The Characteristics and Severity of Psychological Distress After Abortion Among University Students

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Abstract

Controversy over abortion inhibits recognition and treatment for women who experience psychological distress after abortion (PAD). This study identified the characteristics, severity, and treatment preferences of university students who experienced PAD. Of 151 females, 89 experienced an abortion. Psychological outcomes were compared among those who preferred or did not prefer psychological services after abortion to those who were never pregnant. All who had abortions reported symptoms of post-traumatic stress disorder (PTSD) and grief lasting on average 3 years. Yet, those who preferred services experienced heightened psychological trauma indicative of partial or full PTSD (Impact of Event Scale, M=26.86 versus 16.84, p<.05), perinatal grief (Perinatal Grief Scale, M 62.54 versus 50.89, p<0.05), dysthymia (BDI M=11.01 versus 9.28, p< 0.05), (M=41.86 versus 39.36, p<0.05), and co-existing mental health problems. PAD appeared multi-factorial, associated with the abortion and overall emotional health. Thus, psychological interventions for PAD need to be developed as a public health priority.

Introduction

Approximately 42 million women worldwide obtain legal, induced abortions each year.[1] While many women experience emotional relief after abortion, over 30% experience significant psychological distress that does not remit over time.[2] Psychological distress after abortion includes higher rates of suicidal behavior,[3–6] depression,[4,7–9] anxiety,[3,10] post-traumatic stress,[11–14] and substance abuse disorders[15] after abortion, compared with other pregnancy outcomes. Specifically, young women under age 25 years are at highest risk for developing mental health problems after abortions, with one study estimating that psychological distress after abortion (PAD) occurs in up to 40% of these cases.[16] While several studies found that pre-existing psychological problems are

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highly correlated to the severity of post-abortion distress,[17,18] this generalization may not apply to younger women, who develop post-abortion distress primarily because of their youth as well as their emotional response to the abortion experience.

Because of young women's developmental stage, they are vulnerable to a number of risk factors associated with post-abortion mental health problems. Certain factors that are specific to this age group that can effectively predict post-abortion distress include younger age,[19] single relationship status, lack of social support,[20] concealment of the unwanted pregnancy and abortion, social pressure to have an abortion,[21] immature coping skills,[16] and repetitive abortions.[22] Repetitive abortions among younger women often occur as the result of their tendency to behaviorally act out emotions of guilt, grief, anger, or confusion after a first abortion, as compared with adult women who verbalize such emotions.[16] Acting out behaviors after abortion include engaging in high-risk sexual behavior, such as unprotected, indiscriminate, and promiscuous sexual encounters, which often lead to more unintended pregnancies and abortions, as well as self-destructive behaviors and suicidal behaviors. Indeed, because women worldwide under age 25 years are most likely to experience their first abortion[1] and have a 40% chance of experiencing another,[23] young women are at high risk for experiencing PAD.

However, another risk factor, and one that is often overlooked, stems from the onset of the reproductive phase of the lifespan—a phase in which young women are more biologically vulnerable to mood and anxiety disorders, and particularly during reproductive events. For example, researchers used a birth cohort of 1,223 Australian women at 21 years of age[7] to examine lifetime psychiatric and substance use disorders after all types of pregnancy loss, including abortion and miscarriage compared with birth. They found that women who had aborted a pregnancy were twice as likely to abuse alcohol (OR=2.1; 95% CI 1.3–3.5) and suffer from depression (OR=1.9 CI 95% 1.1–3.1) than those who delivered a pregnancy. Similarly, one study found that, even after controlling for socio-demographic, behavioral, and familial variables, those who had experienced an abortion in their twenties had a significantly higher rate of depression than those who delivered (OR 2.9; 95% CI 1.7–5.6).[8] Finally, significant psychological impairment, including higher grief, depression, and behavioral problems, has been found in adolescents and young adults after a first trimester abortion when compared with the never pregnant and pregnant controls.[24] These studies indicate that the abortion experience profoundly affects women, particularly when they experience one at a younger age.

In response to these data, researchers are beginning to recommend that psychological services be provided to women after abortion.[25,26] In fact, preliminary reports indicate that post-abortion counseling that addresses abortion-related stress can be effective.[27–29] However, research on the efficacy of counseling and behavioral interventions is lacking. Moreover, both research and services are lacking for young women even though such services may ease symptoms of depression, anxiety, substance abuse, and self-injurious behaviors in those who seek treatment. Thus, it is critical that the nature of distress within this population be defined in order to develop targeted interventions that can help relieve it.

