

# Induced Abortion and Increased Risk of Substance Abuse: A Review of the Evidence

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**Abstract:** Research conducted over the last few decades has revealed an association between induced abortion history and substance abuse. The experience of induced abortion may be associated with psychological discomfort in some women and substance use offers a convenient remedy for alleviating the negative emotions without the necessity of disclosing the source of the discomfort. On the other hand, many characteristics related to the choice to abort are also systematically related to the likelihood of using substances (e.g., relationship difficulties, pre-existing emotional problems, a tendency to engage in risk-taking behavior, etc.) and the correlations observed in the literature may be due to the presence of uncontrolled third variables. Therefore, the general purpose of this review is to critically evaluate the available evidence linking induced abortion and substance abuse with sensitivity to the contextual complexity of both variables. Specific objectives include the following: 1) provision of an overview of substance use disorders in women, 2) review of evidence for a causal model, highlighting methodological deficiencies in the published literature, 3) identification of process mechanisms (direct and indirect) through which induced abortion may enhance risk for substance abuse, 4) provision of recommendations for further research, and 5) consideration of practice implications of the available findings.

**Keywords:** Induced abortion, substance abuse, decision ambivalence, negative emotions, anxiety.

Substance abuse, defined in terms of the misuse of a variety of substances (alcohol, tobacco, illegal and legal drugs, and/or other mood-altering substances) is implicated in many physical, psychological, interpersonal, familial, and societal ills, rendering it among the most pressing contemporary health problems in the United States. Substance abuse has increased over the past three decades, becoming a particularly disturbing problem among American women in recent years [1,2]. However, awareness of female substance abuse as an emerging public health concern is of relatively recent origin as researchers only began to explore gender differences in the incidence, etiology, course, and treatment of substance abuse a few decades ago.

Many social changes have transpired over the years during which the upward trend in female substance abuse has been observed. For example, more women are attending college, working full-time, often in fields previously dominated by men, caring for aging parents, and women have experienced more personal control over reproduction since legalization of induced abortion in 1973 [3-8]. These changes have obviously brought many expanded opportunities for women's achievement relative to diverse roles while broadening avenues for personal fulfillment and as a result the changes in women's lives are generally viewed very positively. Nevertheless, each change carries the potential to likewise complicate women's lives and introduce new sources of stress, which may have an association with the higher frequency of substance abuse evidenced over the past three decades.

The focus of this article is on the possible causal link between induced abortion and substance abuse. Slightly over 50% of American women facing an unintended pregnancy decide to abort [9] and approximately 43% of women in the United States have had at least one induced abortion prior to age 45 [9]. Many women report pronounced stress and conflict associated with undergoing the procedure [10,11] and several studies published in recent years have suggested an association between induced abortion history and substance use/abuse [12-18]. The underlying assumption motivating the research is that the experience of induced abortion is associated with negative psychological effects (depression, anxiety, guilt, etc.) in some women and substance use offers an easily accessible means for alleviating the discomfort. The obvious counter explanation for the significant associations observed is that characteristics related to the choice to abort are also systematically related to the likelihood of using substances (e.g., relationship difficulties, pre-existing emotional problems, a tendency to engage in risk-taking behavior, etc.). The purpose of this review is to bring cohesion to the available literature. An overview of substance use disorders in women is provided initially followed by a critical review of the evidence for a causal model, which highlights methodological gaps in the existing knowledge base. Possible process mechanisms (direct and indirect) through which induced abortion might be causally linked to substance use/abuse are then explored. Finally, recommendations for further research on the topic and practice implications of the existing findings are described.

## SUBSTANCE ABUSE IN WOMEN

Substance use disorders are typically divided into two categories: substance dependence and substance abuse [19].

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Substance dependence is considered the more serious of the two disorders and occurs when people report experiencing three or more of the following symptoms over the previous year: (1) tolerance, (2) withdrawal, (3) difficulty managing the quantity of substance used, (4) unsuccessful attempts to cut down or stop use, (5) a great deal of time spent obtaining the substance or recovering from the effects, (6) the substance interferes with life activities or responsibilities, or (7) substance use is continued in spite of knowledge that it is harmful. Substance abuse on the other hand is defined as the experience of one or more of the following symptoms of use in the past year: 1) substance use results in failure to meet obligations at home, work, or school, (2) intoxication in situations that are physically dangerous, (3) recurrent legal problems due to substance use, or (4) continued use in spite of repeated interpersonal or social problems caused by the substance use.

Research pertaining to gender differences in substance use/abuse suggests that women are more inclined to initiate substance use in response to traumatic life events. Among the experiences found to trigger substance use are physical or sexual abuse, the sudden onset of an illness, and family problems [20]. Compared to male substance users, females more frequently report a childhood environment of substance abuse [21] and higher levels of dysfunction in their families of origin [22]. For example, studies suggest that 25 to 75% of women who abuse drugs or alcohol experienced childhood sexual abuse [23-26]. Compared to men, women are also more inclined to be plagued by feelings of guilt and self-blame and to experience low self-esteem in conjunction with substance abuse and they have a higher incidence of depression, anxiety, and posttraumatic stress disorder comorbidity [27-31]. Further, women who abuse substances are more inclined than men who abuse substances to be involved in a relationship in which the partner is abusive [32]. Gilbert and colleagues [32] found that 64.9% of substance-abusing women reported partner perpetrated physical abuse, sexual abuse, or indicated that their partner had threatened their lives. This rate of abuse is over twice as high as national epidemiological surveys of the general population of women [32]. Finally, compared to alcohol-dependent men, alcohol-dependent women are less likely to seek treatment from a substance abuse treatment facility [1], are more prone to alcohol-related diseases [33,34] and have a higher alcohol-related mortality rate [1]. Based on this brief overview of gender differences in substance abuse, it is clear that women who abuse substances are more likely to have suffered from multiple past and current challenging life situations and there is emerging evidence indicating that women use substances as a means of coping more frequently than men [35], perhaps because women who are dependent on substances often have deficient social support networks [32].

