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The impact of induced abortion on women's physical, mental and psychosocial health

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BOSTON UNIVERSITY
SCHOOL OF MEDICINE

Thesis

**THE IMPACT OF INDUCED ABORTION ON WOMEN'S PHYSICAL, MENTAL
AND PSYCHOSOCIAL HEALTH**

by

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requirements for the degree of
Master of Science

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DEDICATION

This thesis is dedicated to Joshua M. Scaralia, whose genuine care for others and admirable pursuit of knowledge serves as a continual inspiration in my life.

ACKNOWLEDGMENTS

I would like to acknowledge my readers, Dr. Karen Symes and Dr. Gwynneth Offner, who were instrumental in the success of this project. This thesis would not have been possible without their continual guidance, encouragement and thoughtful advice.

THE IMPACT OF INDUCED ABORTION ON WOMEN'S PHYSICAL, MENTAL AND PSYCHOSOCIAL HEALTH

SOPHIA GAUTHIER

ABSTRACT

Background: Millions of women in the United States seek out an abortion each year and about one in three women will have obtained an abortion within her reproductive lifetime. Abortion affects millions of women and although it is a highly controversial subject, there is a universal concern for women's health. Currently, mandatory data reporting services do not exist in the United States, making it difficult for researchers to comprehensively study the impact of abortion on women's health.

Methods: A review of the relevant legal and medical literature was completed in an attempt to present the physical, mental and psychosocial health effects of induced abortion on women.

Results: Early pregnancy termination is safe for women relative to other common medical procedures, but is a risk factor for future pregnancy complications such as pre-term birth, placenta previa and low birth weight. Correlative studies have found increasing evidence that pregnancy termination is associated with psychological distress and may be related to increased substance abuse and other harmful behaviors. Legislature and social stigma surrounding abortion and non-marital pregnancy has noticeable effects on women's mental health, sexual behavior, contraceptive use and relationships.

Conclusion: Public discourse on abortion generally centers on a women's right to choose versus a fetal right to life, however the aspect of women's health should also be considered in the discussion. Future abortion legislation must be informed by the medical literature. Currently, there is no rigorous method of data collection for abortion statistics, which can make it difficult to study its effect. Policies vary so widely across the country, that it can be burdensome for women experiencing crisis pregnancies to make informed decisions for their health. There is evidence to suggest that there are negative long-term physical effects of previously induced abortions on subsequent pregnancies. Abortion can also have negative psychological impacts on women, which can be compounded by inadequate pre-abortion counseling. While some studies show no difference between long-term stress levels of women who chose abortion compared to women who carried unintended pregnancy to term, more research comparing the two outcomes could shed light on the issue. Abortion legality and practice may also have negative psychosocial effects on relationships, sexual behavior and perpetuate or be affected by stigmas. This project encourages the continuation of academic inquiry into all aspects of the effects of abortion on women's health, particularly in the realms of mental and psychosocial impact where it is more difficult to establish a causative relationship between variables.

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LIST OF ABBREVIATIONS

BU.....	Boston University
CDC.....	Centers for Disease Control and Prevention
CPC.....	Crisis Pregnancy Center
IPV.....	Intimate Partner Violence
IUD.....	Intrauterine Device
PTSD.....	Post Traumatic Stress Disorder
RPC.....	Retained Products of Conception
WIC.....	Women, Infant and Child (federal support program)

INTRODUCTION

The modern controversy surrounding induced abortion in the United States spans multiple decades and disciplines. Scholars in ethics, medicine, public health, and law have contributed a wealth of ideology and research to the ongoing debate. Among these diverse opinions, there has been one point of unanimity: concern for the health of the mother. In the United States, it is estimated that around half of all pregnancies are unintended and that one in three women will undergo an abortion during her reproductive years (Steinauer, Jody, Jackson, Andrea, & Grossman, Daniel, 2013). In other words, abortion affects the lives of millions of women, yet there are few studies that have investigated its impact on women's health. This paper aims to present the current literature on the health effects of induced abortion on women. From here on out, the term "abortion" will be used to reference intentional medically or surgically induced abortions as opposed to spontaneous abortions that occur in 10 – 15% of known pregnancies (Likis, Sathe, Carnahan, & McPheeters, 2013). It is estimated that over half of pregnancies spontaneously abort before clinical detection (Likis et al., 2013).

It is critical to first outline the legal status of abortion in the United States. While it is commonplace to cite the 1973 ruling, *Roe vs. Wade* during an abortion-centered discussion, the public seems generally less aware of the companion case, *Doe vs. Bolton*. These two cases will be reviewed in the following section.

Roe vs. Wade:

Roe vs. Wade, the Supreme Court decision passed in 1973, was initially brought to Texas federal court in 1970 by a pregnant and single woman named Norma L.

McCorvey (pseudonym “Jane Roe”) and her lawyers, Linda Coffee and Sarah Weddington against Henry Wade, the Dallas County District Attorney (Blackmun, 1973a). The plaintiffs argued that the current ban on abortions in Texas, with the exception of those necessary to save the life of the mother, was unconstitutional. After two years in the High Court, the Justices ruled in favor of the plaintiffs.

The final ruling in *Roe vs. Wade* quashed the abortion law status quo in all fifty states. In the earlier part of the twentieth century, abortion was a state issue, largely prohibited with varied exceptions including those for therapeutic abortions (for pregnancies that endangered the life of the mother) (Library of Congress, Congressional Research Service, 2009). *Roe vs. Wade* ruled that criminal abortion laws were unconstitutional and legalized abortions during all three trimesters (Blackmun, 1973a). However, *Roe* gave states the authority to restrict abortion after fetal viability (Library of Congress, Congressional Research Service, 2009). At the time of the ruling, the medical community believed that viability occurred at twenty-eight weeks gestation, although the timing and definition of “fetal viability” are still being debated (Patrick W. Gill, 1984).

Doe vs. Bolton:

Doe vs. Bolton was a similar case brought to the Georgia federal court by a pregnant mother of three, named Sandra Cano (pseudonym “Mary Doe”), and her lawyer Margie Pitts Hames, against Arthur K. Bolton, Georgia’s attorney general (Blackmun, 1973b). Georgian abortion laws of the time prohibited abortion except in cases of danger to the mother’s life, severe fetal deformity, and rape (Library of Congress, Congressional Research Service, 2009). Although exceptions in Georgia were broader than those in

Texas, Georgian law also required that abortions be performed in licensed hospitals after approval by a hospital committee and two consenting physicians (Library of Congress. Congressional Research Service, 2009).

The ruling in *Doe* expanded the right to abortion established in *Roe* beyond state regulation. Although *Roe* allowed for the state prohibition of abortion after fetal viability, *Doe* created a “health exception” for abortions performed post-viability (Library of Congress. Congressional Research Service, 2009). “Health” was defined in this context to include “all factors – physical, emotional, psychological, familial, and the woman’s age – relevant to the well-being of the patient” (Blackmun, 1973b), which included any emotional reservation a woman had regarding her unborn child. In conjunction, the *Roe vs. Wade* and *Doe vs. Bolton* sister case rulings were major legislative overhauls. The Supreme Court Justices of the 1970s explicitly intended that the rulings in *Roe* and *Doe* be interpreted simultaneously and interdependently (Blackmun, 1973a). By increasing access to abortion, the Justices believed that they would be protecting women from undue psychological, physical and mental health effects (Blackmun, 1973a). Here medical data will be examined to determine the impact of induced abortion on women’s physical, mental and psychosocial health.

Abortion Law and Health Implications

Since *Roe* and *Doe*, many states have passed various abortion regulations and restrictions that often have effects on women’s health. A 2013 study surveyed healthcare providers in order to understand how well they understood their state’s abortion laws (Dodge, Haider, & Hacker, 2013). It was discovered that while physicians tended to be

better informed when sent reminders regarding the current legislature, less than half of the survey participants reported ever receiving reminders (Dodge et al., 2013). Most of the study participants were either obstetricians and gynecologists or were currently offering abortion services and knew the law fairly well, however abortion providers were significantly more informed on the law than non-providers (Dodge et al., 2013). Although most physicians were reasonably well-informed on the law, only 58.7% of participants were knowledgeable of state laws regarding mandated pre-abortion counseling (Dodge et al., 2013). Since perceived inadequate pre-abortion counseling is a risk factor for post-abortion psychological problems (Coyle, Coleman, & Rue, 2010), it is critical that physicians who care for women of reproductive age be fully informed about the law in order to provide the highest quality of care. Counseling laws will be further discussed in a later section.

Abortion law varies across the states, some of which can be compared in Table 1.

Table 1: State abortion restrictions. In states where physicians are not required, abortions can be performed by physician assistants, nurse-practitioners or nurse-midwives. Exceptions for prohibitions vary among states and can also include exceptions in cases of rape or incest. The term “enjoined” means that a law is prohibited from being in effect because the state court has deemed that the restrictions are in violation of their state constitution. Public funding for states vary with regards to types of abortions covered (ie. all, only therapeutic, etc.). In twenty states, there is mandated counseling on fetal pain. In some states, parental involvement can be waived. Adapted from the Alan Guttmacher Institute, State Policies in Brief, 2015.

