualitative study. *Bjog*, 123(10), 1684-1691. doi:10.1111/1471-0528.14117
- Herd, P., Higgins, J., Sicinski, K., & Merkurieva, I. (2016). The Implications of Unintended Pregnancies for Mental Health in Later Life. *Am J Public Health*, 106(3), 421-429. doi:10.2105/ajph.2015.302973
- Higgins JPT, A. D., Sterne JAC (editors). . (2011). Assessing risk of bias in included studies. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 (updated March 2011)*. The Cochrane Collaboration, 2011. .
- Hirve, S. S. (2004). Abortion Law, Policy and Services in India: A Critical Review. *Reprod Health Matters*, 12(24), 114-121. doi:10.1016/s0968-8080(04)24017-4
- Hogmark, S., Klingberg-Allvin, M., Gemzell-Danielsson, K., Ohlsson, H., & Essen, B. (2013). Medical students' knowledge, attitudes and perceptions towards contraceptive

- use and counselling: a cross-sectional survey in Maharashtra, India. *BMJ Open*, 3(12), e003739. doi:10.1136/bmjopen-2013-003739
- Hognert, H., Kopp Kallner, H., Cameron, S., Nyrelli, C., Jawad, I., Heller, R., . . . Gemzell-Danielsson, K. (2016). Immediate versus delayed insertion of an etonogestrel releasing implant at medical abortion-a randomized controlled equivalence trial. *Hum Reprod*, 31(11), 2484-2490. doi:10.1093/humrep/dew238
- Huber, D., Curtis, C., Irani, L., Pappa, S., & Arrington, L. (2016). Postabortion Care: 20 Years of Strong Evidence on Emergency Treatment, Family Planning, and Other Programming Components. *Glob Health Sci Pract*, 4(3), 481-494. doi:10.9745/ghsp-d-16-00052
- India, M. C. o. M.B.B.S. Search Colleges and Courses. Retrieved from <http://www.mciindia.org/InformationDesk/CollegesCoursesSearch.aspx>
- Ipas, G. o. I. *Comprehensive abortion care reference handbook*.
- Iyengar, K., Klingberg-Allvin, M., Iyengar, S. D., Paul, M., Essen, B., & Gemzell-Danielsson, K. (2016). Home use of misoprostol for early medical abortion in a low resource setting: secondary analysis of a randomized controlled trial. *Acta Obstet Gynecol Scand*, 95(2), 173-181. doi:10.1111/aogs.12815
- Jejeebhoy, S. J., Kalyanwala, S., Mundle, S., Tank, J., Zavier, A. J., Kumar, R., . . . Jha, N. (2012). Feasibility of expanding the medication abortion provider base in India to include ayurvedic physicians and nurses. *Int Perspect Sex Reprod Health*, 38(3), 133-142. doi:10.1363/3813312
- Joe W, S. S., Sharma J, Shanta YM, Ramanathan M, Mishra US, Sri BS. (2015). *Maternal Mortality in India: A Review of Trends and Patterns*. New Delhi.
- Joffe, C. (1999). Abortion in Historical Perspective. In M. L. Paul, ES. ; Borgatta, L.; Grimes, DA.; Stubblefield Phillip G. (Ed.), *A clinician's guide to medical and surgical abortion*. Philadelphia: Churchill Livingstone.