Drug dependence has increased steadily among girls and women in recent years and for some drugs, the increases have exceeded the increases among boys and men [2]. For example, in the 1990s regular use of cocaine increased for women while men's cocaine use declined slightly [36]. Based on an extensive review of the literature, Greenfield [1] concluded that the incidence of alcohol dependence among women in the U.S. has risen steadily since the early 1970s

and is now comparable to that of men. According to a report by the U.S. Surgeon General [38], the smoking rate among men declined from 51.9% to 37.5% during the period extending from 1965 to 1979; whereas the decrease in the smoking rate of 33.9% to 29.9% among women within the same time frame was much smaller and the gender gap narrowed to a steady 5% by the mid 1980s. The decline in smoking rates among adult women tapered off in the 1990s and the smoking rate increased among the nation's adolescent female population during the 1990s.

Results from the 2003 National Survey on Drug Use and Health (SAMHSA, 2004) revealed that 57.3 % of males aged 12 or older were current drinkers compared with 43.2% of females; however, among individuals between the ages of 12 and 17, males and females had comparable rates of current alcohol use (17.1% of males and 18.3% of females). The results of the same study revealed that more males than females aged 12 or older smoked cigarettes in 2003 (28.1% vs. 23.0%); but for respondents between the ages of 12 and 17 comparable smoking rates were observed for boys and girls (11.9% vs. 12.5% respectively). The study further indicated that men were more inclined to report current illicit drug use than women (10.0% vs. 6.5%), and among respondents aged 12 to 17, the rate of current illicit drug use was similar for boys (11.4%) and girls (11.1%). Finally, among individuals aged 12 or older, males (12.2%) were twice as likely as females (6.2%) to be classified with substance dependence or abuse. The rate of substance dependence or abuse among females (8.7%) was once again not significantly different from the rate among males (9.1%) for respondents between the ages of 12 to 17.

Substance abuse is potentially detrimental to women's health at any point in their lives; however substance abuse during pregnancy is particularly troubling due to established links with poor pregnancy and birth outcomes [39,40] as well as detrimental effects on children's subsequent development [41,42]. Among pregnant women in the United States, 15-19% use alcohol [43,44], 14-20% smoke cigarettes [44,45], and 5% use one or more illegal drugs [46].

#### **EVIDENCE FOR ASSOCIATIONS BETWEEN INDUCED ABORTION AND SUBSTANCE ABUSE**

Accumulating research evidence indicates that a history of induced abortion is associated with enhanced risk for substance abuse post-dating the procedure. In a study of over 700 women in New York State, Yamaguchi and Kandel [18] found that the use of illicit drugs other than marijuana was 6.1 times higher among women with a history of induced abortion when compared to women without a history. Similarly, research by Reardon and Ney [17] revealed that among women with no prior history of substance abuse, those who aborted when compared to those who continued their pregnancies to term were 4.5 times more likely to report subsequent substance abuse. Eighty-nine percent of the women reported the onset of substance use to be within three years of the induced abortion. Similarly, research conducted by Morrissey and Schuckit [47] at a Seattle detoxification center revealed that problem drinkers and alcoholics were more likely to report having experienced alcohol related problems after as opposed to before an induced abortion. Amaro and colleagues [12] found that

adolescent drug users when compared to nonusers were significantly more likely to report a history of induced abortion (33% vs. 16.3%). In the same study, no associations were identified between drug use and parity or other forms of perinatal loss (spontaneous abortion /stillbirth). Additional studies have identified significant associations between induced abortion and substance use/abuse [14,15, 48, 49].

Unfortunately, only one study conducted to date has used an appropriate control group and compared substance use rates among women who abort and women who deliver an unintended pregnancy. Using data from the National Longitudinal Survey of Youth, Reardon and colleagues [16] recently reported that women who aborted, when compared to those who carried to term, were twice as likely to use marijuana and reported more frequent use of alcohol after controlling for age, race, marital status, income, education, and prior psychological well-being.

Negative induced abortion-related emotions, which may enhance risk for substance use, could be triggered or exacerbated by the physical and psychological changes associated with a later pregnancy [13]. For example, in a recent study of pregnant women with a prior history of induced abortion, 37% reported unresolved feelings related to the induced abortion [50] and Bradley [51] found that women, who had aborted, when compared to women without a history of induced abortion, were more likely to report anxiety during pregnancy. With regard to substance use, studies comparing women with and without a history of induced abortion have identified significant correlations between a prior history of induced abortion and smoking during pregnancy [52,53,54]. Further, a few studies have demonstrated significantly higher rates of alcohol use [55,56] and illicit drugs such as cocaine, methamphetamines, and opiates [57,58,59] among pregnant women who have aborted compared to pregnant women who have not. Using data from a nationally representative sample, Coleman *et al.* [13] found that pregnant women with a prior history of induced abortion were significantly more likely to use marijuana (odds ratio: 10.29), various illicit drugs (odds ratio: 5.60), and alcohol (odds ratio: 2.22) than women with a history of a prior birth. Finally, in soon to be published study by Coleman, Reardon, and Cogle [60] a history of induced abortion was found to be associated with a higher likelihood of using substances of various forms (cigarettes, cocaine, marijuana, and other forms of illicit drugs) in a subsequent pregnancy after statistically controlling for various demographic variables (odds ratios ranged from 2.0 to 5.06). Interestingly, these researchers found no differences in substance use among women with a history of stillbirth or spontaneous abortion compared to women without the respective form of loss.

Although strong correlational evidence has accumulated establishing a link between induced abortion and substance use, a number of methodological improvements in the research are necessary to determine if the association is actually causal. A variety of methodological issues are addressed later in this article. First, however, logical processes that might explain the induced abortion-substance use link are explored in an effort to stimulate more research

devoted to understanding why and how induced abortion may increase risk for substance use.

### **ANXIETY AS A MEDIATOR OF RELATIONS BETWEEN INDUCED ABORTION AND SUBSTANCE ABUSE**

Substances are frequently used in an attempt to alleviate stress [61]; therefore women who suffer from post-abortion anxiety may be inclined to use or abuse alcohol or drugs in an effort to self-medicate. Substance use may in turn exacerbate mental health problems, leading to further deterioration in psychological functioning. In order to explore the likelihood of heightened post-abortion anxiety precipitating substance use/abuse, it is necessary to describe the empirical evidence for links between induced abortion and anxiety and between anxiety and substance use. Although several studies have explored these relationships separately (reviewed below), no studies have directly examined the possibility of anxiety acting as a mediator of relations between induced abortion and substance use.

