

Review Article

Abortion and subsequent mental health: Review of the literature

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The risk that abortion may be correlated with subsequent mental disorders needs a careful assessment, in order to offer women full information when facing a difficult pregnancy. All research papers published between 1995 and 2011, were examined, to retrieve those assessing any correlation between abortion and subsequent mental problems. A total of 36 studies were retrieved, and six of them were excluded for methodological bias. Depression, anxiety disorders (e.g. post-traumatic stress disorder) and substance abuse disorders were the most studied outcome. Abortion versus childbirth: 13 studies showed a clear risk for at least one of the reported mental problems in the abortion group versus childbirth, five papers showed no difference, in particular if women do not consider their experience of fetal loss to be difficult, or if after a fetal reduction the desired fetus survives. Only one paper reported a worse mental outcome for

childbearing. Abortion versus unplanned pregnancies ending with childbirth: four studies found a higher risk in the abortion groups and three, no difference. Abortion versus miscarriage: three studies showed a greater risk of mental disorders due to abortion, four found no difference and two found that short-term anxiety and depression were higher in the miscarriage group, while long-term anxiety and depression were present only in the abortion group. In conclusion, fetal loss seems to expose women to a higher risk for mental disorders than childbirth; some studies show that abortion can be considered a more relevant risk factor than miscarriage; more research is needed in this field.

Key words: abortion, anxiety, depression, mental illness.

THE POSSIBILITY THAT abortion might have mental consequences has been widely investigated in the last few years.¹ The same concerns apply also to miscarriage;² therefore psychological support has been advocated for women who experience a fetal loss, either induced or involuntary.^{3,4} The psychological drawbacks of abortion have been studied in order to offer complete information to the women who hesitate when facing a difficult pregnancy.^{5,6} In the last few years, these studies have become more and more frequent, and a constant update of research evidence in this field is needed. In particular, several studies have compared the mental consequences of

abortion (voluntary termination of pregnancy) with those described after a miscarriage (involuntary termination of pregnancy with fetal death). Most studies investigated the possible mental consequences of abortion, maybe because it is worth determining whether this intervention can be an actual help for women's health, and how to prevent its drawbacks, if any. Thus, we performed a review of the scientific literature on the psychological and psychiatric drawbacks of abortion.

METHODS

We performed a search in PubMed and Medscape from the year 1995 to 2011. We used as key words the following: 'abortion', 'mental disorder', 'depression', 'anxiety', 'illicit drugs', 'tobacco', 'alcohol'. Inclusion criteria were: (i) original studies about mental risks correlated with abortion; (ii) presence of a control

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group of women, who did not undergo abortion, with similar background features; (iii) clarity and simplicity of design, and reliability of the measures used to assess the outcome; and (iv) correct statistical evaluation to assess the significance of differences between groups. Exclusion criteria: (i) reviews, commentaries, case-reports; and (ii) all studies that did not fulfill the inclusion criteria. We carefully examined each paper, and highlighted several features: age and sample size, type of control group, outcome, tool used to assess the studied outcome, conclusions, major limitations of the study. We performed a further analysis of the 30 studies that fulfilled the inclusion criteria, and divided them into four categories, according to the type of study design: (i) prospective studies with validated assessment tools and adjustment for previous mental illness; (ii) prospective studies with validated assessment tools and no adjustment for previous mental illness; (iii) retrospective studies reporting specific diagnoses; and (iv) retrospective studies reporting only the rates of first-time psychiatric contact.

RESULTS

We retrieved 36 papers.^{7–42} We excluded seven studies: two for absence of a control group,^{26,40} one because the control group was composed of women's partners,²⁵ one because it did not use a validated questionnaire,²² one because it compared the consequences of medical and surgical abortion,⁴² one because it was a re-elaboration of a previous paper to investigate the causes of the increase of depression in the abortion group,¹⁹ and one because there was no statistical comparison between abortion and childbirth groups.³⁹

We retained 30 studies for analysis. Of these, only two assessed adolescent women.^{7,41} Four studies assessed only a possible correlation between abortion and depression,^{15,31,32,35} 14, a correlation between abortion and depression along with other outcomes such as anxiety disorders or substance abuse disorders,^{9,12,16–18,20,21,23,24,27,28,30,37,41} three, a correlation between abortion and anxiety disorders alone,^{8,14,38} and one, a correlation between abortion and loss of self-esteem alone.⁷ Three papers used as outcomes the rates of psychiatric visit or psychiatric treatment taken from databases.^{11,29,33} Three papers studied illicit drugs, alcohol and smoke use as the only outcome,^{11,13,34} and in five cases they studied the correlation between abortion and both substance abuse disorder and depression.^{12,16,17,28,30}

