



Induced abortion and implications for long-term mental health: a cohort study of 1.2 million pregnancies

Nathalie Auger^{a,b,c,d,*}, Jessica Healy-Profitós^{a,b}, Aimina Ayoub^{a,b}, Antoine Lewin^{e,f}, Nancy Low^g

^a University of Montreal Hospital Research Centre, Montreal, Quebec, Canada

^b Institut national de santé publique du Québec, Montreal, Quebec, Canada

^c Department of Social and Preventive Medicine, School of Public Health, University of Montreal, Montreal, Quebec, Canada

^d Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Montreal, Quebec, Canada

^e Department of Mathematics, University of Sherbrooke, Sherbrooke, Quebec, Canada

^f Medical Affairs and Innovation, Héma-Québec, Saint-Laurent, Quebec, Canada

^g Department of Psychiatry, McGill University, Montreal, Quebec, Canada

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ABSTRACT

Background: The relationship between induced abortion and long-term mental health is not clear. We assessed whether having an induced abortion was associated with an increase in the long-term risk of mental health hospitalization.

Methods: We carried out a retrospective cohort study of 28,721 induced abortions and 1,228,807 births in hospitals of Quebec, Canada, between 2006 and 2022. The exposure was induced abortion compared with other pregnancies, and the outcome was hospitalization for a psychiatric disorder, substance use disorder, or suicide attempt over time. We followed patients up to 17 years after the end of pregnancy to identify mental health-related hospitalizations. We calculated hazard ratios (HR) and 95 % confidence intervals (CI) for the association between induced abortion and mental health hospitalization, adjusted for pregnancy characteristics.

Results: Rates of mental health-related hospitalization were higher following induced abortions than other pregnancies (104.0 vs. 42.0 per 10,000 person-years). Abortion was associated with hospitalization for psychiatric disorders (HR 1.81, 95 % CI 1.72–1.90), substance use disorders (HR 2.57, 95 % CI 2.41–2.75), and suicide attempts (HR 2.16, 95 % CI 1.91–2.43) compared with other pregnancies. The associations were greater for patients who had preexisting mental illness or were aged less than 25 years at the time of the abortion. Abortion was strongly associated with mental health hospitalization within five years but risks waned over time.

Conclusion: Induced abortion is associated with an increased risk of mental health-related hospitalization in the long term but the association weakens with time.

1. Introduction

Induced abortions have implications for psychiatric health in the short term, but the association with long-term mental health is less clear. Mental health disorders are common in patients of reproductive age, with up to 17 % of women aged 18–44 years experiencing depression or anxiety-related conditions (Salameh et al., 2020). Abortions are also frequent, with an estimated 23 % of women having a voluntary termination during childbearing years (Jones and Jerman, 2022). Patients with induced abortions have a high prevalence of depression and anxiety, with many disorders relating to prior mental health or exacerbated

by a pregnancy termination (Littell et al., 2024; National Collaborating Centre for Mental Health, 2011). Some studies suggest that patients with induced abortions are at risk of developing mental health disorders up to a year later (Littell et al., 2024; National Collaborating Centre for Mental Health, 2011) or even 3 years later (Biggs et al., 2015; van Ditzhuijzen et al., 2017). However, the possibility that the risk of mental health disorders may be elevated over a longer period has received less attention.

Few studies have examined mental health complications beyond three years of an abortion (Jalanko et al., 2020; Steinberg et al., 2024; van Ditzhuijzen et al., 2018). A survey of 325 patients recruited from

* Corresponding author. 190 Cremazie Blvd E, Montreal, Quebec H2P 1E2, Canada.

E-mail address: nathalie.auger@inspq.qc.ca (N. Auger).

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abortion clinics in the Netherlands found that patients were more likely to develop mood disorders up to 6 years later compared with individuals who did not have abortions (van Ditzhuijzen et al., 2018). An analysis of 12,000 teen pregnancies from Finland found that abortions were associated with mental health disorders up to five years later compared with no pregnancy (Jalanko et al., 2020). In contrast, an analysis of 72,424 Danish patients with no history of mental disorders found less support for an association; first trimester abortion was not associated with the likelihood of receiving a new psychiatric diagnosis up to five years later (Steinberg et al., 2024). Many of these findings are however derived from selective study populations (Jalanko et al., 2020; Steinberg et al., 2024; van Ditzhuijzen et al., 2018). Large population-based studies with long-term follow-up are rare yet necessary to understand the mental health needs of women post abortion. We assessed the long-term risk of mental health hospitalization following an induced abortion in a population-based cohort of 1.2 million pregnancies with 17 years of follow-up.