#### **Anxiety in Response to Induced Abortion**

In a recent review of literature, Bradshaw and Slade [62] considered women's typical levels of psychological distress immediately before an induced abortion and they noted that the strongest studies indicate that 40 to 45% of women experience high levels of anxiety. Feelings of relief and reduced stress are commonly reported after the procedure [63,64,65]; however, a minority of women (approximately 10-20%) suffer from serious post-abortion psychological problems [66- 70], which frequently include pronounced anxiety [70-75].

When measured 2-4 weeks post-abortion, rates of anxiety have typically been found to range from just under 8% to over 40%. In a recent review of the literature, Bradshaw and Slade [62] concluded that up to 30% of women experienced clinical levels of anxiety and/or high levels of general stress one month after induced abortion. Although not widely studied, a few investigators have explored possible links between induced abortion and more extreme stress reactions indicative of posttraumatic stress disorder (PTSD). Individuals with PTSD experience symptoms of avoidance (efforts to escape from reminders of the event), intrusion (e.g., unwanted thoughts, nightmares, flashbacks related to the event), and arousal (exaggerated startle reflex, sleep disturbance, irritability) for a month or more following exposure to a traumatic event [19]. According to Speckhard and Rue [77], induced abortion may act as a traumatic stressor when it is perceived as involving the death of a human being or as a serious threat to one's physical health.

In a study of 80 women in the United States, Barnard [67] used standardized PTSD instruments and found that 3-5 years post-abortion, 18% of the sample met the full diagnostic criteria for PTSD and 46% displayed high stress reactions to their induced abortions. Similar findings were reported by Hanley *et al.* [78] with the results indicating that some women report negative induced abortion-related responses similar to the classic PTSD symptoms of intrusion, avoidance, and arousal with these symptoms present many years after the induced abortion. Posttraumatic re-experiencing has also been documented in anniversary

reactions. For example, in a small study conducted by Franco *et al.* [72], 30 out of 83 women reported experiencing anniversary reactions, which included intense emotional psychosomatic pain. Major and colleagues [79] assessed PTSD symptoms using a scale adapted for specific reference to an induced abortion and determined that induced abortion related PTSD was positively identified in 6 of 443 women who had induced abortions two years earlier. However, only 38% of the women approached at the clinics participated in the two-year follow-up. In a study by Rue, Coleman, Rue, and Reardon [80], 65% of American women and 13.1% of Russian women experienced multiple symptoms of intrusion, avoidance, and arousal associated with PTSD and 14.3% of the American and 0.9% of Russian women met the full diagnostic criteria for PTSD.

Finally, Congleton and Calhoun [81] compared two groups of 25 women who elected induced abortion: those who identified themselves as distressed and those who reported more neutral or non-distressed responses. PTSD symptoms identified in the distressed group included suppression of feelings/thoughts about the induced abortion, reactions to catalytic events that aroused thoughts/feelings about the induced abortion, and avoiding reminders of infants. More than two out of three women in the distressed group were distinguished by reports of "suppression" or "denial" of parts of the induced abortion experience or negative emotional reactions to it. Women in the distressed group also were over twice as likely to report symptoms of induced abortion trauma compared to women in the non-distressed group. In this same study, women who identified themselves as distressed post-abortion indicated feeling a sense of loss/emptiness (48%), shock/detachment (28%), anger toward partner/others (24%), depression (20%), loneliness, betrayal, loss of self-worth, relief (16%), guilt and sorrow (12%), confusion (8%), and fear of dying and suicidal thoughts (4%). Interestingly, in the group of women who elected induced abortion and did not believe they were distressed, 20% had symptoms of depression, a percentage similar to that experienced by the distressed group. The authors concluded that for some women, induced abortion is a "critical event" which produces high levels of psychological distress.

Methodological problems in the research related to post-abortion anxiety include limited follow-up, infrequent use of appropriate control groups, and insufficient controls for pre-existing anxiety. However, a soon to be published study by Cogle, Reardon, and Coleman [82] employing data from the 1995 National Survey of Family Growth and based on the responses of over 2800 participants revealed that women who aborted an unintended pregnancy, when compared to women who carried an unintended pregnancy to term, were 34% more likely to report an episode corresponding to Generalized Anxiety Disorder in the first several years following an induced abortion. This study is particularly noteworthy because women who reported a period of anxiety prior to their first pregnancy event and women who reported having their first period of anxiety at the same age as their first pregnancy event were excluded from the analyses. Therefore, this study provides clearer evidence than previously published work that induced abortion carries the potential to trigger anxiety.

### **Association Between Anxiety and Substance Abuse**

Stress has been strongly implicated in the etiology of substance abuse and a number of studies have shown that stress frequently leads to substance use relapse after a period of abstinence [61, 83]. There is strong evidence for an association between PTSD and substance use disorders [31, 84-87], particularly abuse of central nervous system depressants [86]. A general population study published in 1995 revealed a 7.6% lifetime rate of drug abuse or dependence for women without a history of PTSD and 26.9% lifetime rate of drug abuse or dependence among women with a history of PTSD. Recent research has indicated that the onset of PTSD typically precedes the onset of substance use disorders, suggesting a causal relation [85,87]. In a study of over 1000 young adults, Chilcoat and Breslau [85] found that PTSD was associated with a more than 4-fold increased risk of drug abuse and dependence 3 to 5 years after an initial assessment. The authors suggested that drug abuse or dependence in persons with PTSD might be a result of their efforts to self-medicate.

Two distinct lines of research have been devoted to identifying common physiological mechanisms to explain behavioral associations between PTSD and substance use disorders [86,88,89]. The first involves identification of a common area of the brain (central nucleus of the amygdala) that is activated in response to fear and anxiety associated with PTSD and is inhibited by commonly abused drugs and possibly alcohol [88]. This neurobiological evidence supports the notion of individuals who suffer from PTSD turning to substances for self-medication purposes. The second line of research implicates abnormalities in the primary neuroendocrine system involved in the stress response, the hypothalamic-pituitary-adrenal (HPA) axis, in both PTSD and substance use disorders [86,89].