	Must be performed by licensed physician	Prohibited except in cases of health endangerment if at:	Pubic funding exists	Individual Providers may refuse to participate	Mandated Counseling on fetal pain	Mandated counseling on negative psychological effects	Waiting Period after Counseling (Hours)	Parental Involvement required if minor	
Alabama	Yes	20 weeks	Yes				48	Consent	
Alaska	Yes		Yes	Yes	Yes			Notice	
Arizona	Yes	Viability	Yes	Yes				24 Consent	
Arkansas	Yes	20 weeks	Yes	Yes	Yes		Day Before	Consent	
California		Viability	Yes	Yes				Enjoined	
Colorado			Yes					Notice	
Connecticut		Viability	Yes	Yes					
Delaware	Yes	Viability	Yes	Yes			Enjoined	Notice	
District of Columbia			Yes						
Florida	Yes	24 weeks	Yes	Yes				24 Notice	
Georgia	Yes	Viability	Yes	Yes	Yes			24 Notice	
Hawaii	Yes	Viability	Yes	Yes					
Idaho	Yes	Viability	Yes	Yes				24 Consent	
Illinois		Viability	Yes	Yes				Notice	
Indiana	Yes		Yes	Yes	Yes			18 Consent	
Iowa	Yes	20 weeks	Yes	Yes				Notice	
Kansas	Yes	3rd trimester	Yes	Yes	Yes	Yes		24 Consent	
Kentucky	Yes	20 weeks	Yes	Yes				24 Consent	
Louisiana	Yes	Viability	Yes	Yes	Yes	Yes		24 Consent	
Maine	Yes	Viability	Yes	Yes					
Maryland	Yes	Viability	Yes	Yes				Notice	
Massachusetts	Yes	24 weeks	Yes	Yes			Enjoined	Consent	
Michigan	Yes	Viability	Yes	Yes		Yes		24 Enjoined	
Minnesota	Yes	24 weeks	Yes	Yes	Yes			24 Notice	
Mississippi	Yes	20 weeks	Yes	Yes				24 Consent	
Missouri	Yes	Viability	Yes	Yes	Yes			72 Consent	
Montana		Viability	Yes	Yes			Enjoined	Notice	
Nebraska	Yes	20 weeks	Yes	Yes		Yes		24 Consent	
Nevada	Yes	24 weeks	Yes	Yes				Enjoined	
New Hampshire			Yes					Notice	
New Jersey	Yes		Yes	Yes				Enjoined	
New Mexico	Yes		Yes	Yes				Enjoined	
New York		24 weeks	Yes	Yes					
North Carolina	Yes	20 weeks	Yes	Yes		Yes		24 Consent	
North Dakota	Yes	20 weeks	Yes	Yes				24 Consent	
Ohio	Yes	Viability	Yes	Yes				24 Consent	
Oklahoma	Yes	20 weeks	Yes	Yes	Yes			24 Consent and Notice	
Oregon			Yes	Yes					
Pennsylvania	Yes	24 weeks	Yes	Yes				24 Consent	
Rhode Island		24 weeks	Yes	Yes				Consent	
South Carolina	Yes	3rd trimester	Yes	Yes				24 Consent	
South Dakota	Yes	24 weeks	Yes	Yes	Yes			72 Notice	
Tennessee	Yes	Viability	Yes	Yes				48 Consent	
Texas	Yes	20 weeks	Yes	Yes	Yes	Yes		24 Consent and Notice	
Utah	Yes	Viability	Yes	Yes	Yes	Yes		72 Consent and Notice	
Vermont			Yes						
Virginia	Yes	3rd trimester	Yes	Yes				24 Consent and Notice	
Washington		Viability	Yes	Yes					
West Virginia		20 weeks	Yes					24 Notice	
Wisconsin	Yes	Viability	Yes	Yes				24 Consent	
Wyoming	Yes	Viability	Yes	Yes				Consent and Notice	
SUM		38	43	50	45	12	7	28	38

Since the 1970s, many states have passed different laws that restrict or regulate abortion practices in various ways (Medoff, 2010). These laws generally fall under one of four categories: Medicaid, parental involvement, waiting periods, and patient counseling (Medoff, 2010). It is currently federally acceptable for states to decide whether or not to

provide Medicaid funding for abortions (Medoff, 2010). Since Medicaid serves to provide healthcare for the poor, many often criticize such laws for restricting abortion access to women of low socioeconomic status. In 1996, researchers examined Medicaid abortion restrictions, abortion and birth rates over a ten year period in fifty states (Levine, Trainor, & Zimmerman, 1996). Birth rates and abortion rates per state were summed to calculate an average pregnancy rate (Levine et al., 1996). Researchers discovered decreases in abortion rate and unaffected or decreasing birth rates in women under the poverty line in areas where Medicaid abortion funding was restricted (Levine et al., 1996). Both of these trends examined together demonstrate a decrease in pregnancies, which supports researcher's hypothesis that limited access to abortion may encourage women to take measures to prevent unintended pregnancy (Levine et al., 1996). This conclusion was also supported by data from the National Longitudinal Survey of Youth (Levine et al., 1996). Another study in 2003 examined the claim that Medicaid funding restrictions increased pregnancy avoidance behaviors in women (Sen, 2003). This paper found no significant relationship between Medicaid funding restrictions and state gonorrhea rates among women over a twenty-year period, contesting the idea that abortion restrictions affect sexual behavior (Sen, 2003).

In a more recent 2012 study, consistent records of gonorrhea incidence over a twenty-year period in forty-one countries were evaluated as a measure of risky sexual behavior (Klick, Neelsen, & Stratmann, 2012). Abortion laws by country were grouped into three categories: restrictive legislation that allows abortion only when a women's life or physical health is at risk, laws that permit abortions for mental health reasons or

financial reasons, and laws that allow abortion on demand (Klick et al., 2012).

Interestingly, major abortion law reform and liberalization in nine countries was highly correlated with increasing rates of gonorrhea prevalence, indicating an increase in the rate of sexual risks undertaken by individuals of a large population (Klick et al., 2012). The other thirty-two countries where abortion law did not change were used as a control population (Klick et al., 2012).

Many states have also implemented parental involvement laws that require either parental notification or consent for minors seeking abortions (Medoff, 2010). Another study from 2008 found a similar association between abortion law and risky sexual behavior (Klick & Stratmann, 2008). This time, researchers theorized that parental involvement laws would encourage adolescents to reduce risky sexual behavior by either abstaining from sex or using contraceptives more judiciously (Klick & Stratmann, 2008). Gonorrhea rates among adolescent females as compared to rates in older women were examined across states with varying differences in parental involvement laws (Klick & Stratmann, 2008). A significant reduction in gonorrhea rate was observed among adolescent women in states that enacted more stringent parental involvement laws, especially for females of Hispanic or Caucasian ethnicity (Klick & Stratmann, 2008). A similar study the same year found that increases in the financial cost of an abortion and parental involvement laws were associated with decreases in the rate of pregnancy of all women of reproductive age, indicating that sexual behavior can be influenced by the costs of abortion (Medoff, 2008).

States also may enact waiting periods (generally twenty-four hours) between the time a woman initially enters a clinic seeking an abortion and receives mandatory counseling and when she can legally obtain said abortion (Medoff, 2010). Opponents often contend that such laws add to the indirect costs of abortion such as transportation costs and time, thus limiting abortion access to impoverished women (Medoff, 2010).

All states have instated mandatory counseling laws that require abortion providers to confer specific information to women seeking an abortion (Medoff, 2010). The type of counseling varies across states but may include information regarding fetal development, alternative options for unplanned pregnancies and physical and psychological health risks of abortion (Medoff, 2010). This paper will examine such potential health risks in the hopes of raising awareness regarding the relative safety of abortion.

Because abortion restrictions vary among the states, studies have been conducted that compare the degree of abortion law restrictions and the number of non-marital pregnancies (Rolnick & Vorhies, 2012). The conventional syllogism suggests that restrictive abortion laws increase the indirect costs of abortion, thus dissuading women from seeking abortion and therefore increasing the number of continued non-marital pregnancies (Medoff, 2010). Public health initiatives have strived to reduce the number of non-marital pregnancies since such pregnancies are associated with a higher degree of poverty and other disadvantageous circumstances (Medoff, 2010). However, evidence from multiple studies indicate that more restrictive abortion laws are associated with lower non-marital pregnancy rates, evidence that restrictive abortion laws may decrease risky, non-marital sexual behavior (Medoff, 2010).

According to the Alan Guttmacher Institute, the now autonomous research division that was once a part of Planned Parenthood, almost half of all states require provisions to be made for a pre-abortion ultrasound, although only three of those states (Louisiana, Texas, and Wisconsin) require the physician to show and describe the ultrasound to the woman. One study examining the effects that pre-procedure ultrasound viewings had on the decision to move forward with an abortion showed that while 98.4% of women who chose to view their ultrasound terminated their pregnancy, 1.60% chose to continue their pregnancy (Gatter, Kimport, Foster, Weitz, & Upadhyay, 2014). Of the women who decided against abortion, 100.0% of them had revealed feelings of uncertainty before the ultrasound (Gatter et al., 2014). Only 42.5% of the women in the study opted to see their ultrasounds (Gatter et al., 2014). Ultrasound viewings may offer some women pause while deciding whether or not to abort although it seems that women are more largely influenced by other factors such as financial reasons, timing, and partner-related reasons (Biggs, Gould, & Foster, 2013), as will be discussed in a later section.

Health Impacts of Contraception Use on Women

Alternatives to induced pregnancy termination include keeping the child or adoption. Unintended pregnancy counseling from healthcare providers can help women in crisis pregnancies navigate an otherwise overwhelming sea of decisions.

The risk of unintended pregnancies can be prevented or lowered via sexual abstinence and proper usage of contraceptives. A 2010 paper examined the obstacles against the consistent use of contraceptives and found that they fell into several major

categories: monetary costs, a desire to keep sexual activity from parents, the role of alcohol in sexual situations, forgetfulness and a lack of planning (Campo, Shelly, Askelson, Spies, & Losch, 2010). Although many public health initiatives have worked to increase young adult access to contraception, inconsistent use in young adults still largely stems from a lack of education or responsibility and/or an underestimation of risk (Campo, Shelly et al., 2010).