2. Method

2.1. Study design

We carried out a retrospective cohort study of 28,721 induced abortions and 1,228,807 births between April 2006 and March 2022 in Quebec, Canada. We included induced abortions, stillbirths, or live births occurring in hospital among women between the ages of 10–59 years. Abortion is legal in Canada and covered by provincial health insurance (Public Health Agency of Canada, 2024). We determined the pregnancy end date and used unique personal identifiers to follow the patients over time to identify future mental health hospitalizations. We had follow-up until March 31, 2023, for a maximum period of 17 years.

We used data from the Maintenance and Use of Data for the Study of Hospital Clientele registry, which comprises the discharge abstracts for all hospitalizations in Quebec (Ministry of Health and Social Services, 2020). Each abstract contains up to 41 diagnoses and 35 procedures during pregnancy admissions or subsequent admissions for mental disorders. The data do not include spontaneous abortions, ectopic pregnancies, and molar pregnancies. We excluded patients who died at the end of pregnancy and were not eligible for follow-up.

2.2. Abortion

The exposure of interest was induced abortion compared with other pregnancies. We identified abortions using International Classification of Diseases (ICD-10) diagnostic codes (Table S1), and further classified abortions by age (<20, 20–24, 25–29, 30–34, 35–39, ≥40 years), preexisting psychiatric disorders, substance use disorders, and suicide attempts (yes, no), prior live birth (yes, no), prior abortion (yes, no), and gestational timing of abortion (early <20 weeks, late ≥20 weeks, unspecified). We had information on pregnancy history going back to 1989.

2.3. Mental health-related outcomes

The main outcome was mental health hospitalization anytime after pregnancy. We assessed several mental health outcomes, including psychiatric disorders (bipolar, depression, anxiety and stress, eating, psychosis, and personality disorders), substance use disorders (alcohol, opioids, cannabis, cocaine, stimulant, hallucinogen, sedative, other illicit substance), and suicide attempts. Mental health disorders were diagnosed by physicians following criteria in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013) and coded using the ICD-10 (Table S1).

2.4. Covariates

We accounted for covariates that could influence the association between abortion and mental health, including age at pregnancy end (<20, 20–24, 25–29, 30–34, 35–39, ≥40 years), comorbidity (yes, no), preexisting mental illness (yes, no), material deprivation (yes, no, unknown), rural residence (yes, no, unknown), and period (2006–2010, 2011–2015, 2016–2022). Comorbidity and preexisting mental illness were operationalized as binary variables to facilitate model convergence. Comorbidity included preexisting obesity, hypertension, diabetes mellitus, and dyslipidemia. Preexisting mental illness included psychiatric disorders, substance use disorders, or suicide attempt during or before pregnancy. We measured material deprivation using a neighborhood composite index for the most disadvantaged quintile of the population based on census data for mean income, employment, and education (Pampalon and Raymond, 2000).

2.5. Data analysis

We calculated mental health hospitalization rates per 10,000 person-years and plotted the cumulative incidence over time. We estimated hazard ratios (HR) and 95 % confidence intervals (CI) for the association between abortion and mental health hospitalization using Cox proportional hazards models adjusted for age, comorbidity, preexisting mental illness, material deprivation, rural residence, and time period. HRs estimate the relative incidence of an outcome in exposed versus unexposed individuals over a given time and are interpreted similarly to a relative risk (Sashegyi and Ferry, 2017).

We used the number of days since the end of pregnancy as the time scale and stopped follow-up at the first mental health hospitalization, death, or study end. We censored women who did not have mental health admissions at the study end, and accounted for death as a competing outcome using the Fine and Gray approach. We used clustered sandwich estimators to account for patients with more than one pregnancy and verified the proportional hazards assumption using survival curves. We used flexible survival models with a time interaction term to examine changes in the association between abortion and mental health hospitalization over time (Dewar and Khan, 2015).