### **AMBIGUITY IN INDUCED ABORTION DECISIONS, ASSOCIATED VARIABLES, AND SUBSTANCE USE**

Numerous studies have shown that decisions regarding resolution of an unplanned pregnancy are not easy for many women [91-95]. For example, results reported by Husfeldt and colleagues (1995) indicated that 44% of women expressed doubts about a decision to abort at the time the pregnancy was identified, with 30% continuing to express doubts at the time of the induced abortion. In a small interview-based study conducted in Sweden, Alex and Hammarstrom [96] found that ambivalence was a prominent theme before and one month after an induced abortion among women who enthusiastically supported the right to choose induced abortion. The authors noted: "Despite positive attitudes towards abortion in general, the women had negative attitudes towards their own abortion" (p. 160). Moreover, as Landy [97], a former executive director of the National Abortion Federation has noted, the confusion that many women experience in response to an induced abortion decision is at times expressed indirectly. Based on years of experience she has described how ambivalence may be displayed through uncommunicative behavior, impatience or hostility directed toward clinic personnel, or even as excessive self-assurance.

The ambivalence experienced by many women is likely based on interpersonal, moral, and/or spiritual conflicts surrounding the decision [64, 98]. Biologically-based changes characteristic of early pregnancy may create conflict as well. For example, in Alex and Hammarstrom's [96] study, there was evidence to suggest that women experienced maternal feelings possibly due to hormonal changes associated with the pregnancy prior to the induced abortion. More focused research is needed to address the specific nature of women's mixed emotions, because difficulty with an induced abortion decision is one of the most robust predictors of post-abortion psychological disturbance [63,90], with decision difficulty precipitating post-abortion guilt [99], anxiety [100], regret, depression, and anger [63]. If conflict over an induced abortion decision is linked with heightened vulnerability to mental health problems, this variable may likewise be associated with increased risk for substance use.

When women experience considerable conflict over how to resolve an unplanned pregnancy, they may engage in decision-making strategies characterized by faulty thinking in order to minimize stress. Landy [97] described four styles of poor decision-making observed in abortion clinics: 1) the "spontaneous approach" involving very fast decision-making without taking the time to explore options and ambivalent feelings; 2) the "rational-analytic approach" focusing on practical reasons for pregnancy termination (finances, single parenthood, etc.) as opposed to emotions; 3) the "denying-procrastinating approach" or avoiding decision-making due to internal conflicts that are not resolved prior to termination; and finally 4) the "no-decision making approach" or deferring to others to make the decision (partner, parents, a health care professional, etc.). Any of these patterns may logically result in lower levels of satisfaction post-abortion and lead to psychological or substance use problems, because under each scenario the woman does not fully internalize her decision.

A number of moderators of post-abortion adjustment identified in the literature pertain directly to induced abortion decision-making. Specifically, induced abortion decision risk factors for negative post-abortion adjustment include the following: 1) difficulty with the decision [99,100], 2) emotional investment in the pregnancy [101,102], 3) having initially planned the pregnancy [27,103-106], 4) conservative views of induced abortion [99,107], and beliefs in the humanity of the fetus [108]. Very little research attention has dealt with reasons why these variables are associated with negative emotional reactions; however, when considered together these variables suggest at least some level of commitment to continuing the pregnancy in general and/or the presence of personal values opposed to induced abortion. Further, women who possess any of the above risk factors for negative post-abortion adjustment may be more inclined to experience a sense of loss/bereavement, guilt/self-reproach, anger, and/or relationship difficulties in response to an induced abortion. These variables may in turn lead to mental health problems such as anxiety or depression, which enhance the risk for substance use. Alternatively, a sense of loss/bereavement, guilt/self-reproach, anger, or relationship problems may more directly initiate substance use without anxiety or depression or any other intervening variables

operating if these variables alone cause enough suffering to cause a woman to seek relief through substance use. A third possibility is that some women suppress negative emotions at the time of their induced abortion and substance use is subsequently employed as a means for keeping negative emotional experiences from consciousness. No research conducted to date has included all the relevant variables (factors related to decision difficulty, level of decision difficulty, direct emotional repercussions of a difficult decision (e.g., guilt, loss), relationship difficulties resulting from a difficult decision, general feelings of stress/anxiety or depression, and post-abortion substance use) in an effort to explore alternative process hypotheses. However, there has been some research exploring the prevalence of specific post-abortion negative emotional responses including loss/bereavement, guilt/self-reproach, and anger in addition to relationship problems that may follow an induced abortion. This work is reviewed below and associations between these variables and substance use/abuse are considered.

### Loss/Bereavement

A study by Lloyd and Laurence [109] revealed that 77% of women (37 out of 48) who terminated a pregnancy in response to knowledge of fetal malformation, experienced acute grief after the induced abortion. Most women who experience an involuntary perinatal loss such as a spontaneous abortion or stillbirth will experience a grief reaction with approximately 25% of women likely to suffer from persistent, severe negative psychological consequences [110]. Because induced abortion is voluntary, associations between induced abortion and feelings of loss, grief, or bereavement have been less actively studied [110]. However, as indicated above, the choice to abort is difficult for many women due to conflicting emotions and external pressures [63,65,71,90,108,111,112] and final decisions may frequently not reflect women's true desire. As a result, many women may in fact experience the induced abortion as a loss involving grief and other unpleasant emotions.