Another study interviewed thirty heterosexual couples to discuss their attitudes regarding contraception (Wright, Fawson, Frost, & Turok, 2015). Interestingly, survey participants felt that men should be responsible for male contraceptive use such as condoms while women should be responsible for female methods such as hormonal birth control (Wright et al., 2015). Men were also less informed about hormonal birth control methods, evidence that the division in contraceptive responsibility could lend itself to a lack of necessary conversation regarding birth control within couples (Wright et al., 2015).

Even if a couple discusses and uses contraception, the efficacy of assorted methods varies depending on a variety of factors. Forty-seven percent of unplanned pregnancies occur when the women is using contraceptives (Potter, 1996). The risk of pregnancy is around 1% for women using long term methods such as intrauterine devices, Depo-Provera (birth control shot), Norplant (contraceptive implant), and sterilization (Potter, 1996). This risk increases to about 3% for oral contraceptives, which are used by three-quarters of women on birth control (Potter, 1996). Unfortunately, not many studies have been completed evaluating a women's "contraceptive compliance" (whether or not

she is a continuous and correct user of contraception), so it is difficult to pinpoint exactly how contraceptive failures occur and why rates are so high (Potter, 1996).

Contraceptive methods are not 100% effective and information on their efficacy is often presented per one time use. However, the likelihood of a consequence from risky behavior compounds over time, increasing its likelihood. *The New York Times* published an article in 2014, with a graphical representation of contraceptive efficacy calculated over a ten-year period (Figure 1). Data was sourced from the Office of Population Research at Princeton University (Aisch & Marsh, 2014).

Mathematically calculated risk of unwanted pregnancies per 100 women over 10 years by contraceptive method

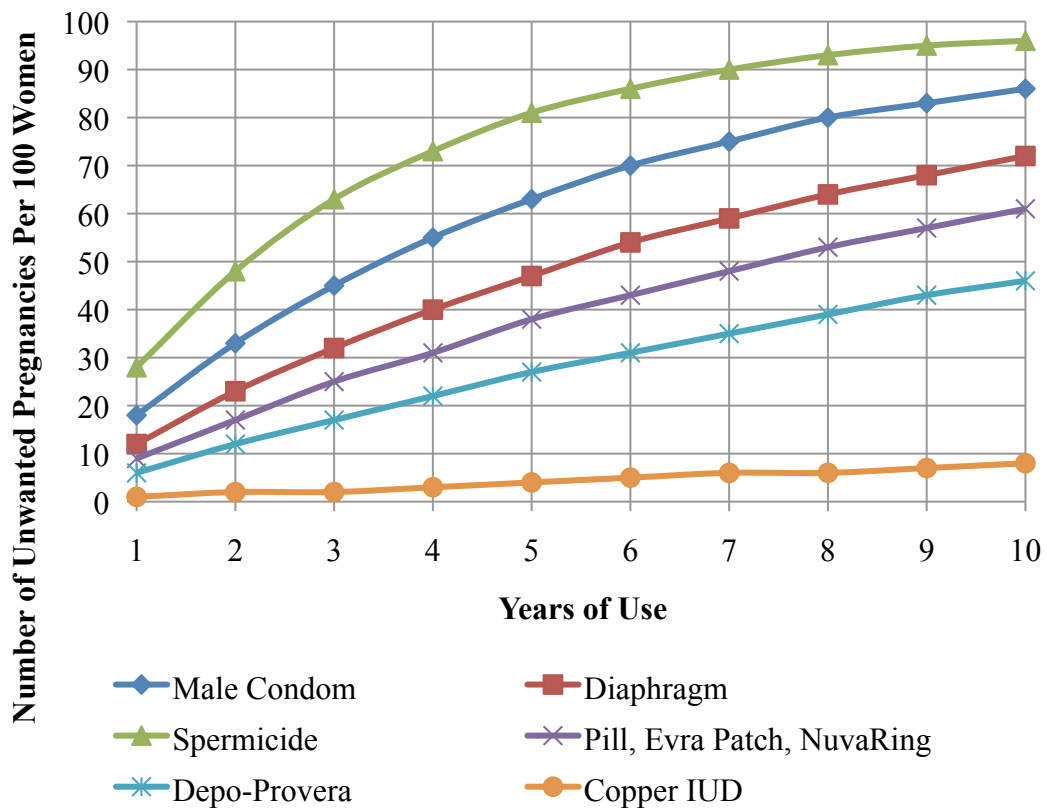


Figure 1: Mathematical projection of the number of women per 100 who will experience an unplanned pregnancy after using a specific contraceptive method for a given number of years. Data based on unplanned pregnancy risk after one year of contraceptive use extrapolated for one decade. Adapted from Aisch & Marsh, 2014.

It is important to note that many people use multiple methods of birth control in conjunction and likely switch between methods over time, especially if one method fails or a sexual partner ceases being as such. This graphic is simply a mathematical projection of data from one year of use (Aisch & Marsh, 2014).

While many public health efforts have aimed at increasing young adult access to contraception, some research shows that such initiatives may only decrease unintended pregnancy rates in the short term, while increasing them in the long run (Arcidiacono, Khwaja, & Ouyang, 2012). It is often reasoned that increased access to contraception encourages people to switch from unprotected sex to protected sex (Arcidiacono et al., 2012). However, increased contraceptive access may also inadvertently encourage those originally abstaining from sex to begin engaging in protected sex, thus increasing the risk of unintended pregnancy via contraceptive failure (Arcidiacono et al., 2012).

Health Impact of Unintended Pregnancy on Women

Since contraceptive measures are not 100% failsafe, unintended pregnancies still do occur. Unintended pregnancies are correlated with a significantly greater risk for low birth weight than planned pregnancies (Flores et al., 2010). Research comparing the health of women experiencing unintended pregnancies as compared to those experiencing planned pregnancies, however, is rare (Khajehpour, Simbar, Jannesari, Ramezani-Tehrani, & Majd, 2013). One study interviewed 200 women and found that those with unplanned pregnancies reported lower levels of personal physical and mental health and

lower levels of prenatal care (Khajehpour et al., 2013). Regardless of whether sub-optimal health is a risk factor for unplanned pregnancy or the other way around, such preliminary research indicates that women experiencing unplanned pregnancies are a group in need of specially attentive medical care (Khajehpour et al., 2013).

Women experiencing crisis pregnancies have several options. The process of adoption has improved dramatically over the last several decades (O'Reilly, 2009). Adoptions are legally mediated and can be confidential, semiopen or open (O'Reilly, 2009). Birth mothers are monetarily reimbursed for the costs of childbearing and are generally given a several day period post-birth before they are required to sign legally-binding adoption papers (O'Reilly, 2009).

Some women ultimately decide to parent their child, and there are many federal programs such as Women, Infant and Child (WIC) that are designed to support low-income women who are pregnant (O'Reilly, 2009).

Specific Aims

Throughout the past four decades, the topic of abortion arguably remains one of the most controversial subjects in the United States political sphere. It is therefore critical to examine the current medical literature in the hopes of creating a bipartisan consensus on the topic of abortion, by using scientific data that ultimately serving the best health interests of our society.

This study aims to evaluate:

- 1) Current abortion statistics in the United States.
- 2) The most common reasons women seek out abortions.

- 3) The physical, psychosocial, and mental health consequences of induced abortions.
- 4) How women's health can be improved in the realm of the reproductive rights debate.

I am hopeful that conducting this research will shed light on the complex impact that abortion has had on women's health in the United States.

PUBLISHED STUDIES

Since the Supreme Court decriminalized abortion in the early 1970s, there have been over forty years of research examining the health effects of the procedure on women. Although abortion is often regarded and described as a “safe” medical procedure, it is important to recognize that with any medical or surgical intervention, there are still risks. Because abortions are uniquely treated as a constitutional right and are only voluntarily reported by the institutions that perform them, it is difficult to enforce safety regulations or even properly study the individual and societal impacts of abortion. In the following section, the current literature regarding abortion statistics and the physical, mental and psychosocial health effects of abortion will be evaluated and discussed.

Abortion Statistics

After *Roe* and *Doe*, the number of legal abortions steadily increased to a record high of 1.61 million abortions in 1990, a number which has since declined (Jones & Kooistra, 2011).

Abortions are only voluntarily reported in the United States (Pazol et al., 2014). In 2008, there were 1,793 abortion facilities in the country (Jones & Kooistra, 2011). Forty-six of the fifty-two reporting areas in the United States consistently reported abortion data to the CDC between 2002 and 2011 (Pazol et al., 2014). In 2011, forty-nine areas reported abortion data to the CDC (excluding Maryland, California and New Hampshire) (Pazol et al., 2014). In 2011, the CDC reported a total of 730,322 abortions in the United States (Pazol et al., 2014). This has decreased from around reported 820,000 abortions reportedly performed in 2008 (Pazol et al., 2014). However, other sources report an

estimated 1.21 million abortions were performed in 2008 (Jones & Kooistra, 2011). Abortion data are underreported, however since the heavily cited 2011 statistic from Jones & Kooistra is described as an “estimate” and the CDC contains the most centralized amalgamation of abortion data, numbers from the CDC will be used in the following section.

Only ten abortion related mortalities were recorded in 2010, although the number has been variable throughout the last several years (Pazol et al., 2014). As seen in Figure 2, the incidence of abortion in the United States has been decreasing over the past several years. Between 2002 and 2011, the total number of abortions decreased by 13% (Pazol et al., 2014). It is generally thought that the decreasing demand for abortion is due to the increasing use of effective contraceptives such as the copper IUD, therefore supporting the rationale behind public health initiatives aimed at increasing education and access to such methods for sexually active women (Pazol et al., 2014).