In sensitivity analyses, we excluded stillbirths from the comparison group to minimize the possibility that late pregnancy losses masked the associations. We performed the analysis with SAS version 9.4 (SAS Institute Inc., Cary, NC). As we used anonymized data, the University of Montreal Hospital Centre institutional review board waived the need for informed consent and ethics review.

3. Results

There were 28,721 (2.3 %) induced abortions in the cohort (Table 1). A greater proportion of patients with induced abortions had preexisting mental illness (11.3 % vs. 6.3 %) and material deprivation (23.6 % vs 20.0 %) compared with other patients. Patients with induced abortions were more likely to be at extremes of reproductive age (<20 or ≥40 years). There was a total of 74,092 mental health hospitalizations during 11,073,900 person-years of follow-up. Mean length of follow-up for the cohort was 9.1 years (standard deviation 4.6).

Mental health disorders appeared to be more frequent after induced abortions than after other pregnancy types from the beginning of follow-up (Fig. 1). At the end of 17 years, there was a cumulative incidence rate of 14.3 mental health hospitalizations for every 100 induced abortions (95 % CI 13.6–15.0) versus 6.8 for every 100 pregnancies that led to a delivery (95 % CI 6.7–6.9) (p-value <0.0001).

Hospitalization rates were elevated for all types of mental disorders following abortion (Table 2). Compared with other pregnancies, patients with abortions had higher hospitalization rates for any mental disorder (104.0 vs. 42.0 per 10,000 person-years), psychiatric disorders (85.1 vs 37.1 per 10,000 person-years), substance use disorders (56.7 vs

Table 1
Characteristics of abortions and other pregnancies.

	No. pregnancies (%) ^a	
	Abortion	Other pregnancies
Age, years		
<20	3191 (11.1)	25,436 (2.1)
20–24	4891 (17.0)	157,358 (12.8)
25–29	6646 (23.1)	404,801 (32.9)
30–34	6934 (24.1)	414,046 (33.7)
35–39	5060 (17.6)	188,188 (15.3)
≥ 40	1999 (7.0)	38,977 (3.2)
Comorbidity ^b	807 (2.8)	63,655 (5.2)
Preexisting mental illness ^c	3230 (11.3)	77,386 (6.3)
Material deprivation	6786 (23.6)	245,827 (20.0)
Rural residence	5674 (19.8)	221,575 (18.0)
Period		
2006–2010	10,401 (36.2)	361,568 (29.4)
2011–2015	7904 (27.5)	392,003 (31.9)
2016–2022	10,416 (36.3)	475,236 (38.7)
Total	28,721	1,228,807

^a Chi-squared p-value <0.0001 for every category, comparing abortion with other pregnancies.

^b Preexisting obesity, hypertension, diabetes mellitus, dyslipidemia.

^c Psychiatric illness, substance use disorder, or suicide attempt during or before pregnancy.



Fig. 1. Mental health-related hospitalization rates for patients with abortions and other pregnancies^a

^aOther pregnancies include live births and stillbirths. P-value <0.0001 for the difference in cumulative incidence of mental health hospitalizations among women with and without abortion based on a log-rank test.

15.0 per 10,000 person-years), and suicide attempts (14.7 vs 4.4 per 10,000 person-years). Table 2 shows that abortion was associated with the long-term risk of hospitalization for psychiatric disorders (HR 1.81, 95 % CI 1.72–1.90), substance use disorders (HR 2.57, 95 % CI 2.41–2.75), and suicide attempts (HR 2.16, 95 % CI 1.91–2.43) in models adjusted for age, comorbidity, preexisting mental illness, material deprivation, rural residence, and time period. Abortion was more strongly associated with eating disorders (HR 2.25, 95 % CI 1.67–3.03), hallucinogen use disorders (HR 5.15, 95 % CI 2.76–9.58), and cocaine use disorders (HR 3.46, 95 % CI 3.01–3.98).

