A Reanalysis of Mental Disorders Risk Following First-Trimester Abortions in Denmark

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ABSTRACT:

Background: A previous Danish study of monthly and tri-monthly rates of first-time psychiatric contact following first induced abortions reported higher rates compared to first live births but similar rates compared to nine months pre-abortion. Therefore, the researchers concluded abortion has no independent effect on mental health; any differences between psychiatric contacts after abortion and delivery are entirely attributable to pre-existing mental health differences. However, these conclusions are inconsistent with similar studies that used longer time frames. Reanalysis of the published Danish data over slightly longer time frames may reconcile this discordance.

Method: Monthly and tri-monthly data was extracted for reanalysis of cumulative effects over nine- and twelve-months post-abortion.

Results: Across all psychiatric diagnoses, cumulative average monthly rate of first-time psychiatric contact increased from an odds ratio of 1.12 (95% CI: 1.02 to 1.22) at 9-months to 1.49 (95% CI: 1.37 to 1.63) at 12 months post-abortion as compared to the 9 months pre-abortion rate. At 12 months post-abortion, first-time psychiatric contact was higher across all four diagnostic groupings and highest for personality

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or behavioral disorders (OR=1.87; 95% CI:1.48 to 2.36) and neurotic, stress related, or somatoform disorders (OR=1.60; 95% CI: 1.41 to 1.81).

***Conclusions*: Our reanalysis revealed that the Danish data is consistent with the larger body of both record-based and survey-based studies when viewed over periods of observation of at least nine months. Longer periods of observation are necessary to capture both anniversary reactions and the exhaustion of coping mechanisms which may delay observation of post-abortion effects.**

Background

Research regarding the mental health effects of abortion has been plagued by political controversy and selective reporting of results.[1] One frequently cited study in this field is an analysis of Danish medical records which reported a 127% greater risk of first-time treatment for psychiatric disorders among women following a first induced abortion (15.2 cases per 1000 person years, 95% CI: 14.4 to 16.1) as compared to women having a first live birth (6.7 cases per 1000 person years, 95% CI: 6.4 to 7.0).[2] Despite this finding of higher rates of mental health care following abortion, the authors concluded that abortion does not increase the risk of mental illness based on their additional analyses of first-time contact for psychiatric treatment in the nine months prior to these pregnancy outcomes. Based on those analyses, the authors concluded that the women who are most likely to have abortions were simply at greater risk of psychiatric treatment contact prior to their abortions, and therefore the elevated rate of mental health issues observed after abortion is simply an incidental continuation of pre-existing mental health risks. In short, they suggested, women who are predisposed to mental health issues are more likely than others to have abortions. Therefore, their main finding of higher rates of mental health disorders among aborting women, as compared to delivering woman, can and should be ignored; abortion has no independent mental health effects.

This study was widely criticized for several methodological issues. For example, similar records-based studies of mental health treatment rates before and after abortion had controlled for twelve months of prior mental health[3,4] whereas the Danish study inexplicably examined only nine months. The selection of nine months prior to the pregnancy outcome also meant that they were comparing women who carried to term during only the time they were pregnant to women who had abortions who were only pregnant for approximately