- Kassebaum, N. J., Bertozzi-Villa, A., Coggeshall, M. S., Shackelford, K. A., Steiner, C., Heuton, K. R., . . . Lozano, R. (2014). Global, regional, and national levels and causes of maternal mortality during 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*, 384(9947), 980-1004. doi:10.1016/s0140-6736(14)60696-6
- Kilander, H., Alehagen, S., Svedlund, L., Westlund, K., Thor, J., & Brynhildsen, J. (2016). Likelihood of repeat abortion in a Swedish cohort according to the choice of post-abortion contraception: a longitudinal study. *Acta Obstet Gynecol Scand*, 95(5), 565-571. doi:10.1111/aogs.12874
- Klingberg-Allvin, M., Cleeve, A., Atuhairwe, S., Tumwesigye, N. M., Faxelid, E., Byamugisha, J., & Gemzell-Danielsson, K. (2015). Comparison of treatment of incomplete abortion with misoprostol by physicians and midwives at district level in Uganda: a randomised controlled equivalence trial. *Lancet*, 385(9985), 2392-2398. doi:10.1016/s0140-6736(14)61935-8
- Klingberg-Allvin, M., Van Tam, V., Nga, N. T., Ransjo-Arvidson, A. B., & Johansson, A. (2007). Ethics of justice and ethics of care. Values and attitudes among midwifery students on adolescent sexuality and abortion in Vietnam and their implications for midwifery education: a survey by questionnaire and interview. *Int J Nurs Stud*, 44(1), 37-46. doi:10.1016/j.ijnurstu.2005.11.018

- Kopp Kallner, H., Fiala, C., & Gemzell-Danielsson, K. (2012). Assessment of significant factors affecting acceptability of home administration of misoprostol for medical abortion. *Contraception*, 85(4), 394-397. doi:10.1016/j.contraception.2011.08.009
- Kopp Kallner, H., Gomperts, R., Salomonsson, E., Johansson, M., Marions, L., & Gemzell-Danielsson, K. (2014). The efficacy, safety and acceptability of medical termination of pregnancy provided by standard care by doctors or by nurse-midwives: a randomised controlled equivalence trial. *BJOG*. doi:10.1111/1471-0528.12982
- Kumar, A., Hessini, L., & Mitchell, E. M. (2009). Conceptualising abortion stigma. *Cult Health Sex*, 11(6), 625-639. doi:10.1080/13691050902842741
- Kvale, S., & Brinkmann, S. (2009). *InterViews: learning the craft of qualitative research* (2 ed.): SAGE Publications Inc.
- Launiala, A. (2009). How much can a KAP survey tell us about people's knowledge, attitudes and practices? Some observations from medical anthropology research on malaria in pregnancy in Malawi. *Anthropology Matters*, 11(1).
- Lee, J. W., Jones, P. S., Mineyama, Y., & Zhang, X. E. (2002). Cultural differences in responses to a Likert scale. *Res Nurs Health*, 25(4), 295-306. doi:10.1002/nur.10041
- Leone, T., Coast, E., Parmar, D., & Vwalika, B. (2016). The individual level cost of pregnancy termination in Zambia: a comparison of safe and unsafe abortion. *Health Policy Plan*, 31(7), 825-833. doi:10.1093/heapol/czv138
- Leppalahti, S., Heikinheimo, O., Kalliala, I., Santalahti, P., & Gissler, M. (2016). Is underage abortion associated with adverse outcomes in early adulthood? A longitudinal birth cohort study up to 25 years of age. *Hum Reprod*, 31(9), 2142-2149. doi:10.1093/humrep/dew178
- Levesque, J. F., Harris, M. F., & Russell, G. (2013). Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *Int J Equity Health*, 12, 18. doi:10.1186/1475-9276-12-18
- Lince-Deroche, N., Constant, D., Harries, J., Blanchard, K., Sinanovic, E., & Grossman, D. (2015). The costs of accessing abortion in South Africa: women's costs associated with second-trimester abortion services in Western Cape Province. *Contraception*, 92(4), 339-344. doi:10.1016/j.contraception.2015.06.029
- Lincoln, Y., & Guba, E. (1985). *Naturalistic observation*. Thousand Oaks, CA: Sage.
- Lund, C. J. (1953). Uterine curettage, its development and use. *South Med J*, 46(1), 39-42.