Risk of mental health hospitalization was greatest within the first five years of abortion, particularly for substance use disorders and suicide attempts (Fig. 2). After five years, patients with abortions had a 74 % greater risk of mental health hospitalization compared with other

patients (HR 1.74, 95 % CI 1.66–1.82). The risk waned over time. By the end of follow-up, abortion was no longer associated with mental health hospitalization (HR 1.04, 95 % CI 0.96–1.13). Only the risk of substance use disorders remained elevated at the end of follow-up (HR 1.37, 95 % CI 1.22–1.54).

Abortion was more strongly associated with mental health hospitalization among patients with certain characteristics (Table 3). Patients aged <20 years at the time of abortion had 2.53 times greater risk of mental health hospitalization over time compared with other patients (95 % CI 2.27–2.82), whereas patients aged ≥40 years had 1.33 times greater risk (95 % CI 1.09–1.61). Patients with preexisting mental health disorders before their abortion were 9.01 times more likely to be hospitalized for mental disorders over time (95 % CI 8.35–9.71), whereas patients with no preexisting mental health disorder were 1.46 times more likely (95 % CI 1.38–1.54). Patients with repeat abortions and patients who had a prior live birth were also more likely to be hospitalized for mental health disorders.

In sensitivity analysis, induced abortion remained associated with the long-term risk of mental health hospitalization when we excluded stillbirths (Table S2).

4. Discussion

In this population-based study of more than 1.2 million pregnancies, having an induced abortion was associated with an increased risk of hospitalization for a mental disorder more than a decade later. Compared with live births and stillbirths, patients with induced abortions had a greater risk of admission for psychiatric disorders, substance use disorders, and suicide attempts over time. Patients with abortions who were under age 25 years or had a preexisting mental health disorder were most at risk of mental health hospitalization. The association with mental health hospitalization was greatest within five years of abortion and weakened thereafter. After 17 years of follow-up, the risk of mental health hospitalization began to resemble pregnancies that carried to term.

Prior studies have found little evidence that abortion increases the long-term risk of mental health complications once preexisting risk factors are accounted for (Biggs et al., 2017; Jalanko et al., 2020; Steinberg et al., 2024; van Ditzhuijzen et al., 2018). Some evidence even suggests that women who are refused abortions are more at risk of mental health disorders (Biggs et al., 2017). However, study designs and data sources vary considerably. Researchers from the Netherlands and the U.S. have relied on longitudinal survey data from women sampled in abortion clinics (Biggs et al., 2017; van Ditzhuijzen et al., 2018). Comparison groups included women from a separate survey of Dutch women who reported not having an abortion (van Ditzhuijzen et al., 2018), and women who sought an abortion but were turned away from clinics in the U.S. (Biggs et al., 2017). Another study relied on a national registry of 72,424 Danish women with a first trimester abortion and no history of mental illness, but did not include a comparison group without abortions (Steinberg et al., 2024). Mental health outcomes up to 18 years after abortion were compared with the year prior among the same women. The variety of comparison groups in the literature has been highlighted as a limitation in several systematic reviews (Littell et al., 2024; Major et al., 2009; National Collaborating Centre for Mental Health, 2011). In our study, abortions were associated with an elevated risk of mental health admission up to 17 years later. We included a comparison group that was representative of the pregnant population.