This study identified the incidence, characteristics, severity, and determinants of psychological distress following abortion within a population of university students who preferred psychological follow-up services after abortion. The theoretical underpinnings of the study included the concept of abortion as a type of psychologically stressful event, where some women experience PAD as a psychological stress response consistent with post-traumatic stress disorder.[11–14] Abortion is also conceptualized as a type of perinatal loss that may lead recipients to experience PAD as a perinatal grief response.[30] The results provide preliminary data to develop a psychological follow-up intervention after abortion for students who desire such services. From there, the intervention can be pilot-tested to determine efficacy. If effective, a prototype can be developed and replicated for delivery within student health centers. The study asked the following questions: (1) What is the incidence of university students who experience psychological distress after abortion (PAD)? (2)

Do students who experience psychological distress after abortion desire professional psychological follow-up services if offered? (3) What are the characteristics and severity of psychological distress after abortion among university students (i.e., depression, anxiety, grief, and PTSD)? (4) Do students who experience psychological distress after abortion have more co-existing mental health problems compared with students who experience no psychological distress after abortion and students who were never pregnant? (5) Is psychological distress after abortion associated with the pregnancy and abortion experience, or other factors? 6) Does younger age, less time since the abortion, and multiple abortions contribute to PAD?

The study hypotheses were: (1) More than 30% of students experienced PAD and preferred psychological follow up services if offered to them; (2) depression, anxiety, and co-existing mental health problems were higher among students who obtained an abortion and preferred psychological follow-up services compared with students who obtained an abortion and preferred no psychological follow-up services, and the never pregnant controls; (3) PTSD and perinatal grief were higher among students who obtained an abortion and preferred psychological follow-up services compared with students who obtained an abortion and preferred no psychological follow-up services; (4) some symptoms of PAD were associated with the pregnancy and abortion experience and may be modifiable; and (5) younger age, less time since the abortion, and multiple abortions were associated with higher PAD.

Methods

Design

An ex post facto descriptive design was used to compare psychological outcome after abortion among a convenience sample of students recruited from McGill University and Concordia University in Montreal, Canada, and the University of Vermont. Eligibility included (a) enrollment in a participating university, (b) age between 18 to 35 years, (c) single, (d) non-child-bearing, (e) ability to read and speak English, (f) experienced either one (or multiple) induced, legal, and voluntary abortion(s) within the past 10 years, and was willing to complete questionnaires about the experience, or (g) had never been pregnant, and (h) reported no other stressful life events. Students were recruited from e-classified, bulletin board, and campus newspaper advertisements, as well as referrals from health care providers. Students who had experienced an abortion and were willing to report on their experience were recruited as such, and those who were never pregnant were recruited separately. The same recruitment methodology for all three groups was consistent relative to time frame, advertising strategies, locations, population, and referral sources. A $25 stipend was offered for participation. Due to the sensitivity of the topic, the principal investigator (PI) conducted an extensive educational outreach to the professional staff of the student health services at each university. Arrangements for referrals were made at each site for students who desired psychological follow-up services at the time of interview. The McGill University Institutional Review Board provided the initial and continued approval for the study.

The PI, an advanced practice psychiatric nurse, met with participants in a private office to explain study protocol, obtain informed consent, and determine group classification. The study included a three-group comparison design including the independent variable of whether the student preferred psychological follow-up after abortion. The dependent variables included outcomes of depression, anxiety for all groups, and PTSD and perinatal grief for the groups who had an abortion. Covariates included co-occurring mental health conditions, length of time since abortion, number of abortions, and age. Students were asked to classify themselves into one of the following three groups: (1) those who had obtained an abortion and would prefer psychological follow-up services at time of interview (*Abortion Treatment Preferring* group), (2) those who had obtained an abortion and desired no psychological follow-up services (*Abortion Non-treatment*

Preferring group); and (3) those who were never pregnant and preferred no psychological follow-up services (*Control* group). All students completed paper-and-pencil demographic and health questionnaires and standard measures for depression, anxiety, and baseline mental health. All students who obtained an abortion completed additional measures for reproductive history, psychological stress, and perinatal grief. Sample size was determined according to a three group MANCOVA at a power of 0.80, a level of significance of 0.05 for analyzing two to four variables, and a medium ($d=0.75$) to large effect size ($d=1.0.$), requiring approximately 40 to 50 participants per group.[31] MANCOVA is used to test the significance of differences in dependent variables between the means of two or more groups as well as control for the influence of covariates while limiting experiment wise error.

Measures

The Brief Symptoms Inventory (BSI) was used to measure co-existing mental health among all study participants. Co-existing mental health was identified as a covariate for this study and was controlled for due to its influence on psychological outcome. The Beck Depression Inventory (BDI) was used to measure depression, a dependent variable, while the State Trait Anxiety Inventory was used to measure situational (State) and characterological (Trait) anxiety, also dependent variables. The Impact of Event Scale was used to measure the psychological stress specific to the abortion experience, a dependent variable, while the Perinatal Grief Scale was used to measure grief specific to ending the pregnancy, a dependent variable.