two to three months prior to their abortions and were not pregnant during the other six months. A better methodological baseline, as used in other studies, would have been to control for mental health history for a full year prior to conception of the index pregnancy. Moreover, while the prior studies had excluded women with a history of abortion from the control group of women who carried to term, the Danish study included women with one or even multiple abortions into the group of delivering women once they had a first live birth. In other words, they were comparing women who had a first abortion against a mixed group of women who had one or more abortions prior to their first live birth, women who had miscarriages prior to a first live birth, and women whose first pregnancy ended in a first live birth. This admixture would clearly tend to obscure rather than clarify the interpretation of their findings. A request sent to the lead author (Munk-Olsen) for a breakdown of the number of first-time mental health treatment cases in the delivery group based on prior exposure to abortions by the author of this reanalysis was refused. In my experience, that refusal was atypical. When I have made similar queries of other authors, they have been quick to provide such clarifications of their findings. An additional shortcoming is that unlike prior studies,[3,4] the Danish study failed to segregate their results relative to inpatient and outpatient treatments, even though this would have been an excellent way to distinguish between the severity of mental illnesses. Yet another problem was that the researchers chose to exclude women who died during the year following their pregnancy outcomes, which is problematic since abortion is associated with increased rates of suicide and deaths from other self-destructive behaviors, which are clearly markers of psychiatric distress.[5] Finally, in addition to using a shorter pre-abortion period of investigation, the investigators limited their post-abortion period to just one year. This was another step back from the methodological strength of the prior record-linkage studies that examined treatment rates over a period of four years following an index pregnancy outcome.[3,4] A longer period of follow up is important in consideration of the literature indicating that the most severe reactions to abortion can be delayed until after coping mechanisms are exhausted and may be related to anniversary reactions and other triggers such as a subsequent pregnancy.[6–11] By limiting the investigation to one year, the Danish research team would likely miss some of the reactions associated with the one year anniversary, if they fell just outside the anniversary date, in addition to any other delayed reactions.

The Danish researchers' conclusions have also been called into question by both prior studies which employed better methodologies,[3,4] and subsequent studies.[12–15] For example, an analysis of the National Longitudinal Study of Adolescent to Adult Health (Add Health), which controlled for 25 confounding factors, including prior mental health and exposure to violence, found that

each exposure to abortion increased the risk of subsequent mental health disorders, a finding that could not be explained by prior mental health.[12] In addition, the subset of women who reported aborting a wanted child experienced a 122% higher rate of depression and a 244% higher rate of suicidality.[14]

Two other studies, based on medical records of nearly 5,000 women continuously covered by Medicaid from the age of 16 forward, examined mental health treatment rates both prior to and after each woman's first pregnancy outcome.[13,15] These studies found that the change in the rate of mental health treatments per patient per year from before to after a first pregnancy outcome was highest among women who had abortions, compared to both women who carried to term[13] and women who had natural losses.[15] This was consistently true across multiple outcomes: outpatient treatments, inpatient treatments, and the length of hospitalization for inpatient care. In addition, yet another analysis of Medicaid records found that a history of abortion is an independent risk factor for postpartum psychiatric episodes.[11]

Given the discontinuity between the Danish authors' conclusions and the findings of prior and subsequent studies of a similar nature, the purpose of this reanalysis is to determine if the Danish data can be reconciled with the direction of findings of other studies if the data is examined over the full time period of the data presented, twelve months, instead of in one- and three-month increments.

Method

All details regarding the original study design, population, and methods are detailed in the original study.[2] Specifically, multiple Danish population and medical registries were crosslinked to extract reproductive and mental health data on all Danish born women who had a first-time, first-trimester abortion and or a first-time live birth from 1995 through 2007. Women who had abortions prior to their first live birth were included in both groups. The nine months prior to abortion and childbirth were used as a pre-pregnancy outcome reference period. Women with a record of inpatient psychiatric treatment prior to the nine month pre-pregnancy outcome period were excluded. First time psychiatric contacts for each group were identified for the nine months preceding a first abortion, reported as a cumulative average, and for up to twelve months following the abortion. Follow up ceased at the time of their first psychiatric contact, upon their death, or at twelve months after their abortions, whichever occurred first.

For this reanalysis, data was extracted from Table 1 of the original Danish study[2] to identify the total number of women to have a first psychiatric contact periods in the nine months prior to an abortion and in each of the one month and three-month periods following an abortion that were reported by the

authors. From this data, the cumulative number of first-time psychiatric contacts were calculated for both nine months and twelve months in the post-abortion period. The average rate of first-time psychiatric contact per month per 100,000 women were also calculated. Odds ratios for each diagnostic group, and for any diagnosis, were calculated for the nine- and twelve-month average monthly rates compared to the average monthly rate in the nine months pre-abortion.