- Margo, J., McCloskey, L., Gupte, G., Zurek, M., Bhakta, S., & Feinberg, E. (2016). Women's Pathways to Abortion Care in South Carolina: A Qualitative Study of Obstacles and Supports. *Perspect Sex Reprod Health*. doi:10.1363/psrh.12006
- Marlow, H. M., Shellenberg, K., & Yegon, E. (2014). Abortion services for sex workers in Uganda: successful strategies in an urban clinic. *Cult Health Sex*, 16(8), 931-943. doi:10.1080/13691058.2014.922218
- Marriam-Webster. Marriam-Webster. Retrieved from <http://www.merriam-webster.com/dictionary/attitude>
- Maxwell, L. (2013). *Qualitative Research Design: An Interactive Approach* (3 ed.): Sage.



- McIntyre, D., Thiede, M., & Birch, S. (2009). Access as a policy-relevant concept in low- and middle-income countries. *Health Econ Policy Law*, 4(Pt 2), 179-193. doi:10.1017/s1744133109004836
- Regulations on Graduate Medical Education, (1997).
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Bmj*, 339, b2535. doi:10.1136/bmj.b2535
- Draft Medical Termination of Pregnancy (Amendment) Bill 2014, (2014).
- Momberg, M., Harries, J., & Constant, D. (2016). Self-assessment of eligibility for early medical abortion using m-Health to calculate gestational age in Cape Town, South Africa: a feasibility pilot study. *Reprod Health*, 13, 40. doi:10.1186/s12978-016-0160-x
- Munk-Olsen, T., Laursen, T. M., Pedersen, C. B., Lidegaard, O., & Mortensen, P. B. (2011). Induced first-trimester abortion and risk of mental disorder. *N Engl J Med*, 364(4), 332-339. doi:10.1056/NEJMoa0905882
- Ngo, T. D., Park, M. H., & Free, C. (2013). Safety and effectiveness of termination services performed by doctors versus midlevel providers: a systematic review and analysis. *Int J Womens Health*, 5, 9-17. doi:10.2147/ijwh.s39627
- NICE, N. I. o. H. a. C. E. Assessing cost effectiveness. Retrieved from <https://www.nice.org.uk/process/pmg6/chapter/assessing-cost-effectiveness>
- Nikolajsen, T., Nielsen, F., Rasch, V., Sorensen, P. H., Ismail, F., Kristiansen, U., & Jager, A. K. (2011). Uterine contraction induced by Tanzanian plants used to induce abortion. *J Ethnopharmacol*, 137(1), 921-925. doi:10.1016/j.jep.2011.05.026
- Norris, A., Bessett, D., Steinberg, J. R., Kavanaugh, M. L., De Zordo, S., & Becker, D. (2011). Abortion stigma: a reconceptualization of constituents, causes, and consequences. *Womens Health Issues*, 21(3 Suppl), S49-54. doi:10.1016/j.whi.2011.02.010
- Olavarrieta, C. D., Ganatra, B., Sorhaindo, A., Karver, T. S., Seuc, A., Villalobos, A., . . . Sanhueza, P. (2015). Nurse versus physician-provision of early medical abortion in Mexico: a randomized controlled non-inferiority trial. *Bull World Health Organ*, 93(4), 249-258. doi:10.2471/blt.14.143990
- Oppegaard, K. S., Qvigstad, E., Fiala, C., Heikinheimo, O., Benson, L., & Gemzell-Danielsson, K. (2015). Clinical follow-up compared with self-assessment of outcome after medical abortion: a multicentre, non-inferiority, randomised, controlled trial. *Lancet*, 385(9969), 698-704. doi:10.1016/s0140-6736(14)61054-0
- Penchansky, R., & Thomas, J. W. (1981). The concept of access: definition and relationship to consumer satisfaction. *Med Care*, 19(2), 127-140.
- Pinter, B., Hakim, M., Seidman, D. S., Kubba, A., Kishen, M., & Di Carlo, C. (2016). Religion and family planning. *The European Journal of Contraception & Reproductive Health Care*, 21(6), 486-495. doi:10.1080/13625187.2016.1237631
- Potts, M. (1979). Changing attitudes toward abortion. *West J Med*, 131(5), 455-459.