As noted previously, studies suggest that many women develop emotional bonds to the fetus during pregnancy [113-115] with one study by Leifer [115] indicating that maternal attachment to the fetus may begin soon after conception. Studies of early attachment have typically dealt with pregnancies that were continued as opposed to having been terminated and it may seem counterintuitive to suggest that women who are planning to abort will develop similar emotional connections to a developing fetus. However, there is some preliminary evidence suggesting that the processes underlying these early connections may be beyond the conscious control of the mother. For example, Kemp and Page [116] found that women with high-risk pregnancies (due to the possibility of serious health complications or even loss of life for the fetus or the woman) reported similar levels of attachment to those undergoing uncomplicated pregnancies. Coleman and Nelson [71] found that 30% of college students who had experienced a past induced abortion agreed or strongly agreed with the following statement: "I sometimes experience a sense of longing for the aborted fetus," providing evidence of some connection developed prior to the induced abortion. Finally, Kero and

colleagues [64] recently found that approximately 20% of women who experienced an induced abortion described severe emotional distress in conjunction with the experience with some of the women reporting having mourned the loss of the child. If women do develop an emotional connection to the fetus, then it is reasonable to hypothesize that they will be at a heightened risk for substance use as an effort is made to alleviate feelings of loss. A feeling of loss under such circumstances may be particularly difficult and confusing for women residing in a society that generally views induced abortion as a benign medical procedure as opposed to an event involving termination of a developing human life, because their pain is not socially recognized. Guilt feelings may further complicate and hinder the mourning process [117].

### **Post-Abortion Guilt/Self-Reproach**

Induced abortion is voluntary, therefore many women may experience a considerable amount of guilt or self-reproach associated with the decision if their moral or religious beliefs conflict with the decision [65,80,118]. The percentage of women reporting guilt associated with an induced abortion has been found to be rather high, ranging from 29.7% to over 75% [65,80,118]. In a national poll conducted by the *Los Angeles Times*, 56% of women who had aborted in the past reported experiencing guilt and 26% reported regretting the induced abortion, implying less directly that the decision to undergo an induced abortion may conflict with one's beliefs and values [119]. Kero *et al.* [118] interviewed 221 Swedish women planning to abort and found that 46% experienced a conflict of conscience in association with thoughts regarding termination. The source of such conflict may logically lie with women's beliefs regarding the humanity of the fetus. In Conklin and O'Connor's [108] study of 800 women who had an induced abortion, those who reported believing in the humanity of the fetus experienced significantly more post-abortion negative affect and decision dissatisfaction than women who did not. Beliefs in the humanity of the fetus are surprisingly common among women who are seriously contemplating an induced abortion. For example, using semi-structured interviews Smetana [120] found that 25% of women confronting an induced abortion decision viewed the fetus as human and regarded induced abortion as the taking of life. Further, in a recent study conducted by Rue *et al.*, 50.7% of American women and 50.5% of Russian women who had an induced abortion felt induced abortion was morally wrong [80].

In an interview-based study conducted by Patterson, Hill, and Maloy [121], the results indicated that women's reasons for choosing induced abortion were overwhelmingly tied to their particular life circumstances (e.g., possible impact on one's relationship with the father) as opposed to abstract, moral or religious principles. Any conflict between the induced abortion and personal and/or religious beliefs is therefore likely to be suppressed in order to facilitate induced abortion decision-making. Women contemplating induced abortion may engage in distorted thinking due to conflicts between their desire to abort and personal beliefs tied to moral issues. For example, Foster and Sprinthall [122] reported that the level of reasoning exhibited by young women's abortion decision-making was significantly lower

than their general reasoning abilities. When reasoning abilities that are temporarily suspended during the decision are restored following the induced abortion, guilt reactions may surface.

### **Post-Abortion Anger, Resentment**

Although anger in response to induced abortion has not received very much scholarly attention, one small-scale clinical study of 30 women who were particularly distressed by an induced abortion experience revealed that 92% reported feelings of anger, rage, and/or hostility that were directed both inward and toward others [123]. A few other studies have identified anger as one of various negative post-abortion emotions examined [63,81]. Self-directed anger is a logical consequence in situations wherein an induced abortion violates an individual's conscience based on well-developed values. The literature reviewed previously indicates that many women opt for induced abortion despite believing that it is morally wrong. Externally projected anger represents a logical correlate of an induced abortion experience that results from the coercion of others, as previous research does suggest that feeling forced into an induced abortion by one's partner, others, or by life circumstances, is a risk factor for a variety of negative post-abortion outcomes [103]. Another potential source of anger is when women feel they did not receive adequate counseling/information from health care professionals. Women who seek an induced abortion are usually provided with information pertaining to how the procedure will affect them physically, but criticism of pre-abortion counseling has focused on insufficient assistance with the decision-process [124,125]. As a result, many women who abort do so without a thorough understanding of the procedure and research suggests that feelings of having been misinformed or denied relevant information are related to post-abortion difficulties [126,127,128]. Finally, anger may also be directed toward significant individuals in the woman's life who are perceived as not having provided sufficient emotional support prior to, during, or after the procedure. More research is needed to determine the incidence of feelings of anger post-dating an induced abortion, since a connection between anger and substance use is well-established [129-132].

### **Post-Abortion Relationship Difficulties**

Unintended pregnancy can cause considerable strain on relationships as each partner's immediate and long-term goals, values, and commitment to the relationship require assessment in order arrive at a decision regarding resolution of the pregnancy [133]. A few studies have found that induced abortion is related to an increased likelihood of sexual dysfunction [80,134,135], communication problems [136], and other relationship difficulties including separation or divorce [80,100,136-138]. Other studies have, however, suggested few changes in sexual or general relationships with a partner following an induced abortion [62]. The studies on this topic vary in methodological rigor, with common problems including high attrition, simplistic measures of relationship quality, and reliance on self-selected retrospective methodologies. In one of the strongest studies with a high initial consent rate, no attrition, use of a control group, standardized measures, and a prospective data

collection strategy, 22% of German women's relationships with their partners had ended a year later [137]. Although very little research attention has focused on induced abortion as a risk factor for domestic violence, a few studies have revealed an association between a history of induced abortion and increased risk for violence during a subsequent pregnancy [139,140].

Relationship conflicts in the aftermath of an induced abortion could conceivably emerge from partner or relationship information derived through the process of induced abortion decision-making or from negative psychological effects on the part of one or both parties involved. There are therefore many possible sources of stress, which could be implicated in an association between induced abortion and relationship problems that should be explored. For example, one partner could feel frustrated by his/her inability to provide financially for a child or the decision made by one may be incongruent with the other's preference leading to resentment and feelings of rejection. Alternatively, one partner's behavior may change as a result of an induced abortion experience. For example, the induced abortion could initiate negative emotions, which in turn could lead to apathetic, antagonistic, or even abusive behavior directed toward one's partner. If both partners suffer emotionally from an induced abortion, they may experience difficulty meeting each other's psychological needs.