Annual number and ratio of abortions performed in the United States as consistently reported by clinics, 2002 - 2011

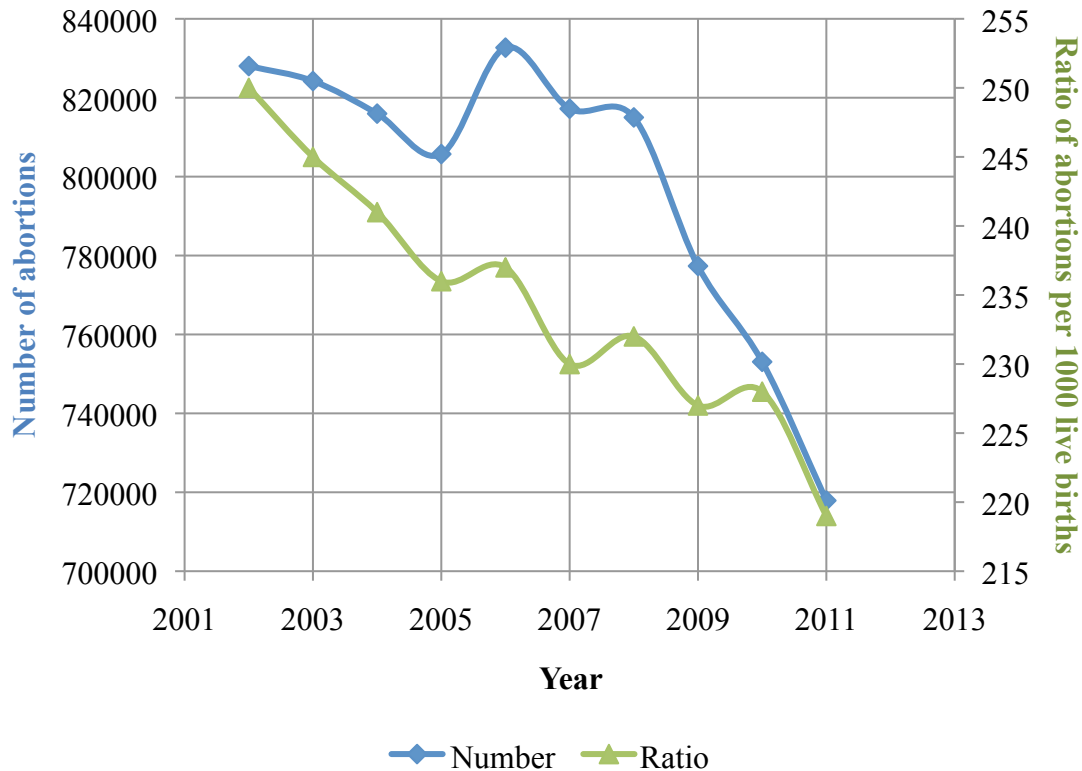


Figure 2: Annual abortion surveillance data describing the number and ratio of abortions in the United States, as voluntarily reported to the Centers for Disease Control (CDC), 2002 - 2011. Data from the CDC demonstrate that both the number of abortions and ratio of abortions per 1000 live births have been decreasing over the past decade. Adapted from Pazol et al., 2014.

Of abortions performed in the United States, the highest percentage is performed on women between the ages of 20 and 29 (Pazol et al., 2014). This trend has been consistent throughout the most recent data collection period (2002 – 2011) (Pazol et al., 2014). The distribution of abortions by age can be seen in Figure 3. It is worthy to note that while the number of abortions performed on adolescents has been decreasing, the number of abortions performed on older women has increased (Pazol et al., 2014). This

may be due to an increase in genetic screening and public awareness of the risks associated with pregnancy at older ages. The rate of abortions (number of abortions per 1000 women ages 15 – 44) has also been decreasing between the years of 2002 and 2011 (Pazol et al., 2014).

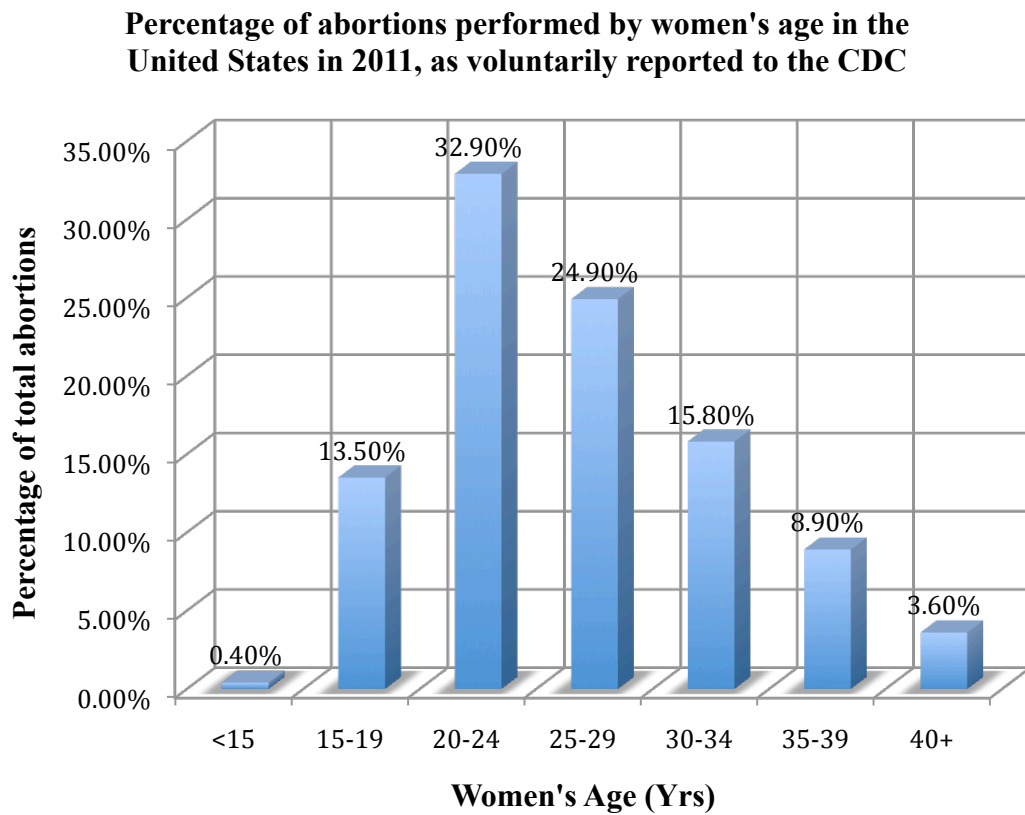


Figure 3: Annual abortion surveillance data relating women’s age and abortion from the Centers for Disease Control (CDC), 2011. Data from the CDC demonstrate that the highest incidence of abortion occurs in women aged 20 – 24. Adapted from Pazol et al., 2014.

As seen in Figure 4, the majority of abortions are performed within the first eight weeks of pregnancy. In 2011, the 91.40% of abortions across the United States were performed within the first trimester (Figure 4). As seen in Figure 4, as gestational age increases, the number of abortions decrease, probably owing to a multitude of factors

including the availability of home pregnancy tests and increasing state restrictions on abortion as gestational age increases.

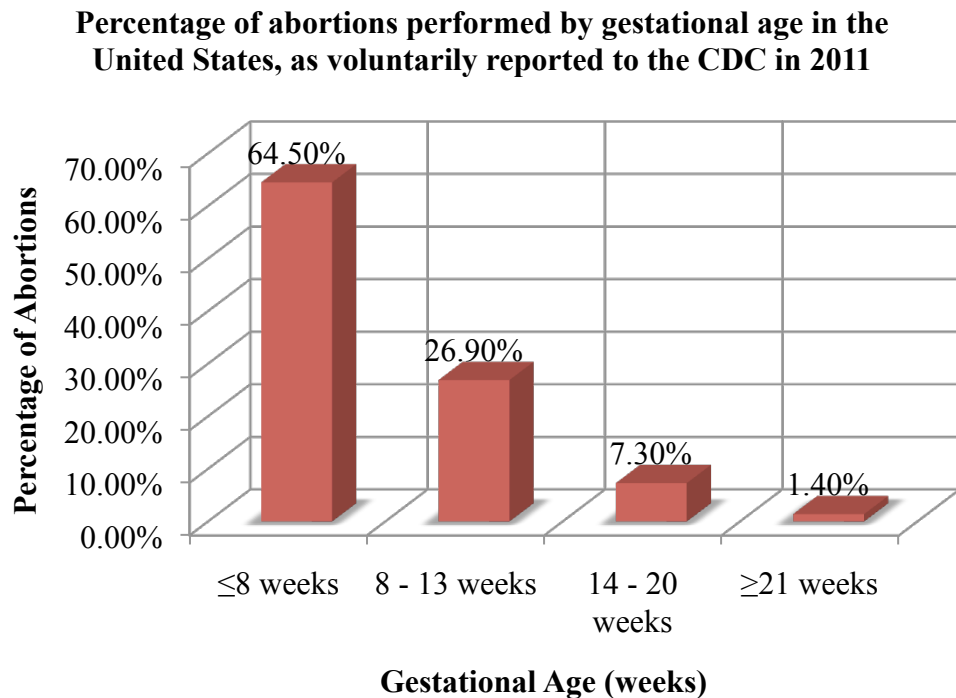


Figure 4: Annual abortion surveillance data relating gestational age and abortion from the Centers for Disease Control (CDC), 2011. CDC data show that the majority of abortions take place within the first trimester. Adapted from Pazol et al., 2014.

Abortions are incredibly common medical interventions, so common that about one in three women will have had an abortion by the time she reaches menopause (Templeton & Grimes, 2011). As seen in Table 2, almost half of all women seeking an abortion will have already had at least one previous abortion. Efforts have been made to provide women obtaining an abortion with long-term contraceptives such as intrauterine devices (IUD) (Templeton & Grimes, 2011). Studies have shown that early insertion of intrauterine contraception after abortion is well tolerated and may have effects in reducing the risk of subsequent unplanned pregnancies (Sääv, Stephansson, & Gemzell-

Danielsson, 2012). Education is also critical in helping both men and women become reproductively responsible.