Rates and odds ratios were calculated in Microsoft Excel. Institutional review was not required since this reanalysis is based on only previously published aggregate data.

Results

Table 1, below, shows the number of women from a total of 84,620 Danish women who had a first-time, first-trimester abortion who received either a first-time inpatient or outpatient treatment in each of the time frames reported in the original paper, plus the cumulative data during the first nine months after their abortions, or within twelve months after their abortions. A total of 868 women had a first psychiatric contact in the nine months before their abortions, leaving a total of 83,752 women, of whom 1,277 had a first-time psychiatric contact during the subsequent twelve months. For each row of Table 1, the rate is calculated as the average rate of psychiatric contact per month per ten thousand women (yes divided by no times ten thousand). The increase in rate relative to the baseline was greatest relative to psychiatric contact for personality or behavioral disorders followed by neurotic, stress related, or somatoform disorders. Overall, the average monthly rate of first-time psychiatric contact in terms of cases per month per 10,000 women was 11.52 prior to a first abortion and 12.90 cases afterwards as cumulatively measured over the full course of the 12 months examined.

Table 2 shows the odds ratios and 95% confidence intervals for the cumulative number of first-time psychiatric treatments for the first nine months following an abortion and the first twelve months as compared to the nine months preceding an abortion. Most notably, the degree of difference and the level of significance increased with increased time of observation across every diagnostic category. At nine months post-abortion, a period of time equal to the pre-abortion reference period, the average monthly rate was 12% higher overall (OR=1.12; 94% CI: 1.02 to 1.22) and 33% higher for personality or behavioral disorders (OR=1.33; 95% CI: 1.01 to 1.75) and 21% higher for neurotic, stress related, or somatoform disorders (OR=1.21; 95% CI: 1.05 to 1.39). When the cumulative effects over a full twelve months were examined, allowing for detection of at least early anniversary reactions, there was a significantly higher risk of first time contact over all four subcategories. Overall, for any disorder, the elevated risk rose from 12% to 49% (OR=1.49 95% CI: 1.37 to 1.63). For personality

Table 1., Number and average rates per month per 10,000 women of first-time psychiatric contact before and after an abortion.

Time Frame	Psychiatric Contact for Affective Disorder			Psychiatric Contact for Neurotic, Stress Related, or Somatoform Disorder			Psychiatric Contact for Personality or Behavioral Disorder			Psychiatric Contact for Any Other Diagnosis			Any First-Time Psychiatric Contact		
	yes	no	Rate	yes	no	Rate	yes	no	Rate	yes	no	Rate	yes	no	Rate
During the 9 months prior to abortion	174	84,446	2.29	360	84,260	4.75	90	84,530	1.18	244	84,376	3.21	868	83752	11.52
1 month after abortion	14	84,432	1.66	50	84,210	5.94	8	84,522	0.95	24	84,352	2.85	96	83656	11.48
2 months after abortion	23	84,409	2.72	61	84,149	7.25	10	84,512	1.18	24	84,328	2.85	118	83538	14.13
3 months after abortion	20	84,389	2.37	57	84,092	6.78	16	84,496	1.89	30	84,298	3.56	123	83415	14.75
4-6 months after abortion	60	84,329	2.37	139	83,953	5.52	45	84,451	1.78	97	84,201	3.84	341	83074	13.68
7-9 months after abortion	49	84,280	1.94	129	83,824	5.13	41	84,410	1.62	71	84,130	2.81	290	82784	11.68
10-12 months after abortion	51	84,229	2.02	135	83,689	5.38	48	84,362	1.90	75	84,055	2.97	309	82475	12.49
0-9 months after abortion	166	84,280	2.19	436	83,824	5.78	120	84,410	1.58	246	84,130	3.25	968	82784	12.99
0-12 months after abortion	217	84,229	2.15	571	83,689	5.69	168	84,362	1.66	321	84,055	3.18	1277	82475	12.90

Table 2: Odds Ratios and significance level (p) for two post-abortion periods compared to the pre-abortion period