Although there are numerous logical reasons why an induced abortion decision could lead to relationship difficulties, associations between these variables could also be explained by relationship conflict pre-dating the induced abortion [134]. Many studies indicate that partner relationship problems are among the most common motives for seeking an induced abortion [141,142], with the experiences of partner sexual assault frequently found to be associated with the choice to abort [143-145]. As noted in the introduction to this article, relationship problems are a common source of substance use problems in women and future efforts to understand how induced abortion may lead to substance use should include careful attention to relationship quality mediational processes.

## METHODOLOGICAL ISSUES

An obvious challenge to the hypothesis that induced abortion increases risk for substance use disorders is that women who choose to abort are also more inclined to use substances and the correlations observed are due to individual characteristics, relationship factors, previous experiences, or current situational factors that operate as third variables. For example, if relationship violence is correlated with the choice to abort and substance abuse, an association observed between induced abortion and substance abuse could be due to both variables being related to relationship violence as opposed to indicating a causal path between induced abortion and substance use. However, testing the tenability of this alternative hypothesis is constrained by limited data pertaining to antecedent processes leading to an induced abortion decision. Predictors of the choice to abort and non-induced abortion related predictors of substance use need to be identified and statistically controlled in order to more definitively document substance use effects of induced abortion and rule

out alternative explanations. Another strategy would be to explore moderation of the induced abortion-substance use link based on characteristics likely to differentiate between women who choose to abort and women opting to carry an unintended pregnancy to term and/or based on characteristics linked with substance use. For example, if a history of child sexual abuse is found to be associated with a higher likelihood of induced abortion or with substance use, separate analyses exploring associations between induced abortion and substance use can be conducted for women with and without a history of sexual abuse. Analyses of this nature would provide clearer evidence of the purity of an association between induced abortion and substance use in addition to offering information regarding the potential for induced abortion to exacerbate negative mental health effects of previous stressful experiences.

Some progress has been made relative to the objective of identifying predictors of the choice to abort, which can be used as control variables in efforts to understand the association between induced abortion and substance use. For example, women who abort often describe themselves as self-reliant, independent, rebellious, and enjoy being unattached or unconnected to other people, places, and things [51,106]. Personally believing that induced abortion is acceptable, believing that family members support induced abortion, and having a female relative with a history of induced abortion are also predictive of the choice to abort [106,146]. In a large-scale study by Zavodny [147], the following variables were correlated with higher rates of induced abortion compared to birth: discrepancy in age between the woman and her partner (an older male), race (Blacks were most likely to opt for induced abortion, followed by Whites, and then Hispanics), and higher educational attainment of the partner and of the woman's mother. Finally, the choice to abort in adolescence has been correlated with high academic achievement and high educational aspirations as well as with being less religious [148,149].

Another way to address predictors of induced abortion is to examine the issues that enter into women's decisions to abort. The choice to abort is often initiated by partners and men frequently play a primary role in women's final decisions [150-152]. Moreover, as noted earlier, the desire to avoid single parenthood and partner relationship difficulties including abuse are commonly reported reasons for induced abortion [107,142,143,153,154]. Fear that a child will interfere with the continuation of one's current intimate relationship, future education, career, or personal plans [121,155,156], young age [156], inadequate finances [156,157], and lacking the time and energy for another child [48] are other frequently reported reasons for choosing induced abortion.

The decision to abort has cognitive, emotional, moral, spiritual, and lifestyle/practical elements and most of the existing research on induced abortion decision-making only addresses one particular aspect. In order to truly understand how and why women make the choice to abort, more qualitative, interview-based research is needed. Studies of this nature should probe women's thoughts and feelings pertaining to personal issues including spiritual and moral

beliefs regarding the fetus, relevant relationship factors, practical, and contextual elements that entered into their decisions to abort. More information should likewise be obtained regarding the woman's life history, focusing on variables that are known to predict substance use such as a childhood history of familial dysfunction or abuse and exposure to substance use in the family of origin. The use of open-ended questions posed by empathetic interviewers is likely to result in rich data that is freer from social desirability biases than other methodologies. A substantive understanding of factors that differentiate between women who choose to abort versus deliver will enable inclusion of more appropriate controls in future efforts to understand the association between induced abortion and substance use.

In addition to the need for qualitative studies, more research incorporating information from sources other than the individual women is needed. Data gathered from significant individuals in women's lives (e.g., partners and family members) and/or behavioral assessments (possibly from counselors and other abortion provider personnel or conducted by researchers) should enhance efforts to assess the complexity of women's experiences before, during, and after the decision to abort. For example, if the researcher is interested in the effects of induced abortion on substance use as mediated by partner relationships or marital quality, information could be derived from the partner, friends or family members who know the couple well, and the researcher might conduct a laboratory assessment of relationship factors such as communication, supportiveness, trust, and/or anger.

Additional methodological improvements needed to more definitively document causal relations between induced abortion and substance use/abuse include the following: 1) more prospective, longitudinal investigations that clearly establish temporal relations between an induced abortion experience and substance use, 2) most active employment of appropriate control groups, women who carry an unintended pregnancy to term and either raise the child or give the child up for adoption or women who do not experience an unintended pregnancy, yet have very similar demographic and psychological characteristics to women who experience an unintended pregnancy, 3) efforts to include potential mediators of the induced abortion-substance use link such as those described in this report (e.g., anxiety, guilt, bereavement, anger, relationship problems), and 4) more studies in which women are directly asked if they view changes in their use of substances to be a direct result of the induced abortion. Finally, in order to enhance the generalizability of findings, large-scale, nationally representative, investigations are essential.