Twenty-eight of the studies that examined psychiatric symptoms used a validated scale, while three examined psychiatric diagnosis from the database from which the data on psychiatric help were collected;^{10,29,33} and three studies on drug, alcohol or tobacco abuse were done using simple interviews or questionnaires to ascertain the use of these substances and did not investigate for substance abuse disorders.^{11,13,34}

For a more detailed analysis, Table 1 lists studies according to major outcome (depression, anxiety disorder, substance addiction disorder etc.), and then according to the type of main control groups: common childbearing, miscarriage, and unintended childbearing. Twenty-three studies were prospective,^{7–10,16–18,20,21,23,24,27,30–39,41} while seven were retrospective (Table 1).^{11–15,28,29}

In most studies, the group of women who had abortion was compared with women who had given birth, without considering the intention of being pregnant,^{10–12,15–17,21,23,24,27,28,30,31,35,38} and in others with women who had miscarried^{8,9,13,16,17,21,36} or who had had unintended pregnancies that had led to delivery.^{14,17,20,32,34} Two studies compared women who had delivered a baby, with those with fetal reduction.^{27,40}

Abortion versus childbirth

Thirteen studies supported the presence of a risk of mental disorder (Table 1) in the groups of women who had had an abortion versus those who gave birth.^{10–12,15–17,19,23,24,28,30,31,33} Only five papers showed no risk in the abortion group:^{18,21,27,35,41} in particular if women do not consider their experience of fetal loss to be difficult,²¹ or unless all fetuses die in a fetal reduction aimed to eliminate only one fetus,²⁷ but in the presence of negative emotional reactions, the subsequent negative effects of abortion on mental health were more frequent.¹⁸ One study noted a lower increase in first psychiatric contact after abortion than after childbirth.²⁹ One study that evaluated self-esteem after abortion produced mixed findings.⁷

Abortion versus unplanned pregnancy

When comparing abortion and unplanned pregnancies that ended in delivery, four studies found a higher risk for loss of self-esteem, anxiety disorders, depression, suicide ideation, and substance abuse

Table 1. Synthesis of the retrieved studies

First author	Women's age	Pregnancy status compared in the study (no. cases)	Outcomes	Outcome assessment: time after pregnancy	Results	Study design
Main outcome: Depression						
Gilchrist, 1995 ²⁰	No limits	UC (6151), A (6410)	Self-harm psychoses, D, anxiety	Variable	Compared with UC, A had no more reported psychiatric disorders Women with a previous history of psychiatric illness were most at risk of disorder after the end of their pregnancy, whatever its outcome. Women without a previous history of psychosis had an apparently lower risk of psychosis after A than after C, but rates of psychosis leading to hospital admission were similar. In women with no previous history of psychiatric illness, deliberate self-harm was more common after A	A
Salvesen, 1997 ³⁷	No limits	A (29); M (24)	D, anxiety disorder	7 weeks, 5 months, 1 year	Anxiety and depression, close to the event are greater in the abortion group, but they are similar after 1 year.	A
†Broen, 2005 ⁹	18–45	A (80), M (40)	Stress, quality of life, anxiety, D	10 days, 6 months, 2 and 5 years after the event	Compared with the general population, A had significantly higher anxiety scores at all four interviews, while M had significantly higher anxiety scores only at 10-day interview. No significant differences in depression scores.	A
Rees, 2007 ³⁵	No limits	A (99); M or CB (107); C (629); N (1732); P (146).	D	1 and 3 years after childbirth/abortion	Women who have an abortion are not at higher risk of depression than those who give birth. The positive association between abortion and depressive symptoms cannot be explained by pre-pregnancy depression.	A
Kersting 2007 ²³	No limits	A (62), C (65)	Complicated grief, PTSD, D, anxiety	14 days, 6 months and 14 months after the abortion/delivery	Compared with C, A had significantly higher scores in all outcomes.	A
Kersting, 2009 ²⁴	No limits	A (62), PrC (43), TC (65)	D, anxiety and PTSD	2 weeks, 6 months and 12 months after the birth/abortion	Compared with TC, PrC had higher outcome scores, and A even higher	A
McKinney, 1995 ²⁷	No limits	C (44), FR (44)	D and other mental illnesses	Variable	Compared with C, in FR if only one fetus dies, outcomes are similar; if all fetuses die, outcomes are worse, both if the loss is voluntary or spontaneous.	B
Reardon, 2002 ³²	14–24 (1st interview)	UC (128), A (293)	D	Variable	Compared with UC, A married women, were significantly more likely to be at high risk of clinical depression. The difference was not significant among unmarried women.	C
Cogle, 2003 ¹⁵	14–21 (1st interview)	A (131–154); C (877–1197) (the range depends on the no. respondents for each item of the questionnaire).	D	Variable. Interviewed in 1992	Compared with C, after A, greater depression was present	C
Pedersen, 2007 ³⁰	12–18 (1st interview)	N: (461), C (183), A (76), C&A: (49)	D, substance abuse	In 1992, and after 2, 7 and 13 years	Compared with N and C, A and C&A had elevated rates of substance use and D. A women who lived with the father of the aborted fetus were not at increased risk.	C
†Dingle, 2008 ¹⁶	21	N (943), C (97), A (101), M (82)	Substance abuse, D	Variable	Compared with N and C, A and M had higher scores in all parameters than the other two groups	C
†Fergusson, 2008 ¹⁷	16–30 (1st interview)	A (153), M (138), UC (52) PC (197)	D, anxiety, suicide ideation, substance abuse	Variable	Compared with UC and PC, A and M have higher risks in all outcomes, with A having higher risk than M	C