Time period	Psychiatric Contact for Affective Disorder		Psychiatric Contact for Neurotic, Stress Related, or Somatoform Disorder		Psychiatric Contact for Personality or Behavioral Disorder		Psychiatric Contact for Any Other Diagnosis		Any First-Time Psychiatric Contact	
	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
During the 9 months prior to abortion	ref		ref		ref		ref		ref	
0-9 months after abortion	0.96 (0.77-1.18)	ns	1.21 (1.05-1.39)	0.0059	1.33 (1.01-1.75)	0.383	1.01 (0.84-1.20)	ns	1.12 (1.02-1.22)	0.0103
0-12 months after abortion	1.25 (1.02-1.53)	0.0283	1.60 (1.41-1.81)	<.0001	1.87 (1.48-2.36)	<.0001	1.32 (1.12-1.56)	0.0011	1.49 (1.37-1.63)	<0.0001

and behavioral disorders, the average monthly odds ratio increased from 1.33 over nine months to 1.87 (95% CI: 1.48 to 2.36) at twelve months, reflecting the addition of just three more months of data. Similar increases were seen across the other three subcategories, suggesting that the psychiatric effects associated with abortion are time sensitive and may be missed if the period examined is too short.

Discussion

Reanalysis of the differences between pre- and post-abortion first-time psychiatric contact in the Danish medical records revealed that in the full one-year period following abortion the rate at which women sought mental health care after an abortion was 1.49 times higher (95% CI: 1.37 to 1.63) than the rate in the nine months prior to an abortion. Statistical significance was also noted when the time frame of consideration was nine months, a period equal to the pre-abortion observation period.

These findings suggest that abortion's effect size on mental health is relatively small and can be easily missed when analyses are restricted to shorter time periods. The Danish research team's methodology was almost entirely focused on short time periods, even as short as a single month. This was an oversight, since the best evidence indicates that most women will be able to successfully repress abortion related stresses for at least a moderate period of time.[1,8–10]

A strength of this reanalysis is that it examined the post-abortion effects over longer periods of time, an approach which is more consistent with the evidence that negative emotional effects may be triggered by anniversary reactions or repressed until coping mechanisms are exhausted.[6–10] A weakness is that insufficient data was reported to allow for control of the effects of age, economic class, or other demographic variables. Also, while the reasons for each abortion represent important risk factors for negative psychological outcomes, especially when women feel pressured into unwanted abortions,[14,16,17] there was no information in this data set to control for or to investigate those effects. It is also known that psychological risks associated with abortion increase with exposure to multiple abortions,[12,18] but the data provided was limited to only first-time first-trimester abortions. The data provided also failed to identify the number of women who died in the post-abortion period from suicides or accidents (a possible proxy for self-destructive or risk-taking behaviors), which are known to increase following induced abortion[19,20] and should certainly be considered as psychological effects. As a result, these findings are important, but they cannot provide a comprehensive understanding of the associations between abortion and mental health needs.

Notably, this reanalysis was submitted to the publisher of the original study, *The New England Journal of Medicine*, but was rejected by the editors

who stated: "After considering its focus, content, and interest, we made the editorial decision not to consider your submission further."

In summary, this reanalysis demonstrates that the Danish data, when examined over periods of at least nine months, is consistent with the findings of both records-based[3,4,13,21] and survey-based studies.[1,12,14,16,17,22,23] Therefore, the authors of the original study erred in their conclusion that first-time contact rates before and after an abortion are not significantly different.[2] Moreover, our reanalysis shows that these differences are likely to become increasingly evident when the period of follow-up is extended beyond one year, such as was demonstrated prior to the Danish study.[3,4] For future research, it is advisable to always investigate emotional and mental health effects for at least a full year following abortions, and preferably more, since this longer time frame is necessary to encompass both anniversary reactions and the exhaustion of repression and other coping mechanisms which may delay the onset and diagnosis of many, or even most, post-abortion reactions.

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