Table 2: Annual abortion surveillance data on the percentage of women obtaining an abortion who have undergone previous procedures, from the CDC, 2011. CDC data show that while the majority of women seeking abortions have never had one before, a sizable portion of women (46.4%) will undergo multiple abortions in their lifetimes. Adapted from Pazol et al., 2014.

Number of previous abortions	Percentage of women
Zero	53.7%
One or Two	37.1%
Three or more	9.3%

Non-Hispanic white and black women accounted for the highest percentages of abortions in 2011 (Pazol et al., 2014). This may be related to religious values, socioeconomic factors and access to education. The data also show that in 2011, 85.50% of women obtaining abortions were non-married (Pazol et al., 2014).

Reasons Women Seek Abortions

Studies have investigated the reasons for which women seek abortions. One study interviewed over 900 women from 30 different abortion clinics across the nation about their rationale (Biggs et al., 2013). Using responses from open-ended questions, researchers were able to categorize the major reasons for abortion into four broad groupings: financial reasons, poor timing, partner-related reasons, and the need to focus on other previously had children (Biggs et al., 2013). Of the respondents, 40% cited financial reasons, 36% cited poor timing, 31% cited partner-related reasons, and 29% cited the need to focus on other children (Biggs et al., 2013). The study found that a

majority of women allude to multiple reasons for seeking an abortion, enforcing data from previous studies and demonstrating the complex interaction of factors that influence such decisions (Finer, Frohworth, Dauphinee, Singh, & Moore, 2005).

Financial motivators were the most commonly cited reasons for women who elected to undergo an abortion (Biggs et al., 2013). In previous studies, financial reasons influenced almost three quarters of women interviewed (Finer et al., 2005). Monetarily influenced reasons oftentimes came from women of lower socioeconomic status who struggle to support themselves or preexisting dependents and felt that they were being responsible by choosing to abort (Biggs et al., 2013). Although there has been a national decrease in the number of annual abortions, the rate of decline in abortion rate for woman of poor socioeconomic status has been slower than the general trend, further supporting the idea that women's financial situations are a major motivating factor in the decision to abort (Biggs et al., 2013).

Poor timing was cited by about one third of women interviewed (Biggs et al., 2013). Many younger women were concerned about how a newborn child would affect schooling or career development, or felt that they were emotionally or mentally unprepared to have a child (Biggs et al., 2013).

Partner-related reasons for electing to have an abortion included unstable relationships, unsupportive partners, or abusive relationships among other more specific reasons (Biggs et al., 2013). In another study, about an equal number of women polled (one third of respondents) cited partner-related reasons for abortion (Chibber, Biggs, Roberts, & Foster, 2014). In a smaller but critical portion of women interviewed, women

aborted their unborn child in order to protect them from an abusive partner or in order to leave an abusive partner, while one woman was actually forced into obtaining an abortion by her partner (Biggs et al., 2013).

Another 2014 study by S. C. M. Roberts et al. examined women experiencing intimate partner violence and how the incidence of violence was related to whether or not they obtained an abortion. Women interviewed either sought an abortion at a clinic just before the gestational limit and were accepted or sought an abortion just after the limit and were turned away (S. C. M. Roberts, Rocca, & Foster, 2014). Obtaining an abortion was associated with lower levels of physical violence by the abusive partner post-abortion while relationships in which the pregnancy was brought to term was not associated with a change in physical violence (S. C. Roberts et al., 2014). This serves as evidence that having a child with an abusive father may make it harder for a woman to leave her relationship, thus motivating some women to terminate their pregnancies (S. C. Roberts et al., 2014).

Women also commonly cited the demands for taking care of their current children as a reason for having an abortion (Biggs et al., 2013). While some women were single mothers with financial and time constraints, others were in stable marriages with limited resources (Biggs et al., 2013).

Although abortions past the second trimester only account for around 8.70% of abortions nationwide (see Figure 7), it is important to recognize that some of these abortions can also be motivated by the screening and detection of fetal deformities or

mental deficits, which is not generally possible until chorionic villus sampling or amniocentesis tests are performed (Simonazzi et al., 2010).

Many of these reasons reveal woman in crisis with lack of financial or relational support. It is important to handle these discussions with care as few, if any women ever actually desire to undergo an abortion.

Medical Abortion Methods

The following section discusses legal abortive methodologies available in the United States today. There are two major types of abortions, medical and surgical. In the first trimester, both medical and surgical procedures are offered. Medical abortions account for 16.5% of all total abortions and 25.2% of pregnancy terminations before ten weeks gestation (Creinin, Mitchell D. & Grossman, Daniel A., 2014).

In the United States, the major medical abortive regimen involves two drugs, Mifepristone (Mifeprex) and Misoprostol, also known as RU-486 (“Abortion Procedures During First, Second and Third Trimester,” 2015). This treatment is generally offered throughout the first nine weeks of pregnancy (“Abortion Procedures During First, Second and Third Trimester,” 2015). An initial dose of up to 600 mg Mifepristone (a partial progesterone receptor agonist) is administered orally in the clinic followed by a 25ug to 800ug dose of the prostaglandin E analogue, Misoprostol, 24 to 48 hours later via an oral or vaginal route (Faúndes, 2011). Mifepristone causes the uterine lining to disintegrate by preventing progesterone from binding, while Misoprostol induces uterine contractions in order to expel the fetus (“Abortion Procedures During First, Second and Third Trimester,” 2015). Medical abortions generally consist of about two weeks of heavy

menstrual-like bleeding and are completed at home (Yonke & Leeman, 2013). The dosage, route of administration and side effects vary greatly between women and time of gestation (Templeton & Grimes, 2011). Methotrexate was adopted in the United States before the advent of Misoprostol, but has since been largely phased out of use (Creinin, Mitchell D. & Grossman, Daniel A., 2014).

Surgical Abortion Methods

During the first trimester, and up to sixteen weeks after a women's last menstruation, abortion providers offer a type of surgical method known by several names: dilation and curettage (D&C), vacuum aspiration or suction curettage ("Abortion Procedures During First, Second and Third Trimester," 2015). During this procedure, a local anesthetic and sometimes a sedative is administered to the women, after which the cervix is manually dilated ("Surgical Abortion Procedures," 2015). A cannula attached to a suction device is inserted into the uterus and the fetus is broken apart and aspirated ("Surgical Abortion Procedures," 2015). About three-quarters of all first trimester abortions are performed via vacuum aspiration (Yonke & Leeman, 2013). At times, generally later in gestation, a curette is inserted to further scrape the lining of the uterus to ensure that all contents have been removed ("Surgical Abortion Procedures," 2015).

Women undergoing an abortion within nine weeks gestation are generally given the choice between a medical and surgical procedure. Some women choose medical abortions because they believe the procedure may be safer since it is not surgical (Creinin, Mitchell D. & Grossman, Daniel A., 2014). However, medical abortions take longer than surgical procedures, are generally completed outside the clinic, are associated

with a higher risk of cramping pain and are more involved than surgical abortions where the women never sees her fetus or blood clots (Creinin, Mitchell D. & Grossman, Daniel A., 2014).

After sixteen weeks, a similar method known as dilation and evacuation (D&E) is used where a women's cervix is usually dilated a day prior to the procedure to make room for the larger fetus ("Abortion Procedures During First, Second and Third Trimester," 2015). During a D&E procedure, first a cannula is inserted to remove the uterine lining, next a curette is used to scrape away uterine contents, and finally forceps are utilized to remove any larger remaining portions of the fetus, followed by a final round of suctioning ("Surgical Abortion Procedures," 2015).

Induction abortions are rarely employed and involve the injection of salt water, urea or potassium chloride into the amniotic sac, which poisons, burns and eventually kills the fetus ("Abortion Procedures During First, Second and Third Trimester," 2015). Vaginally administered prostaglandin analogues are used to induce contractions in order to expel the dead fetus ("Abortion Procedures During First, Second and Third Trimester," 2015)

While most states prohibit abortions in the third trimester or after fetal viability (see Table 1), induction abortions and dilation and extraction abortions (D&X) can be used after 21 weeks gestation ("Abortion Procedures During First, Second and Third Trimester," 2015). D&X, also known as intact D&X, intrauterine cranial decompression or partial birth abortion is completed by using forceps to remove the limbs and body of the fetus through the dilated cervix, after which an instrument is used to pierce the fetus'

skull, creating an opening through which a suction catheter is inserted and used to drain the cerebral matter until the skull collapses and can be pulled out of the cervix (“Surgical Abortion Procedures,” 2015). This procedure was banned by Congress in 2003 although the method is still legally practiced if an injection is used to kill the fetus first (“Gonzales v. Carhart 550 U.S. 124 (2007),” n.d.).

Like any medical procedure, all abortion procedures carry risks. A review of the literature with regards to such consequences will be discussed within the next several sections.

Short-term Physical Health Consequences

The physical consequences of abortion range depending on the abortive method and the timescale examined. Medical abortions, like any other pharmaceutical, carry the risk of side effects, and both medical and surgical abortions can lead to physical complications in the short and long term. The majority of women seek abortions at specialized clinics as opposed to from their general provider because of privacy concerns and the desire to preserve their “image,” among other reasons (Weitz & Cockrill, 2010). When examining the current literature, it is important to understand that rigorous methods of abortion complication surveillance do not yet exist. This paper urges for an increase in standardized documentation with regards to the health effects of abortion on women.