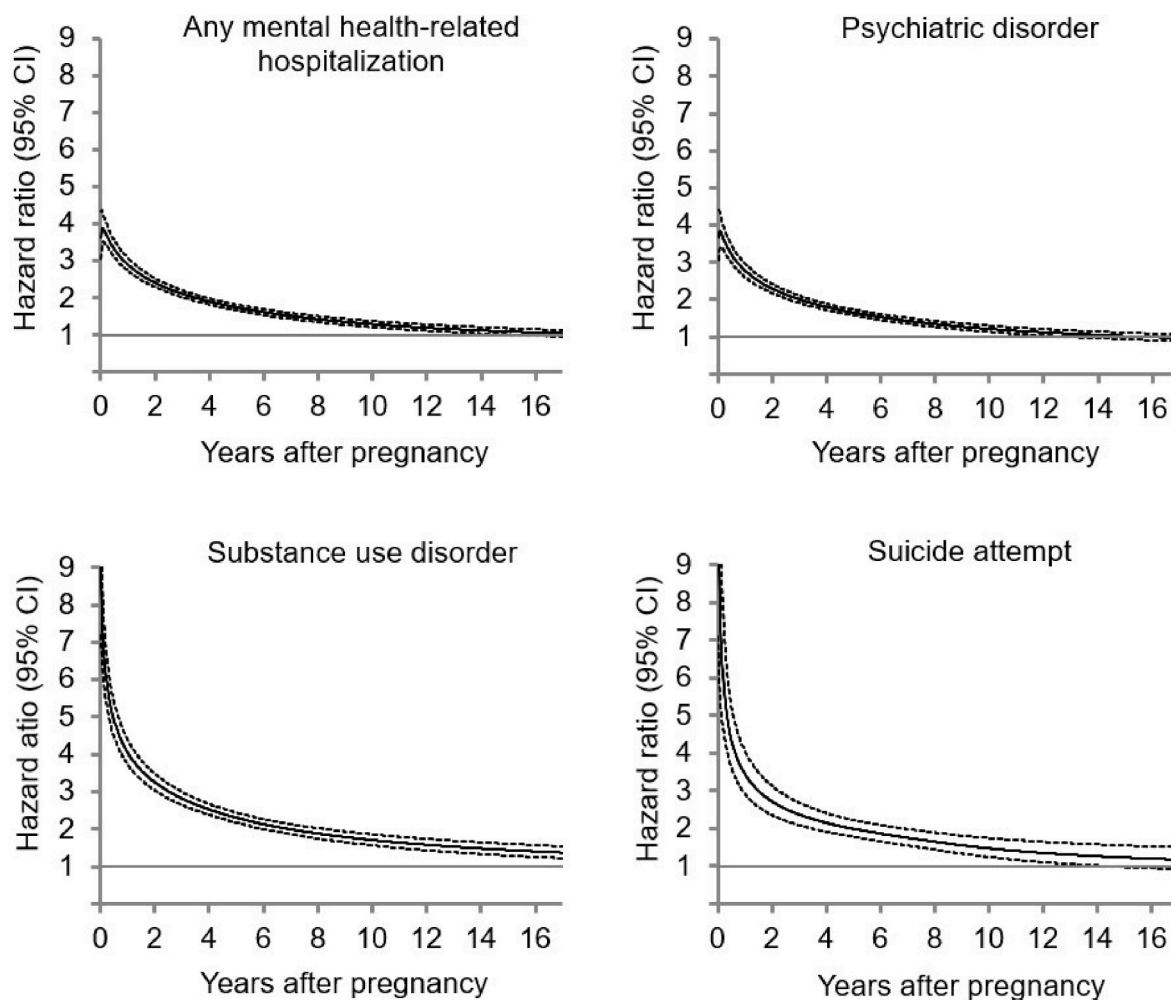
Other studies of mental health after abortion have mainly concentrated on short-term risks (National Collaborating Centre for Mental Health, 2011). Most have not found meaningful associations, although patients often had psychosocial disorders that predated the abortion (Munk-Olsen et al., 2011; Steinberg et al., 2014; van Ditzhuijzen et al., 2017). In a study of 954,702 Danish patients, new psychiatric diagnoses in the year after a first trimester abortion were just as frequent as in the nine preceding months (Munk-Olsen et al., 2011). While patients with

Table 2

Association between abortion and mental health-related hospitalization.