#### **OVERVIEW OF RECENT STUDIES INCORPORATING METHODOLOGICAL IMPROVEMENTS**

In a recently conducted longitudinal study using data from the Fragile Families and Child Well-being Study, associations between induced abortion and substance use among mothers of at least one young child were conducted with controls for numerous potentially confounding variables [158]. The sample consists of women who were predominantly single, young, poor, and unmarried at the time of a birth and was narrowed down to only women who

experienced a subsequent pregnancy resolved through induced abortion ( $n=112$ ) or delivery ( $n=130$ ) within 12 to 18 months of the first birth. Although intendedness status of the second pregnancy could not be assessed due to reliance on pre-existing data, most pregnancies within 12 to 18 months of a prior birth and occurring under adverse ecological conditions are likely to have been unintended.

No previous studies have explored an extensive list of potential predictors of the choice to abort versus deliver, nor have the few available relative risk studies comparing the effects of induced abortion and delivery on the subsequent substance use incorporated many controls for variables associated with the choice to abort. Interestingly, examination of over 50 potential predictors of the choice to abort vs. deliver yielded only 14 variables found to distinguish the two groups, 11 of which related to the mother's assessment of the quality and reliability of paternal involvement in childcare and household maintenance. Women were more inclined to choose to abort when paternal involvement was rated poorly. The other three variables found to predict the choice to abort included being unmarried to the child's father when the child was born, having considered an induced abortion for the earlier pregnancy, and an assessment of the relationship with the child's father as having remained the same or as having become worse after the previous pregnancy was discovered. Interestingly, substance use of various forms was not found to predict the choice to abort; however, when the 14 covariates were used in the analyses, women with a history of induced abortion when compared to women with a second birth, were over three times more likely to report recent heavy use of alcohol (consumption of 5 or more drinks on one day in the past 30 days) and they were nearly twice as likely to report recent cigarette smoking (in the past 30 days).

A second study involved analysis of two waves of data from the Survey of Adolescent Health (ADD Health) with two primary phases [159]. In the first phase, over 50 demographic, educational, psychological, peer, and family factors were examined as possible correlates of pregnancy resolution. Only a self-assessment of being prone to risk-taking behavior and the desire to leave home predicted the choice to abort. In the second phase, psychological and behavioral outcomes among individuals who aborted or delivered during adolescence were compared after statistically removing the effects of risk-taking and the desire to leave home. The results indicated that more than six adolescents with induced abortion experience reported frequent marijuana use for every one adolescent with birth experience. Without the controls, induced abortion was associated with a significantly higher risk for marijuana, tobacco, and alcohol use compared to birth.

Finally, in a recently published study that examined the relative strength of associations between induced abortion and various negative psychological outcomes in two cultures (American and Russian), a few of the methodological improvements advocated for herein were effectively incorporated [80]. Specifically, a wide array of personal psycho-social history variables, with an emphasis on relationship trauma experienced as a child and as an adult,

found to be significantly related to the various outcome assessments were statistically controlled when cross-cultural comparisons were conducted. Most of the outcomes dealt with stress, with a particular emphasis on PTSD, but a measure of drug/alcohol use post-dating an induced abortion was one item on a more generalized composite measure of negative effects. This measure also tapped into negative emotions as well as relationship and employment problems post-dating the procedure.

When controlling for induced abortion context variables (number of induced abortions, weeks pregnant, time elapsed since the induced abortion), stressors before and after the induced abortion that were unrelated to the induced abortion, and psychosocial history variables (harsh discipline as a child, childhood sexual and physical abuse, parental divorce, unwanted sexual contact before age 18, physical or emotional abuse after age 18, and rape after age 18) found to be associated with scores on the negative effects variable, the results revealed that American women reported a higher frequency of negative outcomes. Out of a possible 17 negative post-abortion effects, Russian women reported experiencing an average of 4.57 (SD=3.18) and American women reported experiencing an average of 10.56 (SD=3.59). With regard to increased rates of alcohol or drug use, 4.4% of the Russian women and 26.7% of the American women responded affirmatively. As noted by the authors, differences between the American and Russian women may have been due to discrepant socio-cultural attitudes pertaining to induced abortion, the Russian women generally having more experience with stress based on the difficult economic, political, and social conditions that have plagued Russian life in recent decades, or the differences may have been a result of the Russian women being less prone to verbalize their emotions. More research is needed to explore these and other explanations. A particularly noteworthy feature of this study was that the participants were specifically asked if they perceived the negative effects experienced to be directly related to the induced abortion, which adds strength to a causal hypothesis. Nevertheless, women may attribute their substance use to induced abortion when in fact other factors (e.g., personality traits or additional stressors) are implicated as well [17]. This study, unlike most previously conducted studies, conveyed sensitivity to the embeddedness of induced abortion experiences in the context of other life stressors as an attempt was made to understand the association between induced abortion and mental health.

## FUTURE DIRECTIONS

In addition to the need for methodological improvements in research efforts geared toward yielding a more complete understanding of associations between induced abortion and substance use, there are several related, yet currently unexplored research questions meriting more focused scholarly attention. First, is there an association between induced abortion and dependence on prescription drugs for the relief of anxiety? Securing a prescription for an anti-anxiety medication would not necessarily require women to disclose the source of their stress; therefore, women who suffer emotionally from an induced abortion could very well be at higher risk for dependence on prescription drugs.

Second, why are some women who suffer from an induced abortion less inclined to use substances to relieve their emotional pain? What are some of the healthy ways women have come to terms with a negative induced abortion experience? How do women who take the substance route differ from those who find alternate coping strategies? Do women who turn to drugs for relief of a negative induced abortion experience have less well-developed social networks than women who do not or are they affiliated with a religious or social group that strongly opposes induced abortion? Perhaps women who are more religious find peace through their spiritual lives and do not feel the need to turn to substances. Is the presence of a trusted confidante a deterrent to substance use? Do self-esteem or self-efficacy factor into women's choice of coping strategies? There are obviously many specific unanswered questions to this general question, as effective coping strategies have not been systematically investigated.