After a medical abortion, a woman will experience menstrual-like cramps and prolonged vaginal bleeding for two weeks or more (Faúndes, 2011). Side effects of Misoprostol generally include diarrhea, nausea, vomiting, chills and fever, all of which

have high rates of incidence (over 30%) depending on dosage regimen (Creinin, Mitchell D. & Grossman, Daniel A., 2014). Because of these potential side effects, efforts to reduce the dosage of Misoprostol are made by administering the drug when the uterus is most susceptible to its effects (Faúndes, 2011). Vaginal administration is also associated with lower risks of side effects than oral routes (Templeton & Grimes, 2011). Rare cases of anaphylaxis associated with buccal Misoprostol administration have also been reported (Schoen, Campbell, Maratas, & Kim, 2014).

Another complication that may arise from a medical abortion includes incomplete abortion as evidenced by long-term combination of bleeding and pain (Faúndes, 2011). In such cases, the woman is called back in for a vacuum aspiration to remove any remaining material from her pregnancy (Faúndes, 2011). Medical abortions have a slightly higher failure rate than surgical abortions (Templeton & Grimes, 2011). Although hemorrhaging that is heavy enough to warrant a blood transfusion is rare in both medical and surgical abortions (less than 1%), such complications do occur and generally require uterine evacuation and fluid replenishment (Templeton & Grimes, 2011). Other complications from medical abortions include infection and uterine rupture (Faúndes, 2011).

In one study examining Californian abortion data from 2009 – 2010, 2.1% of women in the almost 55,000 cases evaluated presented with abortion related complications at either the original outpatient clinic or the emergency department (Upadhyay et al., 2015). Women who underwent a medical abortion were significantly more likely to experience complications than those who had received a D&C abortion

during their first trimester (Upadhyay et al., 2015). The majority of complications were minor (Upadhyay et al., 2015).

Short term physical health complications from surgical abortions include hemorrhage, incomplete abortion or retained products from conception (RPCs), infection, cervical lacerations, uterine perforations, embolisms and death (Steinauer, Jody et al., 2013). Risk of RPCs from surgical abortions increases as gestational age increases (Kara et al., 2013). In a 2013 study examining four thousand women who underwent a surgical abortion, abortions performed at an early gestational age (6 weeks) were associated with significantly lower risks of complications than those performed at higher gestational ages (Kara et al., 2013). Another study examining early surgical abortions performed at five weeks gestation or less found a 4% overall complication rate and a 2% overall failure rate (Paul, Mitchell, Rogers, Fox, & Lackie, 2002).

It is generally agreed that the risk of abortion related complications such as infection increases with gestational age (Mentula et al., 2011). In general, the medical community considers the aforementioned complication rates low enough to regard early surgical abortions as safe (Kara et al., 2013). In terms of a woman's health, it is encouraging that the majority of abortions are performed under eight weeks although a significant portion of abortions are still performed at higher gestational ages (Pazol et al., 2014). Women experiencing a crisis pregnancy should be made aware of increasing risks associated with abortion at higher gestational age.

Several risk factors are associated with greater rates of abortion complications, such as abortion failure. Failure for medical abortions is defined as the need for

consequent curettage, whereas failure for surgical abortions is defined as a continuation of pregnancy (Paul et al., 2002). In one study, previous surgical abortions significantly increased the likelihood of retained products of conception (RPC) (from 1% to 16%), requiring additional procedures to complete the abortion (Kara et al., 2013). Pregnancies with more than one fetus were also associated with higher rates of failure (Paul et al., 2002).

As mentioned earlier, complication rates increase with gestational age, a trend that is observed via the higher rates of complications seen in second trimester abortions (as compared to first trimester abortions) (Steinauer, Jody et al., 2013). Abortion complication rate around twelve to thirteen weeks gestation is 3-6% but jumps to 50% in the second trimester (Coleman, Coyle, & Rue, 2010). At eight weeks or less gestation, abortion mortality is reported as 0.1 per 100,000 procedures as compared to 8.9 per 100,000 abortions at over twenty-one weeks gestation (Steinauer, Jody et al., 2013).

Hemorrhage and uterine perforations occur in less than one percent of second trimester abortions, while cervical lacerations and infection occur in under five percent of second trimester abortions (Steinauer, Jody et al., 2013). Although risks are small, hemorrhage is a key cause of maternal death and can result from a number of complications such as placenta previa (a long term abortion health consequence), uterine rupture, cervical or vaginal lacerations or incomplete abortions (Goldenberg & McClure, 2011).

These depend on a variety of risk factors such as maternal age, whether or not general anesthesia is used, previous cesarean sections, and the provider's expertise

(Steinauer, Jody et al., 2013). Embolisms are an incredibly rare complication although they carry a high rate of associated mortality (Steinauer, Jody et al., 2013). Overall, the risk and efficacy of short-term abortion-related complications increases with gestational age. Comparative studies on the risks of medical versus surgical abortions are difficult to come by, but the results of one such study in 2009 can be seen in Table 3.

Table 3: Risks of short-term abortion-related complications by complication type and abortion method. Overall, medical abortions were associated with a higher percentage of short-term complications than surgical abortions. Adapted from Niinimäki et al., 2009.

Complication	Risk of Complication (%)	
	Medical abortion	Surgical Abortion
Hemorrhage	15.6	2.1
RPC / Continued pregnancy	6.7	1.6
Injury	0.03	0.60
Infection	1.7	1.7
Embolism	0.08	0.08
Incidence of Adverse Events	20.0	5.6

Interestingly, one 2014 study compared the average abortion mortality rate (cited at 0.7 per 100,000 abortions between 2000 - 2009) to other common outpatient medical procedures and non-medical risks (Raymond, Grossman, Weaver, Toti, & Winikoff, 2014). Plastic surgeries had mortality rates between 0.8 and 1.7 deaths per 100,000 procedures while there were between 0.6 and 1.2 marathon-related deaths per 100,000 runners (Raymond et al., 2014).

Long-term Physical Health Consequences

Several long-term physical health consequences of abortion have been investigated in the literature: increased risk of preterm birth (before thirty-seven weeks

gestation), low birth weight (below 2500 g, or 5 lb. 8 oz.) and placenta previa in subsequent pregnancies and a potential loss of the protective effects that full-term pregnancies afford against breast cancer. These claims will be examined in this section.

When evaluating long-term health consequences of abortion, many studies utilized an odds ratio (OR) with a 95% confidence interval to express the likelihood of a certain outcome following abortion as compared to the odds of that same outcome occurring in the absence of abortion.

Multiple studies found a link between previous abortion and preterm birth in future pregnancies. Since early birth before thirty-seven weeks gestation is the primary cause of mortality in newborns (Callaghan, MacDorman, Rasmussen, Qin, & Lackritz, 2006), this issue demands further investigation. In 2000, a study found that women who had undergone a previous abortion were almost twice as likely to experience low birth weight in subsequent pregnancies than women with no prior termination of pregnancy, although confounding variables could not be ruled out (W. Zhou, Sørensen, & Olsen, 2000). Later, a 2009 meta-analysis of thirty-seven studies chosen for lower levels of researcher bias concluded that the risk of preterm birth and low birth weight in future pregnancies was increased by previous induced abortions (Shah, Zao, & on behalf of Knowledge Synthesis Group of Determinants of preterm/LBW births, 2009). Subsequent studies have confirmed these findings.

One 2012 study examined over 300,000 Finnish women between the years 1996 and 2008, and found an increased risk of preterm birth and low birth weight for women who had undergone multiple induced abortions (Klemetti, Gissler, Niinimäki, &

Hemminki, 2012). The risk of severity of such outcomes was positively correlated with the number of previous abortions (Klemetti et al., 2012). A similar study one year later corroborated these findings and reported on a link between multiple previous pregnancy terminations and an increased risk of preterm birth (McCarthy et al., 2013). Another research group examining three years of data from seven different public hospitals in China also reported that women who had undergone multiple surgical abortions were at a higher risk of future pregnancy preterm birth than women who had undergone repeated medical abortions (Zhou & Olsen, 2003). Several of these studies found that zero or one previous abortion did not increase the risk for the aforementioned negative future pregnancy outcomes.

Other researchers have examined the relationship between previous abortions and placenta previa in future pregnancies. Placenta previa can induce many complications such as bleeding, requires vigilance throughout pregnancy and often necessitates delivery by Cesarean section. Two studies found that abortion by sharp curettage increased the risk of placenta previa in subsequent pregnancies while one study found linkage between previous abortions performed after six weeks gestation and future pregnancy placental problems (Zhu et al., 2009) (Johnson, Mueller, & Daling, 2003). Another 2013 study by McCarthy et al. found that multiple surgical abortions increased the risk for placental abruption in future pregnancies.

One paper released in 2003 dissented with these findings (Weijin Zhou & Olsen, 2003). This study determined that the linkage between previous induced abortions and future pregnancy complications was not causal, however it did report finding an increase

in the number of stillbirth pregnancies from women who had previously experienced post-abortion infection (Weijin Zhou & Olsen, 2003)

Some studies found that medical abortions (as opposed to surgical abortions) were not associated with higher risks of future pregnancy complications compared to no previous abortions or previous surgical abortions (Virk, Zhang, & Olsen, 2007) (Zhu et al., 2009).

There has also been discussion as to whether abortion induces the loss of full-term first-time pregnancy protection against breast cancer (Huang et al., 2013). A meta-analysis of thirty-six articles studying Chinese women in fourteen provinces demonstrated a significant increase in breast cancer risk for women who had undergone an induced abortion (Huang et al., 2013). This risk increased as the number of previous abortions increased (Huang et al., 2013). In contrast, another analysis of 53 epidemiological studies from 16 different countries was unable to find any linkage between abortion and the risk of breast cancer (Stephenson J, 2004). The results of this evaluation were backed by another study that found no linkage between abortions and breast cancer after adjusting for variables such as smoking and drinking habits (Braüner, Overvad, Tjønneland, & Attermann, 2013). There seems to be some contention within the research community as to whether or not induced abortion causes the loss of full-term first-time pregnancy protection against breast cancer.