	No. mental health-related hospitalizations		Rate per 10,000 person-years (95 % CI)		Hazard ratio (95 % CI) ^a
	Abortion (N = 28,721)	Other pregnancies (N = 1,228,807)	Abortion	Other pregnancies	
Any mental health admission	2709	45,371	104.0 (100.2–108.0)	42.0 (41.6–42.3)	1.91 (1.83–2.00)
Psychiatric disorder	2242	40,180	85.1 (81.7–88.7)	37.1 (36.7–37.4)	1.81 (1.72–1.90)
Bipolar	239	4792	8.7 (7.7–9.9)	4.3 (4.2–4.5)	1.45 (1.25–1.68)
Depression	672	13,306	24.7 (22.9–26.6)	12.1 (11.9–12.3)	1.64 (1.51–1.79)
Anxiety and stress	1473	26,113	54.8 (52.1–57.7)	23.9 (23.6–24.2)	1.81 (1.70–1.92)
Eating	67	819	2.4 (1.9–3.1)	0.7 (0.7–0.8)	2.25 (1.67–3.03)
Psychosis	252	3424	9.2 (8.1–10.4)	3.1 (3.0–3.2)	2.06 (1.77–2.39)
Personality	895	1693	33.0 (30.9–35.3)	9.7 (9.5–9.9)	2.25 (2.07–2.45)
Substance use disorder	1517	16,400	56.7 (53.9–59.6)	15.0 (14.7–15.2)	2.57 (2.41–2.75)
Alcohol	756	8178	27.8 (25.9–29.8)	7.4 (7.3–7.6)	2.49 (2.28–2.73)
Opioids	165	1313	6.0 (5.1–7.0)	1.2 (1.1–1.3)	3.25 (2.68–3.93)
Cannabis	484	4745	17.7 (16.2–19.3)	4.3 (4.2–4.4)	2.57 (2.30–2.89)
Cocaine	374	2714	13.6 (12.3–15.1)	2.5 (2.4–2.6)	3.46 (3.01–3.98)
Stimulant	431	3880	15.7 (14.3–17.3)	3.5 (3.4–3.6)	2.77 (2.44–3.14)
Hallucinogen	21	93	0.8 (0.5–1.2)	0.1 (0.1–0.1)	5.15 (2.76–9.58)
Sedative	288	2749	10.5 (9.3–11.8)	2.5 (2.4–2.6)	2.85 (2.46–3.31)
Other illicit substance	15	81	0.5 (0.3–0.9)	0.1 (0.1–0.1)	5.39 (2.58–11.27)
Suicide attempt	403	4860	14.7 (13.3–16.2)	4.4 (4.3–4.5)	2.16 (1.91–2.43)

^a Hazard ratio for abortion vs other pregnancies, adjusted for age, comorbidity, preexisting psychiatric, eating or substance use disorders, material deprivation, rural residence, and time period.

**Fig. 2.** Association between abortion and risk of mental health hospitalization according to number of years after pregnancy^a

^aHazard ratio for abortion vs other pregnancies, adjusted for age, comorbidity, preexisting psychiatric, eating or substance use disorders, material deprivation, rural residence, and time period.

Table 3

Association between abortion characteristics and risk of any mental health hospitalization after pregnancy.

	No. pregnancies	No. mental health-related hospitalizations	Rate per 10,000 person-years (95 % CI)	Hazard ratio (95 % CI) ^a
Age at abortion, years				
<20	3191	426	129.6 (117.9–142.5)	2.53 (2.27–2.82)
20–24	4891	634	143.3 (132.6–154.9)	2.75 (2.52–3.01)
25–29	6646	683	116.5 (108.0–125.5)	2.32 (2.14–2.52)
30–34	6934	553	90.8 (83.5–98.6)	1.90 (1.73–2.08)
35–39	5060	307	67.7 (60.6–75.7)	1.49 (1.33–1.68)
≥40	1999	106	57.5 (47.5–69.5)	1.33 (1.09–1.61)
Other pregnancies	1,228,807	45,371	42.0 (41.6–42.3)	Reference
Preexisting mental illness				
Abortion with preexisting mental illness	3230	1046	496.1 (466.9–527.1)	9.01 (8.35–9.71)
Abortion with no preexisting mental illness	25,491	1663	69.5 (66.2–72.9)	1.46 (1.38–1.54)
Other pregnancies	1,228,807	45,371	42.0 (41.6–42.3)	Reference
Prior live birth				
Abortion with prior live birth	14,722	1532	118.4 (112.6–124.4)	2.41 (2.27–2.55)
Abortion, no prior live birth	13,999	1177	89.8 (84.8–95.1)	1.49 (1.39–1.60)
Other pregnancies	1,228,807	45,371	41.8 (41.4–42.2)	Reference
Repeat abortion				
Repeat abortion	3835	521	131.9 (121.1–143.7)	2.45 (2.21–2.72)
First abortion	24,886	2188	99.0 (95.0–103.3)	1.82 (1.73–1.91)
Other pregnancies	1,228,807	45,371	42.0 (41.6–42.3)	Reference
Abortion timing				
Early, <20 weeks	7875	672	98.9 (91.7–106.7)	1.91 (1.75–2.08)
Late, ≥20 weeks	4357	234	64.9 (57.1–73.8)	1.43 (1.25–1.63)
Unspecified	16,489	1803	115.2 (110.0–120.7)	2.01 (1.90–2.12)
Other pregnancies	1,228,807	45,371	42.0 (41.6–42.3)	Reference