Table 1. (Continued)

First author	Women's age	Pregnancy status compared in the study (no. cases)	Outcomes	Outcome assessment: time after pregnancy	Results	Study design
Pedersen, 2008 ³¹	12–15 (1st interview).	A (125), C (232)	D	Variable	Women who undergo an A in their 20s, had increased rates of depression at age 27.	C
Coleman, 2009 ¹²	15–54	A (399), C (650)	Panic disorder, panic attacks, PTSD, agoraphobia, mood, bipolar disorder, mania, D, and SAD	Variable	Compared with C, A was found to be related to an increased risk for a variety of mental health problems (panic attacks, panic disorder, agoraphobia, PTSD, bipolar disorder, D), and SAD	C
Mota, 2010 ²⁸	>18	A (452) C (2839)	D, anxiety panic attacks, PTSD, social phobia, SAD, suicidal ideation, eating disorders	Variable	Compared with C, all outcomes but eating disorders were higher in A.	C
Warren, 2010 ⁴¹	Teenagers	C (220); A (69)	D, self-esteem	1 and 5 years	Adolescents who have an abortion do not appear to be at elevated risk for D or low self-esteem in the short term or up to 5 years after the abortion	C
†Hamama, 2010 ²¹	No limits	A (199), M (184) C (1176)	D and PTSD	During subsequent pregnancy	Compared with C, A and M have higher depression and PTSD, only if fetal loss is lived as 'hard times'.	C
Main outcome: Anxiety disorders						
Gilchrist, 1995 ²⁰	No limits	UC (6151), A (6410)	Self-harm psychoses, D, anxiety disorders	Variable	Compared with UC, A had no more reported psychiatric disorder. Women with a previous history of psychiatric illness were most at risk of disorder after the end of their pregnancy, whatever its outcome. Women without a previous history of psychosis had an apparently lower risk of psychosis after A than after C, but rates of psychosis leading to hospital admission were similar. In women with no previous history of psychiatric illness, deliberate self-harm was more common after A	A
Salvesen, 1997 ³⁷	No limits	A (29); M (24)	D, anxiety disorder	7 weeks, 5 months, 1 year	Anxiety and depression are greater in the abortion group, close to the event, but similar after 1 year.	A
†Broen 2004 ⁸	18–45	A (80), M (40)	PTSD	10 days, 6 months, and 2 years after the miscarriage or induced abortion	Compared with M, A was followed by minor short-term PTSD. In the long term, PTSD was higher in the A group.	A
†Broen, 2005 ⁹	18–45	A (80), M (40)	Stress, quality of life, anxiety disorders, depression	10 days, 6 months, 2 and 5 years after the event	Compared with the general population, A women had significantly higher anxiety scores at all four interviews, while M women had higher anxiety scores only at 10-day interview.	A
Kersting 2007 ²³	No limits	A (62), C(65)	Complicated grief, D, anxiety disorders	14 days, 6 months and 14 months after the abortion/delivery	Compared with C, A had significantly higher scores in all outcomes	A
Kersting, 2009 ²⁴	No limits	A (62) PrC (43), TC (65)	D, anxiety disorders	2 weeks, 6 months and 12 months after the birth/abortion	Compared with C, Pr had higher rates of the investigated outcomes, and A even higher	A
†Salvesen 1997 ³⁷	No limits	A(24), M (27)	Anxiety disorders, PTSD	Just after abortion/ miscarriage, and after 4 weeks, 7 weeks and 1 year.	Compared wit M, A was not followed by different outcomes	B
†Hamama, 2010 ²¹	No limits	A(199), M (184), C (1176)	D and PTSD	During subsequent pregnancy	Compared with C, A and M had higher D and PTSD	B
Cogle 2005 ¹⁴	15–44	UC (1813); A (1033)	Anxiety disorders	Variable	Compared with UC, A had significantly higher rates of subsequent generalized anxiety when controlling for race and age	