- Public Health Currents. (1971). Abortion. *J Natl Med Assoc*, 63(6), 481-485.

- Rasch, V. (2011). Unsafe abortion and postabortion care - an overview. *Acta Obstet Gynecol Scand*, 90(7), 692-700. doi:10.1111/j.1600-0412.2011.01165.x
- Registrar General and Census Commissioner India. (2015). Annual report on vital statistics of India based on CRS 2013. Retrieved from [http://crsorgi.gov.in/web/uploads/download/CRS\\_Report2013.pdf](http://crsorgi.gov.in/web/uploads/download/CRS_Report2013.pdf)
- Rehnstrom Loi, U., Gemzell-Danielsson, K., Faxelid, E., & Klingberg-Allvin, M. (2015). Health care providers' perceptions of and attitudes towards induced abortions in sub-Saharan Africa and Southeast Asia: a systematic literature review of qualitative and quantitative data. *BMC Public Health*, 15, 139. doi:10.1186/s12889-015-1502-2
- Renner, R. M., Brahmi, D., & Kapp, N. (2013). Who can provide effective and safe termination of pregnancy care? A systematic review\*. *Bjog*, 120(1), 23-31. doi:10.1111/j.1471-0528.2012.03464.x
- RGI Registrar General India. (2006). *Maternal mortality in India: 1997-2003 trends, causes and risk factors*. New Delhi.
- Roth-Brandel, U., Bygdeman, M., Wiquist, N., & Bergstrom, S. (1970). Prostaglandins for induction of therapeutic abortion. *Lancet*, 1(7639), 190-191.
- Saav, I., Stephansson, O., & Gemzell-Danielsson, K. (2012). Early versus delayed insertion of intrauterine contraception after medical abortion - a randomized controlled trial. *PLoS One*, 7(11), e48948. doi:10.1371/journal.pone.0048948
- Sacristan, J. A., & Obenchain, R. L. (1997). Reporting cost-effectiveness analyses with confidence. *Jama*, 277(5), 375.
- Santerre RE, N. S. (2007). *Health Economics: Theories, Insights and Industry Studies*: Thomson South-Western.
- Schenker, J. G., & Rabenou, V. (1993). Family planning: cultural and religious perspectives. *Hum Reprod*, 8(6), 969-976.
- Sedgh, G., Bearak, J., Singh, S., Bankole, A., Popinchalk, A., Ganatra, B., . . . Alkema, L. (2016). Abortion incidence between 1990 and 2014: global, regional, and subregional levels and trends. *Lancet*. doi:10.1016/s0140-6736(16)30380-4
- Sedgh, G., & Hussain, R. (2014). Reasons for contraceptive nonuse among women having unmet need for contraception in developing countries. *Stud Fam Plann*, 45(2), 151-169. doi:10.1111/j.1728-4465.2014.00382.x
- Shapiro, G. K. (2014). Abortion law in Muslim-majority countries: an overview of the Islamic discourse with policy implications. *Health Policy Plan*, 29(4), 483-494. doi:10.1093/heapol/czt040
- Shearer, J. C., Walker, D. G., & Vlassoff, M. (2010). Costs of post-abortion care in low- and middle-income countries. *Int J Gynaecol Obstet*, 108(2), 165-169. doi:10.1016/j.ijgo.2009.08.037
- Sjostrom, S., Essen, B., Gemzell-Danielsson, K., & Klingberg-Allvin, M. (2016). Medical students are afraid to include abortion in their future practices: in-depth interviews in Maharashtra, India. *BMC Med Educ*, 16(1), 8. doi:10.1186/s12909-016-0532-5
- Sjostrom, S., Essen, B., Syden, F., Gemzell-Danielsson, K., & Klingberg-Allvin, M. (2014). Medical students' attitudes and perceptions on abortion: a cross-sectional survey among medical interns in Maharashtra, India. *Contraception*, 90(1), 42-46. doi:10.1016/j.contraception.2014.02.005

- Sjostrom, S., Kopp Kallner, H., Simeonova, E., Madestam, A., & Gemzell-Danielsson, K. (2016). Medical Abortion Provided by Nurse-Midwives or Physicians in a High Resource Setting: A Cost-Effectiveness Analysis. *PLoS One*, 11(6), e0158645. doi:10.1371/journal.pone.0158645
- Spector, P. (2004). Likert Scale *The SAGE Encyclopedia of Social Science Research Methods*. Thousand Oaks.