^a Hazard ratio for abortion vs other pregnancies, adjusted for age, comorbidity, preexisting psychiatric, eating or substance use disorders, material deprivation, rural residence, and time period.

abortions were more likely to have a new psychiatric diagnosis after pregnancy than patients with deliveries, they were also more likely to have a psychiatric diagnosis before pregnancy (Munk-Olsen et al., 2011). In the U.S., a study of 259 women with abortions found that preexisting mental disorders accounted for the association with post-pregnancy mental disorders (Steinberg et al., 2014). Studies like these suggest that patients who seek abortions may have an elevated risk of mental disorders over their lifetime, with the association driven by predisposing risk factors rather than abortion directly (Munk-Olsen et al., 2011; Steinberg et al., 2014; van Ditzhuijzen et al., 2017).

Preexisting mental health may be one of the more important risk factors for long-term mental health sequelae following abortion. Previous systematic reviews have shown that psychological disorders after an abortion are consistently related to preexisting mental health (Littell et al., 2024; Major et al., 2009; National Collaborating Centre for Mental Health, 2011). In our study, preexisting mental illness was the strongest risk factor for mental health hospitalization in the long-term period after an abortion. Younger age at the time of abortion was an additional risk factor. Many mental health disorders appear during adolescence and early adulthood (Jalanko et al., 2020; National Collaborating Centre for Mental Health, 2011). Pregnancy at a young age is associated with socioeconomic disadvantage and adverse childhood experiences, further predictors of poor mental health (National Collaborating Centre for Mental Health, 2011). Studies of pregnant teenagers from Finland have found that the risk of mental disorders is elevated regardless if teens keep the pregnancy, compared with teens who are never pregnant (Jalanko et al., 2017, 2020).

Having a history of abortion was an additional risk factor for mental health hospitalization after a repeat abortion. The literature is mixed on whether patients with a history of abortion have more mental health disorders after a second abortion (National Collaborating Centre for Mental Health, 2011; Steinberg and Finer, 2011). A systematic review by the U.K.'s National Collaborating Centre for Mental Health found no clear link between multiple past abortions and mental disorders in three studies (National Collaborating Centre for Mental Health, 2011). Prior abortion history was inconsistently associated with mood, anxiety, and

substance use disorders (National Collaborating Centre for Mental Health, 2011). In the U.S. National Comorbidity Survey, patients with multiple abortions were more likely to have experienced violence and preexisting mental health disorders than patients with only one abortion (Steinberg and Finer, 2011).

Having a history of live birth was also a risk factor for mental health hospitalization, although it is not clear why patients who already have children would be at increased risk after an abortion (Biggs et al., 2013; National Collaborating Centre for Mental Health, 2011). Results conflicted in the National Collaborating Centre for Mental Health's systematic review, with one study finding no impact of prior childbirth on post-abortion mental health and the other an increased risk of post-traumatic stress disorder (National Collaborating Centre for Mental Health, 2011). Data from the U.S. suggest that the majority of women with abortions have had a prior birth (Biggs et al., 2013; Ramer et al., 2024). In a survey of 954 patients, nearly 30 % of women cited that the reason for seeking an abortion was concern about their ability to care for the children they already had (Biggs et al., 2013). Women who already have parenting duties may find it more stressful to manage an unwanted pregnancy than women without children.