Table 1. (Continued)

First author	Women's age	Pregnancy status compared in the study (no. cases)	Outcomes	Outcome assessment: time after pregnancy	Results	Study design
[†] Fergusson, 2008 ¹⁷	16–30	A (153), M (138), UC (52) PC (197)	Depression, anxiety disorders, suicide ideation, SAD	Variable	Compared with UC and PC, A and M had higher risks for all outcomes, with A having higher risk than M.	C
Steinberg, 2008 ³⁸	15–44	(a) A (1244) UC (5470) (b) A (273), C (1549)	Anxiety symptoms	Variable	(a) Compared with UC, anxiety was greater in the abortion group, but the difference disappeared if anxiety previous to birth/abortion was considered as a confounding factor (b) Compared with C, anxiety was not greater after A.	C
Mota, 2010 ²⁸	>18	A (452), C (2839)	D, anxiety disorders, panic attacks, PTSD, social phobia, SAD, suicidal ideation, eating disorders	Variable	Compared with C, A was followed by higher outcome rates, with the exception of eating disorders	C
Main outcome: Substance abuse disorders						
Coleman, 2002 ¹¹	15–44	From the National Pregnancy and Health Survey (a) C with PreA (74), C with PreC (531) (b) C with PreA (74) C with no previous pregnancies (664)	SAR	Just after childbirth	Compared with PreC or Pr, A was followed by higher SAR rates.	C
Reardon, 2004 ³⁴	14–21 (1st interview)	UC (535), A (213), N (1144)	SAR	4 years after birth/abortion Interviews every 2 years since 1979 to 1984	Compared with UC and N, A was followed by higher risk of presenting SAR	C
[†] Coleman, 2005 ¹³	No limits	C (1020). In previous pregnancies they had experienced M (404), A (426), and SB (401)	SAR	Just after delivery/abortion	Compared with previous M and SB, previous A was followed by greater risk of SAR in the present pregnancy.	C
Pedersen, 2007 ³⁰	12–18 (1st interview)	N (461), C (183), A (76), C&A (49)	D, SAD	In 1992, and after 2, 7 and 13 years	Compared with N and C, A and C&A had greater rates of SAD and D. A women who lived with the father of the aborted fetus were not at increased risk.	C
[†] Dingle, 2008 ¹⁶	21	N (943), C (97), A (101), M (82)	SAD, D	Variable	Compared with N and C, A and M were followed by worse D and SAD	C
[†] Fergusson, 2008 ¹⁷	30	A (153), M (138), UC (52) PC (197)	D, anxiety disorder, suicidal ideation, SAD	Variable	Compared with UC, M was followed by higher outcome scores for all outcomes, and A by even higher scores	C
Coleman, 2009 ¹²	15–54	A (399), C (2650)	Panic disorder, panic attacks, PTSD, Agoraphobia, mood, bipolar disorder, mania, D, and SAD	Variable	Compared with C, A was followed by higher outcome scores	C

Table 1. (Continued)