- Stinnett, A. A., & Mullahy, J. (1997). The negative side of cost-effectiveness analysis. *Jama*, 277(24), 1931-1932; author reply 1932-1933.
- Subha Sri B, K. R. (2014). *Dead women talking: a civil society report on maternal deaths in India*. Retrieved from
- Supe, A., & Burdick, W. P. (2006). Challenges and Issues in Medical Education in India. *Acad Med*, 81(12), 1076-1080. doi:10.1097/01.ACM.0000246699.94234.ab
- Thiery, M. (1997). Pioneers of the intrauterine device. *Eur J Contracept Reprod Health Care*, 2(1), 15-23.
- Trussell, J., Hassan, F., Lowin, J., Law, A., & Filonenko, A. (2015). Achieving cost-neutrality with long-acting reversible contraceptive methods. *Contraception*, 91(1), 49-56. doi:10.1016/j.contraception.2014.08.011
- UNFPA. (2014). International Conference on Population and Development Programme of action. Retrieved from <http://www.unfpa.org/publications/international-conference-population-and-development-programme-action>
- Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nurs Health Sci*, 15(3), 398-405. doi:10.1111/nhs.12048
- Warriner, I. K., Wang, D., Huong, N. T., Thapa, K., Tamang, A., Shah, I., . . . Meirik, O. (2011). Can midlevel providers administer early medical abortion as safely and effectively as doctors? A randomized controlled equivalence study in Nepal. *Lancet*, 377(9772), 1155-1161. doi:10.1016/S0140-6736(10)62229-5
- Wheeler, S. B., Zullig, L. L., Reeve, B. B., Buga, G. A., & Morroni, C. (2012). Attitudes and Intentions Regarding Abortion Provision Among Medical School Students in South Africa. *International Perspectives on Sexual and Reproductive Health*, 38(3), 154-163. doi:10.1363/3815412
- White, K., deMartelly, V., Grossman, D., & Turan, J. M. (2016). Experiences Accessing Abortion Care in Alabama among Women Traveling for Services. *Womens Health Issues*, 26(3), 298-304. doi:10.1016/j.whi.2016.01.003
- WHO. Health and Human Rights. Retrieved from <http://www.who.int/mediacentre/factsheets/fs323/en/>
- WHO. (2012a). Safe Abortion: Technical and Policy Guidance for Health Systems *Safe Abortion: Technical and Policy Guidance for Health Systems* (2nd ed.). Geneva: World Health Organization.
- WHO. (2012b). *WHO Handbook for guideline development*.
- WHO. (2015a). *Health Worker Roles in Providing Safe Abortion Care and Post-Abortion Contraception Executive summary*. Geneva: World Health Organization
- Copyright (c) World Health Organization 2015.

- WHO. (2015b). Model List of Essential Medicines.
- WHO. (2016, Nov 2016). WHO Maternal mortality Fact sheet Retrieved from <http://www.who.int/mediacentre/factsheets/fs348/en>
- Wiqvist, N., & Bygdeman, M. (1970). Induction of therapeutic abortion with intravenous prostaglandin F. *Lancet*, 1(7652), 889.
- World Medical, A. (2013). World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *Jama*, 310(20), 2191-2194. doi:10.1001/jama.2013.281053
- Wulifan, J. K., Brenner, S., Jahn, A., & De Allegri, M. (2016). A scoping review on determinants of unmet need for family planning among women of reproductive age in low and middle income countries. *BMC Womens Health*, 16, 2. doi:10.1186/s12905-015-0281-3