Third, are there distinct patterns in substance use post-dating an induced abortion based on personal characteristics and/or life circumstances? Post-abortion trajectories could very well differ in a variety of ways. For example, some women who experience induced abortion negatively may fall rapidly into a self-destructive pattern of substance use; whereas others may experience some stress with an induced abortion but develop a gradual reliance on substance use that may become periodically exacerbated by certain life events. Still other women may not experience negative emotions that increase risk of substance use until a much later date when there is exposure to information on prenatal development, belief systems change, or other stressful events initiate feelings of regretting an induced abortion. In a study of women's responses to medical induced abortion, Miller and his colleagues [65] concluded that "the low point following the abortion may not occur for days, weeks, or even months" (p. 262).

More research is needed to explore experiences post-dating an induced abortion that may exacerbate any negative feelings associated with the abortion and serve as a stressor that finally overloads positive coping abilities and leads to negative coping efforts like substance use. For example, a subsequent induced abortion, non-voluntary perinatal loss, experiencing infertility, or the death of a family member may push women to a point wherein their coping skills are no longer effective in bringing relief. Research by Klock and colleagues [160] revealed that spontaneous abortion tends to be experienced as more traumatic for women who have had a history of induced abortion compared to women without a past induced abortion. Women who abort before a spontaneous abortion might be more inclined to blame themselves for a spontaneous abortion if they perceive a connection between the two perinatal losses. The study by Klock *et al.* did not examine substance use; however a few studies have revealed that women who abort more than one pregnancy are more inclined to use substances [15,153]. Unfortunately these studies have not controlled for lifestyle factors that may distinguish between women who obtain one versus multiple induced abortions. Answers to questions pertaining to individual differences in induced abortion-substance use patterns necessitates substantive data collection efforts with inclusion of many personal and

situational variables measured over a longer period of time than is typically done in post-abortion research. Most post-abortion studies follow women for less than a year after the procedure.

### PRACTICAL IMPLICATIONS

For various societal reasons induced abortion does not represent a typical stressor that can be easily dealt with in one of the most common ways people cope with stressful life events, through reaching out to others for sympathy and support. Because feelings of shame and secrecy frequently cloak an induced abortion experience due to strong opinions regarding the morality and legality of the procedure expressed by a significant proportion of our society, women may not feel comfortable confiding in others for needed support. Studies clearly suggest that the presence of a sympathetic social support system is a vital component to effective recovery for the bereaved and as indicated above, many women do identify induced abortion as a death experience [161-163]. Cohen and Roth [164] found that when women discussed an induced abortion decision with others they experienced decreases in anxiety from before to after the induced abortion when compared to women who did not reach out to others for help.

There is some preliminary evidence indicating that the pain of induced abortion is more difficult to resolve than the pain associated with involuntary forms of loss, which in contrast to induced abortion, do have socially sanctioned mechanisms for women to secure emotional support. For example, Broen *et al.* [165] reported that women who aborted 2 years earlier were more likely to suppress thoughts and feelings about the loss than women who had experienced a spontaneous abortion or stillbirth. Specifically, nearly 17% of women who had an induced abortion scored highly on avoidance symptoms compared to about 3% of women who miscarried. Strong feelings of shame, grief, or loss soon after the pregnancy ended were associated with symptoms of avoidance and intrusion 2 years later.

Professionals who work with women who have experienced a spontaneous abortion or stillbirth are inclined to encourage open expression of feelings to foster healing [166]. However with induced abortion such opportunities are undoubtedly less available based on the well-entrenched view that psychological problems in association with an induced abortion are uncommon [98,167]. Women may feel the need to suppress thoughts and emotions related to an induced abortion because they have not been able to process and/or openly express negative emotions, as Kluger-Bell [168] a psychotherapist states "When other people are reluctant to listen to us, when there are no ceremonies to publicly acknowledge the impact of our experiences, we receive the covert message that others would rather not hear what we have to say, and this makes it difficult to even identify our reactions to our losses" (p. 130). Alcohol and drugs, which are readily accessible in our society, may be used as a means for effectively suppressing or blunting painful memories. Given the strong evidence suggesting induced abortion may be linked to mental health problems (described above) in a minority of women, professionals should be actively encouraged to help avert negative

responses and encourage healing in those who are suffering. Specific suggestions along these lines are described below.

There are many obvious problems associated with use of substances as a means for coping with a painful induced abortion. First, it is likely to facilitate avoidance and hinder women from coming to terms with the underlying cause of their discomfort. Further, as the emotional pain of an induced abortion is denied, the many physical, psychological, social, and practical problems associated with substance abuse will in all likelihood introduce new sources of suffering that in turn may fuel the trauma of an induced abortion. Much of this cycle can be averted if women are encouraged to explore ambivalent feelings before an induced abortion and to make choices that are consonant with their fundamental desires and values. In situations wherein women are inclined to choose an induced abortion for practical reasons or out of fears associated with continuing the pregnancy (e.g., disapproval from others, partner break-up) despite an underlying desire to continue the pregnancy and or conflicts with core values, counselors should encourage them to explore how realistic their fears are and assist in identifying sources of support within and outside the family to make pregnancy continuation feasible. Moreover, avenues for open expression of any negative emotions that emerge during or after the procedure are critical. Induced abortion providers need to understand and acknowledge the complexity of women's emotional responses to induced abortion, share literature regarding the wide range of emotional responses, and encourage women to seek post-abortion help as needed. Further, professionals who work with women who are suffering from anxiety or substance use disorders should sensitively inquire about the possibility of a past induced abortion in order to provide women with an opportunity to express their feelings in a comfortable context and foster more positive coping efforts as indicated. Efforts directed toward treating women for substance use disorders without addressing what in many instances may constitute a primary cause are likely to be less effective and in some cases may prove futile.

Due to a variety of political, social, and ideological factors, the topic of induced abortion does not seem to have received the focused research attention it deserves. In addition, the induced abortion literature that has accumulated throughout the world has suffered from numerous methodological shortcomings leading to many inconclusive findings. In the interest of the millions of women who annually undergo one of the most common surgical procedures available in the United States and elsewhere in the world, more substantive, well-controlled research should be a priority. The complexity of individual, relationship, situational, and societal variables that must be considered in efforts to explain associations between induced abortion and substance abuse is daunting as are methodological requirements for sound research on the topic. Nevertheless, given the destructive nature of substance use in the lives of women, efforts to identify causes should be aggressively pursued.

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