First author	Women's age	Pregnancy status compared in the study (no. cases)	Outcomes	Outcome assessment: time after pregnancy	Results	Study design
Mota, 2010 ²⁸	>18	A (452) C (2839)	D, anxiety disorder, panic attacks, PTSD, social phobia, SAD, suicidal ideation, eating disorders	Variable	Compared with C, A was followed by higher outcome rates, with the exception of eating disorders	C
Main outcome: Miscellaneous						
[†] Bailey, 2001 ⁷	<18	M (51), A (75), UC (176), PC (96)	Self-esteem	The teens in prenatal care were interviewed four times: at their first prenatal visit (before discharge in the case of abortion), at approx. 35 weeks of gestation, at 45 days postpartum/abortion, and at 1 year postpartum/abortion.	A and UC and PC: increase in self-esteem after 1 year. The level of self-esteem was far higher in girls who have given birth; its increase rate is faster in those who have aborted. M: lower self-esteem than A after 1 year	B
Coleman, 2002 ¹⁰	14–49	A(14,297); C (40,122)	Rates of 1st-time outpatient mental health treatment	After 180 days, 1 year, 2 years, 4 years from the event	Compared with C, A had 63% more claims within 90 days after the pregnancy; this difference decreased with time.	C
Fergusson, 2009 ¹⁸	16–30	(a) A (104) immediate reactions to A; (b) A (532) long-term reactions to A	Feelings towards their abortion; anxiety disorder	Variable	Abortion was associated with high rates of both positive and negative emotional reactions; risks of subsequent mental health problems increased with the extent of the negative emotional reactions reported by the woman.	C
Reardon, 2003 ³³		C (41 442), A (15 299)	Rates of first-time psychiatric contact (also classified for D or psychoses)	In the following 4 years	Compared with C, A women had more first-time psychiatric admission	D
Munk-Olsen, 2011 ²⁹	No limits	A (84,620), C (280,930)	Rates of first-time psychiatric contact	Within the 12 months after the abortion or childbirth as compared with the 9-month period before the event.	Compared with C, A had a lower increase in first-time psychiatric contact. Personality difficulties increase after A, but not after C.	D

[†]Studies in which abortion is compared with miscarriage. **Bold**, studies in which abortion is compared with UC. Study design: A, prospective studies with validated assessment tools and adjustment for previous mental illness; B, prospective studies with validated assessment tools and no adjustment for previous mental illness; C, retrospective studies reporting specific diagnoses; D, retrospective studies reporting only the rates of first-time psychiatric contact. A, abortion; C, childbirth; D, depression; FR, fetal reduction; M, miscarriage; N, never pregnant; PC, planned childbirth; Pr, pregnant for the first time; PrC, preterm childbirth; PreA, previous abortion; PreC, previous childbirth; PTSD, post-traumatic stress disorder; SAD, substance abuse disorder; SAR, substance abuse rate; SB, stillbirth; TC, term childbirth; UC, unplanned childbirth.

disorder or substance abuse rate in the abortion groups,^{7,14,17,34} and two no difference;^{20,38} in one case, results were indicative of a prevalence of depression in the case of abortion only in the case of married women.³²

Abortion versus miscarriage

Three studies that compared abortion and miscarriage found greater risk of subsequent loss of self-esteem, substance abuse or depression, anxiety

disorder, suicide ideation and – above all – substance abuse disorder after an abortion,^{7,13,17} three found no differences,^{16,21,37} while two noted apparently discordant results (short-term post-traumatic stress disorder [PTSD] and depression are higher in the miscarriage group, while long-term PTSD and depression are present only in the abortion group).^{8,9}

Classification of these results according to study design is given in Table 2; in particular, all studies on the relationship between drug abuse and abortion are retrospective, while those for the other possible

Table 2. Studies comparing mental consequences of abortion with other pregnancy outcomes

Comparison with:	Results of the comparisons (1,x,2,†)			
	1 (n) [Study type]	x (n) [Study type]	2 (n) [Study type]	† (n) [Study type]
Childbirth	(13) [2A, 10C, 1D]	(5) [2A, 1B, 2C]	(1) [D]	(1) [B]
Unplanned childbirth	(4) [1B, 3C]	(2) [1A, 1C]		(1) [C]
Miscarriage	(3) [1B, 2C]	(4) [1B, 2C]		(2) [A]

1, studies reporting a higher risk for mental illness in the case of abortion; x, studies reporting similar risk for mental illness in the case of another outcome (childbirth, unplanned childbirth or miscarriage); 2, studies reporting a higher risk for mental illness in the case of another outcome (childbirth, unplanned childbirth or miscarriage); †, studies reporting that some mental illness are more frequent for abortion and others for the other outcome (childbirth, unplanned childbirth or miscarriage). A, prospective studies with validated assessment tools and adjustment for previous mental illness; B, prospective studies with validated assessment tools and no adjustment for previous mental illness; C, retrospective studies reporting specific diagnoses; D, retrospective studies reporting only the rates of first-time psychiatric contact.

consequences include both prospective and retrospective studies.

The rates of the single outcomes in the various groups of women should be outlined; in some studies rates are not available, and this makes this analysis difficult, but there is a general convergence of the data.