In conclusion, while the risk of short-term physical consequences was higher in medical abortions, the risk of long-term physical consequences, particularly those affecting future pregnancies was higher among women who had undergone multiple

previous surgical abortions, especially those involved sharp curettage. Hemorrhage and incomplete abortion accounted for the most frequent short-term complications while risk of preterm birth, low birth weight and placenta previa in future pregnancies were all associated with previous abortions. No significant link between abortions and breast cancer risk has been established in the literature.

Abortion Mortality

The abortion mortality rate is sometimes quoted as around 0.6 deaths per 100,000 abortions (Raymond & Grimes, 2012). This statistic is often compared to the maternal mortality rate of 8.8 deaths per 100,000 live births (Raymond & Grimes, 2012). The Guttmacher Institute website, an autonomous non-profit research organization initially founded by the Planned Parenthood Federation of America currently states that, “the risk of death associated with abortion is about one-tenth that associated with childbirth.” A comparison between these statistics was also a motivating factor in the original *Roe vs. Wade* decision.

In Justice Harry Blackmun’s *Roe vs. Wade* opinions, he writes,

With respect to the state’s important and legitimate interest in the health of the mother, the “compelling” point, in the light of present medical knowledge, is at approximately the end of the first trimester. This is so because of the now-established medical fact, referred to above at 149, that, until the end of first trimester mortality in abortion may be less than mortality in normal childbirth. It follows that, from and after this point, a State may regulate the abortion procedure

to the extent that the regulation reasonably relates to the preservation and protection of maternal health. (Blackmun, 1973)

The relative safety between abortion and childbirth affected a major portion of the *Roe* ruling, namely, when state regulations should be federally permissible. These statistics are commonly compared, but it is worth examining the data more closely, taking into account the gestation period that the abortion is performed. At eight weeks or less, abortion mortality is reported as 0.1 per 100,000 procedures as compared to 8.9 per 100,000 abortions at over twenty-one weeks gestation (Steinauer, Jody et al., 2013). However, second trimester abortions as compared to first trimester abortions are associated with a ten-fold increase in complication risk, as discussed earlier (Steinauer, Jody et al., 2013).

Data from other countries also raises the question of whether abortion is safer than childbirth. A 2012 study in Denmark by Reardon & Coleman looked at data from fertility, abortion, hospital discharge and death registers on all women born in the country with first time singleton pregnancies within a thirty-year period. Data were examined for almost a half a million women and found that death rates per 100,000 women within 180 days of pregnancy outcome were significantly higher after abortion (19 deaths and 55 deaths per 100,000 for abortion before twelve weeks and after twelve weeks, respectively) than after birth (7.8 deaths per 100,000 women) (Reardon & Coleman, 2012). Rates were adjusted for year of birth and age of first pregnancy in order to control for changes in medical technology (Reardon & Coleman, 2012). The study urges caution in comparing maternal mortality statistics because of the voluntary nature of data

reporting and encourages a more rigorous and accurate form of maternal mortality data collection, citing that “73% of pregnancy associated deaths could not be identified from death certificates alone” (Reardon & Coleman, 2012).

Mental Health Consequences

In comparison to the physical health consequences of abortion, mental health consequences have been more hotly debated among the medical community. This is partially due to the subjective nature of mental health diagnoses as well as a greater degree of confounding variables. While most women report a sense of relief following abortion (Kero, Högberg, & Lalos, 2004), the long term psychological effects of pregnancy termination are less well understood.

One such possible effect, or rather collection of effects, is referred to as Post-Abortion Syndrome (PAS). PAS is often discussed in crisis pregnancy centers, grassroots organizations that aim to provide women experiencing unintended pregnancies with alternatives to abortion. The medical community has contested the existence of PAS. PAS is often compared to Post Traumatic Stress Disorder (PTSD) and its symptoms include depression, reclusiveness, apathy, drug or alcohol abuse, nightmares, regret, anxiety, intrusive thoughts, denial, suicidal thoughts, emotional repression, avoidance of abortion-related events, eating disorders, sexual dysfunction, relationship issues, anniversary syndrome and sometimes an obsession with becoming pregnant again with an “atonement baby” (Kelly, 2014). Many medical authorities including the American Psychological Association, the American Psychiatric Association, the American Medical Association, the American College of Obstetricians and Gynecologists, and the American

Public Health Association do not recognize PAS as a psychological syndrome, although they all recognize research demonstrating a link between abortion and negative emotional experiences (Kelly, 2014). As such, there is no evidence that PAS is an actual psychological trauma. However, the data examining the relationship between abortion and subsequent mental/psychological health problems is discussed below.

The lifetime incidence of developing PTSD for American women is around 13% (Coleman et al., 2010). However, in a paper published in 2010, researchers found that among women who had obtained a previous abortion, that risk jumped to 12-20% (Coleman et al., 2010). Risk seemed cumulative for women in the study who had undergone multiple previous abortions (Coleman et al., 2010). The study was controlled for outside variables such as socioeconomic status, education, marital status, race, and previous mental conditions or trauma, although the voluntary nature of the survey responses could have introduced bias (Coleman et al., 2010).

In 2011, a comprehensive meta-analysis of 22 studies between the years of 1995 and 2009 that included a total of 800,000 participants found that women who undergo an abortion have an 81% increase in their risk for mental health disorders, 10% of which is directly attributable to abortion (Coleman, 2011). The most compelling association found was between abortion and substance abuse although the study called for more rigorous future research (Coleman, 2011). The paper was critical of a recent review by the American Psychological Association Task Force for omitting studies without due cause (Coleman, 2011). It also criticized the majority of papers that failed to use 'unintended pregnancy carried to term' as a control group (Coleman, 2011). This seems to be a

critical oversight since such studies seek to examine the effects of a woman's decisions during crisis pregnancies (Coleman, 2011). Interestingly, the American Psychological Association Task Force concluded that while "[t]he act of an abortion alone does not increase the risk of having mental health issues...several factors are associated with a reduced ability to cope after an abortion [including] feelings of guilt, anxiety, depression, and regret."

Another review conducted in 2013 by Bellieni & Buonocore evaluated 36 papers that were published between 1995 and 2011. Studies were grouped into three categories based on their comparisons between pregnancy outcomes: abortion versus childbirth, abortion versus unplanned pregnancy continued to term, and abortion versus miscarriage (Bellieni & Buonocore, 2013). In the first group, thirteen out of nineteen papers demonstrated a clear risk for either depression, anxiety disorders or substance abuse associated with abortion; in the second group, four out of seven studies showed higher incidence of mental health disorders associated with abortion; in the third group, three studies associated abortion with higher risk for mental health problems, while two demonstrated higher risk for long term anxiety and depression associated with abortion (Bellieni & Buonocore, 2013). In all three categories, studies that did not show linkage between abortion and subsequent mental health problems, showed no difference in risk between the two groups compared (Bellieni & Buonocore, 2013).

A 2014 cohort study looked at 900 women who had either terminated their pregnancy or carried it to term (Steinberg, McCulloch, & Adler, 2014). The paper made two interesting conclusions: 1) that women undergoing abortions were twice as likely as

women who gave birth to develop subsequent substance abuse problems, and 2) the women who elected to abort their pregnancies were significantly more likely to have a prior existing mental health disorder (Steinberg et al., 2014). This potentially suggests that either women who terminate crisis pregnancies are more likely to come from unstable backgrounds/experiences or that women from unstable backgrounds/experiences are more likely to experience crisis pregnancies.

Another interesting study from 2013 showed that women with prior pregnancy loss due to either induced abortion, stillbirth or miscarriage were more likely to experience postpartum depression in future pregnancies than women without prior loss (Giannandrea, Cerulli, Anson, & Chaudron, 2013). The study also found that higher incidences of pregnancy loss by any means occurred among urban mothers of low socioeconomic status (Giannandrea et al., 2013).

Two studies found examined data from the Turnaway Study, which follows women obtaining first trimester abortions, women who received abortions two weeks prior to a clinic's gestational limits ("Near Limits"), and women up to three weeks past a clinic's gestational limits who were denied abortions ("Turnaways") for five years after their procedure (L. F. Harris, Roberts, Biggs, Rocca, & Foster, 2014). The first study did not detect any long term differences in stress levels or social support obtained between the three groups (L. F. Harris et al., 2014). The second study conflicted previous papers on the relationship between abortion and subsequent substance abuse as a coping mechanism by stating that no relationship was found between cohorts and drug use over a two year period (S. C. M. Roberts et al., 2014)

This evidence indicates that certain health risks are associated with abortion and that healthcare providers, especially those involved with women's reproductive health, should be made aware of such research in order to more fully counsel their patients. Poor mental health outcomes such as the symptoms of intrusion, avoidance and hyper-arousal often associated with PTSD were observed more often in women who perceived their pre-abortion counseling to be inadequate versus those who did not have that perception (Coyle et al., 2010). As noted earlier in the section, "Abortion law in the United States today," legislature regarding mandatory counseling on post-abortion mental health outcomes exists in only seven states (Table 1). This paper urges an ongoing reevaluation of the legislature and clinic practices as research in this field develops. An assortment of "evidence-based practices" including peer counseling, support groups and self-awareness assessments can be used in the management of sensitive health topics such as abortion to further encourage the health of women who have obtained an abortion (Upadhyay, Cockrill, & Freedman, 2010).

Psychosocial effects of stigma

Psychosocial health consequences describe the manner in which cultural or social dynamics interact with individual behavior. The prevalence of abortion in the United States carries with it various stigmas about sexual behavior and outcome, and affects the relationship between women, men and children in society. This section will examine the relationship between abortion and its psychosocial effects.