In our study, abortion was more strongly associated with substance use disorders than other mental health conditions. Abortion has been associated with the lifetime risk of developing substance use disorders in other studies (Pedersen, 2007; Steinberg and Finer, 2011). A study of 769 women from Norway who were followed from age 15–27 years found that women with abortions were 2–7 times more likely to use substances compared with women who were never pregnant (Pedersen, 2007). However, the onset time of substance use in relation to the abortion was not always clear (Pedersen, 2007). In the National Comorbidity Survey of women who were pregnant at least once, preexisting substance use disorders were present in 23.2 % of women who had an abortion but only 12.2 % of women without abortions (Steinberg and Finer, 2011). Preexisting substance use can cluster with risky sexual behavior and unintended pregnancies, potentially explaining the association with abortion (Major et al., 2009; Schoneville et al., 2022; Shafique et al., 2022). Abortion may also exacerbate substance use or

lead to new disorders over time. The Turnaway study, a cohort study of nearly 1000 women seeking abortion at 30 U.S. facilities, found that women who had an abortion had greater odds of alcohol use in the following five years, compared with women who were denied an abortion (Roberts et al., 2018). However, the association was due to a decrease in alcohol use among women who gave birth, rather than an increase among women with abortions (Roberts et al., 2018).

In our study, risk of mental health hospitalization was greatest within five years of abortion but decreased slowly thereafter. Abortion may follow the pattern seen with other stressful life events where mental health impacts diminish with time (Farren et al., 2020; Westby et al., 2021). Outcomes such as stillbirth and miscarriage appear to have similar trajectories where mental health gradually improves over time (Farren et al., 2020; Westby et al., 2021). A systematic review of patients who experienced a stillbirth found that the risk of depression, anxiety, and posttraumatic stress disorder was greatest within the first year of pregnancy loss, decreasing gradually afterward (Westby et al., 2021). Likewise, a prospective cohort study of patients with miscarriage or ectopic pregnancy found that the risk of depression, anxiety, and post-traumatic stress disorder decreased as time passed (Farren et al., 2020).

This study had limitations. Exposure, outcome, and covariate data were collected from hospital records and may have been miscoded, although any errors were likely nondifferential. We adjusted for potential confounders but cannot rule out residual bias from factors not documented in hospital records, such as ethnicity, education level, and social support. We were able to capture severe mental health disorders requiring hospitalization but could not evaluate milder mental disorders that were untreated or managed in ambulatory settings. Similarly, we only had information on preexisting mental health disorders or substance use disorders that led to hospitalization prior to pregnancy. We did not have information on psychological support after abortion. We could not differentiate between planned and unplanned pregnancies or identify women who decided to turn down an abortion. We did not know the underlying reason for abortion. Congenital anomalies, severe maternal morbidity, and other medical indications may modify the association between abortion and long-term mental health outcomes. The findings are generalizable to a population with legally accessible abortions covered by publicly funded healthcare. We cannot confirm that associations would be similar in areas with different healthcare delivery models.

This longitudinal cohort study with more than 11 million person-years of follow-up found that induced abortion was associated with an increased risk of mental health hospitalization up to 17 years later. Patients with abortion were at risk of admission for psychiatric disorders, substance use disorders, and suicide attempts in the long-term period following the end of pregnancy. Risks were greatest among patients with preexisting mental health disorders and patients younger than 25 years. Risk of mental health hospitalization was most prominent within five years of abortion and decreased with time. While these findings are not evidence of a causal link between abortion and long-term mental health sequelae, they support the possibility that abortion may be a marker of an increased lifetime risk of mental disorders. Screening for mental disorders at the time of abortion may be an opportunity to identify women who could benefit from psychological and social support, particularly women with preexisting mental health disorders, under age 25 years, and with previous live births or abortions.

CRedit authorship contribution statement

Nathalie Auger: Writing – review & editing, Writing – original draft, Supervision, Methodology, Funding acquisition, Conceptualization. **Jessica Healy-Profitós:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Aimina Ayoub:** Writing – review & editing, Validation, Methodology. **Antoine Lewin:** Writing – review & editing. **Nancy Low:** Writing – review & editing.

Data availability statement

The data that support the study findings are available from the Quebec Statistics Institute (<https://statistique.quebec.ca/research/#/demarche/etape-par-etape>).

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Declaration of competing interest

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jpsychires.2025.05.031>.

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