Clinical depression is present in 17% of women who give birth to a living baby and in 26% of those who abort.¹⁵ Depression and bipolar disorder were present in 43.2% of women who miscarried, in 45.5% of those who had an abortion, in 28.7% of those who gave birth and in 25.1% of never pregnant women.¹⁶ A minority of studies did not find a significant difference between abortion and live birth, but one gave only risk ratios;²⁰ only in the study on fetal reduction, did the authors give depression rates: 15% after fetal reduction and 15% in the control group who gave birth to a healthy baby,²⁷ but fetal reduction is a special type of abortion, because it is balanced by the birth of the surviving fetus. Women enrolled in that study, whose selective reduction provoked the death of all fetuses, had a depression rate of 75%, while those who aborted (control group) had a depression rate of 60%.

With regard to anxiety, one study showed that 10 days after the event, 47.5% of the women who had a miscarriage had high Impact of Event Scale scores, compared with 30% for women who had an induced abortion.⁹ The corresponding values after 2 years were 2.6% and 18.1%, respectively. Another study that compared term childbirth and abortion found that after 14 months, relevant psychiatric diagnoses

were present in 0% and in 16.7% of women, respectively.²³ Cougle *et al.* found clinical anxiety in 10.1% of unintended pregnancies, versus 13.7% in the abortion group ($P < 0.005$).¹⁴

Drug dependence

Dingle *et al.* reported that the rate of various dependences (including alcohol and nicotine) was 21–34% in the case of abortion, 17–31% in the case of miscarriage, and 6.3–26% in the case of childbirth.¹⁶ These data agree with the other analyzed studies on dependence.

DISCUSSION

The studies analyzed here show that abortion is a risk factor for subsequent mental illness when compared with childbirth; data show that even when compared with the other two possible outcomes (miscarriage or the birth of an unplanned baby) the risk is greater or similar. Even miscarriage is a risk factor for subsequent mental illness, although the evidence for this risk has not been investigated so widely and seems lower than for abortion. Some consequences can be drawn.

The first is that fetal loss is traumatic. It is a risk factor for mental illness – both in the case of abortion and in miscarriage – and its impact on a woman's life can erroneously be underestimated. Most studies show that abortion has a greater impact on women's mental health than childbearing; all remaining studies show similar mental consequences and only

one seems to have noted a worse outcome for child-bearing. Even the birth of an unplanned child is often traumatic, but abortion seems to be even more traumatic, or similar with regard to the psychological outcomes; this should be taken into account when counseling women scared by a non-desired pregnancy. Making their choices, women should be clearly informed. It is true that health is more than 'mental health'; nevertheless, mental health and the risks to it after an abortion cannot be disregarded, in counseling women.

These data show that a greater involvement of the national health system in clinical follow up of women who have had a fetal loss is desirable: miscarriage and elective abortion can have negative mental consequences and this should be taken into account, to follow up women who have had a fetal loss. In particular, elective abortion is one of the most common medical interventions in the world: 1.29 million were performed in the USA in 2008.⁴³ Thus it is important to monitor mothers who have undergone abortion, to prevent negative mental consequences: although the discussion in this field is limited to ethics and morality, we emphasize that there is also a serious public health problem. The discussion in this field does not currently trespass on the moral boundaries;^{44,45} now, it is important to consider the hypothesis that abortion is an independent risk factor for mental health, and carry out more research accordingly.

We encourage further research in this field. Only a few of the retrieved studies were prospective; ruled out confounding elements in data analysis; or used validated assessment tools. In contrast, most studies used data taken from big databases on female health, and this is a weak point of these studies, because confounding factors cannot be eliminated, because health assessment is performed at very different times from the event, and because causes of abortion are not explored.

The main restriction on the ability to arrive at a conclusion about the mental risks of abortion, is the scarcity and the heterogeneity of the studies. Different outcomes are studied (depression, anxiety disorders and substance abuse disorders, and several psychological symptoms), different scales or questionnaires have been used to measure them, and different age groups have been analyzed, making difficult any comparison and any conclusion, although a correlation between abortion and subsequent risks for mental health seems realistic.

Further research is needed in this field, and it necessitates large longitudinal, prospective studies assessing the numerous contextual variables and potential confounders associated with having an elective abortion, and mental health status. Future research is needed to shed light on the mechanisms linking abortion to various disorders and to decipher the characteristics of women most prone to developing a particular mental health problem.

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