Beck Depression Inventory The BDI is a 21-item self-administered symptom inventory.[32] Item content includes emotional, behavioral, and somatic symptoms of depression such as sadness, failure, suicidal ideation, agitation, self-loathing, guilt, and pessimism, as well as vegetative symptoms such as loss of interest in sex, appetite changes, and fatigue. Items are rated according to intensity experienced over a 2-week interval from 0 meaning absent, to 3 meaning severe. Scoring ranges from 0 to 63. A score of less than 10 indicates minimal depression, 10 to 18 mild to moderate depression, 19 to 29 moderate to severe depression, and over 30 severe depression.[32] The BDI has had extensive evaluation of reliability and validity with an internal consistency range from 0.73 to 0.92 with a mean alpha coefficient of 0.86 for psychiatric samples and similar results of 0.81 for non-psychiatric samples. Major et al. (1990) used the BDI to measure women's responses immediately after an abortion.[33]

State-Trait Anxiety Inventory The State-Trait Anxiety Inventory (STAI) is a two-dimensional, 20-item, self-administered questionnaire developed to evaluate both transitory (state) and persistent (trait) anxiety.[34] Items are divided into 20 state-anxiety and 20 trait-anxiety symptoms and rated from 0 to 4 in intensity and frequency. Scores for each subscale range from 20 to 80 and are summed with higher scores indicative of greater anxiety. Reliability for the STAI shows high internal consistency with alpha coefficients reported at $r=0.93$ for state anxiety and $r=0.90$ for trait anxiety for a student population. Test and retest reliability shows greater stability (>0.70) for trait anxiety and less (0.36 to 0.51)[34] for state anxiety, which is a less stable condition. Content validity is consistent with the DSM-IV TR[35] criteria for generalized anxiety disorder. The STAI has been used in studies with women prior to and after an abortion.[36,37]

Brief Symptom Inventory The BSI is a shortened form of the Symptom Checklist-90 for psychiatric and community samples.[38] The scale includes domains of depression, anxiety, somatization, obsessive–compulsive tendencies, interpersonal sensitivity, phobias, hostility, psychosis, and paranoid ideation. The scale is a 53-item inventory based on self-reports over the past 7 days, and

each item is scored on a Likert scale from 0 to 5, indicating "not at all" to "extremely." Scores for each domain are summed, divided by the number of items endorsed, and converted to standardized scores. For this study, a global index of the Positive Symptom of Distress Index (PSDI) was used to describe overall distress. The PSDI score included summing all nonzero responses and then dividing by the Positive Symptom Total. Chronbach's alpha indices of reliability for each domain include ranges of 0.71 to 0.85 suggesting moderate to high correlations.[39]

Impact of event scale The Impact of Event Scale (IES) is a 15-item continuous measure used to assess the impact of stress associated with a stressful event, in this case, a previous abortion.[40] The IES measures stress responses ranging in severity from scores of no symptoms to scores of severe symptoms of psychological trauma.[35] The IES taps the two main psychological domains in response to a stressful event, including intrusive phenomena (ideas, flashbacks, images nightmares, and associated feelings) and avoidant phenomena (attempts to avoid stimuli, feelings, or circumstances associated with the event). The IES rates how frequently intrusive or avoidant phenomena occur within 7 days of the event. Items are scored within each of the two subscales according to frequency of responses from 0, "not at all" to 5, "often." The range of scores for the intrusive subscale is 0 to 35, and the range of scores for the avoidant subscale is 0 to 40. A summed score of 26 and above indicates moderate to severe symptoms of psychological trauma and meets the partial or full criteria for post-traumatic stress disorder.[41] The IES has demonstrated internal consistency of both subscales with coefficients ranging from 0.79 to 0.92. The IES has been used in studies assessing abortion[42,43] and perinatal loss,[44] including short-term (i.e., 1 week) and long-term post-abortion responses.

Perinatal grief scale The Perinatal Grief Scale (PGS) is a 33-item scale assessing grief related to pregnancy loss including three subscales of "active grief," "difficulty coping," and "despair".[45] The PGS has been used for all types of pregnancy loss ranging from early to late trimester loss,[46] including abortion.[27] Each subscale is scored from 11 to 55, or a total summed score can be used ranging from 33 to 165 with higher scores reflecting more intense grief. A total summed score of 90 indicates severe psychopathology. Reliability is assessed by Cronbach's alpha for scale as a whole 0.95 with average inter-item correlation of 0.40. Each respective subscale demonstrates values >0.85 with active grief=0.92, difficulty coping=0.91, and despair=0.86. Concurrent validity for the PGS is compared with depression via the Symptom Checklist[38] and demonstrates moderate to high correlation of $r=0.785$ as grief shares similar but not redundant attributes with depression. For this study, the word "pregnancy" was substituted for "baby" and "pregnancy ended" was substituted for "baby died." The summed score for the three subscales was used.