It is critical to understand that women undergoing crisis pregnancies are grappling with difficult and often multifaceted problems. The following paragraphs will examine the effects of abortion and pregnancy stigma.

In a well-cited 1999 paper published by Major & Gramzow, over 400 women of child-bearing age were interviewed over a two year period following their abortion. Those who felt stigmatized by their abortion were more likely to conceal their procedure from loved ones, which lead to psychologically distressing cycles of memory suppression, intrusive thoughts and obsessive preoccupation with their abortion (Major & Gramzow, 1999). In contrast, disclosing their abortion resulted in decreased stress (Major & Gramzow, 1999), suggesting that women who have undergone abortions need safe places to disclose and process their experiences. In another more recent study that examined women by geographical region, age, race, religious affiliation and socioeconomic status, over sixty percent of participants who had obtained an abortion feared judgment for their actions (Shellenberg & Tsui, 2012). Over half of these women internalized perceived abortion stigma and felt the need to conceal their abortion from friends and family (Shellenberg & Tsui, 2012). Two case studies revealed instances where a woman's desire to keep her abortion secret almost prevented her from seeking urgent life-saving medical treatment after an abortion (L. H. Harris, 2012)

Open-ended interviews and personal narratives from women who have undergone abortions reveal a complex underlying emotional turmoil. In a small 2012 study, researchers found that many women felt a mixture of regret, relief and guilt that contributed to their desire to conceal their abortion (Astbury-Ward, Parry, & Carnwell,

2012). Many women felt the need to keep their abortion secret for fear of being punished by negative societal perceptions, however many reported that the cognitive costs of secrecy felt like punishment as well (Astbury-Ward et al., 2012). One woman in the study had not even been able to tell her husband about an abortion she had twenty years prior (Astbury-Ward et al., 2012). Women interviewed were also highly critical of themselves, expressing frustration towards their own perceived mistakes including the pregnancy and resultant choice to terminate (Astbury-Ward et al., 2012). These narratives were incredibly compelling and offered an insightful perspective that should occupy a larger portion of the national discourse on abortion.

Such interviews revealed another stigma that is highly tied to abortion: the stigma of unplanned pregnancy. Many women who seek abortions are young, unmarried and feel a societal pressure to discontinue their pregnancy (Wiemann, Rickert, Berenson, & Volk, 2005). In one study, 40% of almost 1000 adolescents interviewed felt stigmatized by their pregnancy (Wiemann et al., 2005). Young women who felt like their pregnancy was negatively perceived were more likely to consider pregnancy termination and felt abandoned or judged by their parents, peers and the father of their child (Wiemann et al., 2005). Many cited similar reasons as discussed in Biggs et al. for desiring to terminate their pregnancy including fears that it would negatively interfere with their academics, career or social life (Wiemann et al., 2005). Women undergoing crisis pregnancies experience stigma regardless of chosen pregnancy outcome. Effects must be made to reevaluate the cultural perspective of unintended pregnancy.

Psychosocial effects on sexual behavior and contraception

Abortion experience, access and prevalence also seem to have effects on sexual behavior and contraception. As discussed earlier in the section, “*Abortion Law and Health Implications*,” abortion restrictions may increase pregnancy avoidance behaviors (Klick et al., 2012) (Klick & Stratmann, 2008) (Levine et al., 1996).

While the direct and indirect costs of abortion were inversely associated with sexual activity, prior unplanned pregnancy curiously enough, did not have any significant effects on contraceptive use (Matteson, Peipert, Allsworth, Phipps, & Redding, 2006). A study of 500 women between the ages of 14 and 25 found that around one third who were at risk for unplanned pregnancy (engaging in sexual intercourse) and did not wish to become pregnant were not using any method of contraception regardless of past experiences with unplanned pregnancy (Matteson et al., 2006). Such findings were possibly attributable to other factors such as lack of education, lack of access to health care, or a lack of confidence in sexual situations (Matteson et al., 2006).

About fifty-percent of women receiving abortions have previously undergone the procedure (Table 2). A 2010 study hypothesized that providing contraception access would help decrease the number of repeat abortions, however they found that 96% of abortion providers already provided contraceptive care and education, many of which included such services within the cost of abortion (Kavanaugh, Jones, & Finer, 2010). Many intrauterine devices such as copper intrauterine devices and levonorgestrel-bearing intrauterine systems are considered safe and effective means of post-abortion long-acting contraception (Bilgehan, Dilbaz, Karadag, & Deveci, 2015).

Psychosocial effects on relationships

As discussed earlier with regards to stigma, the interplay between abortion and women and their interactions in romantic relationships, family and society is vast and complex. One study investigated the role of abortion among women experiencing intimate partner violence (IPV) (S. C. Roberts et al., 2014). The study found that IPV was common among women seeking abortions (6-22%), citing that many such women sought to terminate their pregnancies for fear of exposing a child to violence or being stuck in the relationship (S. C. Roberts et al., 2014). Data were evaluated from the Turnaway study, which consisted of women who sought abortions in 30 abortion clinics in the United States (S. C. Roberts et al., 2014). Women were sorted into three categories: First Trimester Abortions (women who received an abortion in the first trimester), Near Limits (women who received an abortion within two weeks of a clinic's gestational age limit), and Turnaways (women who were within three weeks after a clinic's gestational age limit and denied an abortion) (S. C. Roberts et al., 2014). The Turnaway Study followed these women for five years via phone interviews (S. C. Roberts et al., 2014). The study found that IPV decreased for Near Limits and women undergoing first trimester abortions but not for Turnaways (S. C. Roberts et al., 2014). They concluded that having a child with an abusive partner made it more difficult to leave the relationship (S. C. Roberts et al., 2014).

Contrast between partners in the decision to abort predictably also had repercussions within relationships (Coyle et al., 2010). Disagreement over such an important event predicted many experiences similar to those seen in PTSD in both men

and women, such as intrusive thoughts and hyper-arousal, which induced long term dissonance within relationships (Coyle et al., 2010).

Thirty-one percent of women report partner-related reasons for seeking an abortion (Biggs et al., 2013). Most reasons involve an unsupportive or instable relationship while 3% of the women interviewed reported having a partner who did not want the child (Biggs et al., 2013). This information alongside an underestimation of pregnancy risk with unsafe sex (Campo, Shelly et al., 2010) demonstrate a cultural detachment between sex and childbearing. Men are also complicit in risking pregnancy even when they may not want a child. It would be interesting to conduct an interview-style survey to study whether or not abortion laws also affected the sexual behavior of heterosexual men. Men may assume less risk since pregnancy does not directly affect them.

The psychosocial effects of abortion on women and society are complex, fluid and difficult to describe, thus providing more reason for research in this area.

DISCUSSION

As evidenced by the names, “Pro-Life” and “Pro-Choice,” the national conversation on the abortion controversy tends to focus on a fetal right to life versus a women’s right to choose while the health effects of abortion on women are secondarily referenced. However, abortion affects the lives and health of millions of American women every year, therefore this thesis exists in the hopes of encouraging a shift in dialogue.

Forty years after the *Roe* and *Doe* Supreme Court decisions, there is emerging evidence regarding the health effects of abortion on women. The short term complications of surgical abortions are few and far between – enough for the procedure to be considered “safe”, however the higher complication rates from medical abortions, the increasing risk of morbidity and mortality as gestational age increases, and the long term risks for future negative pregnancy outcomes are all physical consequences of abortion that need to be properly studied and discussed in the national dialogue.

It is also clear that there exists an association between prior abortion and subsequent psychological distress as a result of the ethical magnitude of the procedure and cultural stigma. This stigma extends to a negative public perception of unintended pregnancy as well. This has prompted efforts in academia to help healthcare providers identify the most successful methods whereby to assist their patients after sensitive experiences such as abortion. The personal narratives of women who have struggled with a pregnancy termination are compelling and insightful and could be a powerful voice in leading the national discussion.

The psychosocial effects of abortion on women are complex and perhaps more contentious than the physical or mental health consequences. Negative stigma surrounding both abortion and unplanned pregnancy make it difficult for women to receive the mental and physical care they need. It is highly concerning from a public health standpoint that almost half of all women seeking abortions have had a prior procedure, even given that many clinics offer women long term contraceptive options after their abortion. It is difficult to pinpoint the reasons for this phenomenon, which could be an area of further research.

Although many programs aimed at decreasing rates of unintended pregnancy encourage increased access to contraception, some research suggests that such access, alongside more liberal abortion legislation, may actually increase the incidence of unintended pregnancy. Psychological studies theorize that the presence of greater abortion and contraception access may cause some women to underestimate the risk of unintended pregnancy and engage in more risky sexual behavior. More research in this area could help illuminate the effects of such access on reproductive behaviors.

Intimate partner violence and contention within relationships involving an unintended pregnancy also demonstrate the psychosocial effects of abortion legality and perception on women.

State by state legislature is complicated and does not always align with the medical literature. Of all the state-imposed restrictions on abortion, some types of mandatory counseling are few and far in between. An association between women who receive inadequate pre-abortion counseling and experience negative mental health

outcomes demonstrates the way in which the law can affect a women's access to quality healthcare.

Do healthcare facilities operate at the necessary standards to protect the health of women? So far, there is no uniform, mandatory method for abortion data collection, resulting in potentially many non-reported abortions each year, which makes it difficult to study its effects on women's health and wellbeing. This may put women at greater risk since it is harder for women to obtain reliable information with regards to their health.

This thesis suggests that there is need to carry out more comprehensive and well controlled studies on the health consequences of abortion and that more rigorous documentation methods will need to be employed so that researchers can develop a better understanding of this complex medical and psychosocial issue.

LIST OF JOURNAL ABBREVIATIONS

JAMA.....Journal of the American Medical Association

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CURRICULUM VITAE