In addition, paper-and-pencil questionnaires were developed which collected demographic, health, and reproductive history information based on self-report. The Demographic Questionnaire collected data on age, school attended, citizenship, and ethnicity; the Health Questionnaire collected data on alcohol, smoking, and medical history, and the Reproductive History Questionnaire collected data associated with the pregnancy and abortion experience, including whether participants experienced medical complications with the abortion or received pre- or post-abortion counseling, that may have contributed to differences among those who sought treatment after abortion.

Data analyses

First, descriptive statistics were used to analyze and compare demographic, health, and reproductive characteristics among groups. A chi-square test and a Kruskal–Wallis rank test were

used for nominal and ordinal data. Next, Chronbach Alpha coefficients were analyzed to measure the internal consistencies of all standard instruments. Then, MANCOVA was used to answer questions of group differences on psychological outcome. MANCOVA tests the significance of differences between the means of two or more groups and controls for covariate influences. The covariates of co-existing mental health problems, younger age, less time since the abortion, and a history of multiple abortions were examined to see if they were associated with those who reported higher distress and preferred psychological follow-up services after abortion. The Statistical Package for the Social Sciences version 17.0 was used to perform all analyses. Data were entered by a trained research assistant. A biostatistician was consulted for the analyses.

Results

Demographic characteristics among the three groups

An international sample of $N=151$ students participated in the study. Most were from McGill University ($n=127$), 9% ($n=14$) were from the University of Vermont, and 7% ($n=10$) were from Concordia University. Of these, $n=89$ had experienced a previous abortion. Thirty students who responded to ads were deemed ineligible due to age, school attended, abortion type, or marital status. One student was enrolled and then withdrawn due to distress caused by completing the questionnaires, and this was reported to the IRB. Five students were referred to university psychiatric services for suicidal ideation or moderate depression (BDI scores>20, or suicidal ideation endorsed). Twelve students requested and were referred for psychological follow-up services to address the abortion at the time of interview. Group classifications included $n=48$ students in the *Abortion Treatment Preferring* (Group 1), $n=41$ students in the *Abortion Non-Treatment Preferring* (Group 2), and $n=62$ students in the *Control* group (Group 3).

No demographic differences among participants between schools, between an urban and rural setting, or between Canada and the United States were found. Of the total sample, the majority were Caucasian (67%, $n=101$), citizens of Canada (66%, $n=99$), and attended McGill University (84%, $n=127$). Participants from the Universities of Vermont and Concordia comprised less than 20% of the sample. No major demographic differences were found between groups. Most of the *Control* group lived on campus as compared with 10% ($n=5$) and 5% ($n=2$) of the other groups (chi square=21.098, df=6, $p=0.002$). Concerning religious practice, no significant differences among the groups were found. The majority of the total sample (52%, $n=79$) as well as the majority of each group declared no religious affiliation (*Abortion Treatment Preferring*=62%, *Abortion Non-treatment Preferring*=51%, *Controls*=45%). Likewise, most participants did not attended religious services (74%, $n=112$). (See Table 1)

The age of participants ranged from 18 to 35 years (*M* 22.4 years, SD 3.78). As expected, the *Control* group was significantly younger than the groups who had abortions (*M Control*= 20.4 years, versus *M Abortion Treatment Preferring*=23.9 years, *M Abortion Non-treatment Preferring*=23.7 years, df=2, F=18.250, $p=0.000$). The *Control* group was also more homogenous in age (SD=1.7 years) compared with the total sample. There were no significant differences in age between the *Abortion Treatment Preferring* group and the *Abortion Non-treatment Preferring* groups. All participants who obtained an abortion did so under 25 years of age. The younger *Control* group also resulted in an expected trend of less educational years than the *Abortion Treatment Preferring* and the *Abortion Non-treatment Preferring* groups (6.6 years versus 7.58, 7.54, df=2, F=5.400, $p=0.005$). (See Table 2)

No significant differences for health characteristics or history including smoking, alcohol use, or recreational drug use, including self-reported past mental health history, among groups were

Table 1

Demographic characteristics for the three groups

	Abortion				
Variable	Group 1 (n=48)	Group 2 (n=41)	Group 3 (n=62)	Total (n=151)	P value
School		Chi squared 12.6, df=4, p<0.05			
McGill	40 (83.3%)	35 (85.4%)	52 (40.9%)	127 (84.1%)	
U of V	2 (4.2%)	2 (4.9%)	10 (16.1%)	14 (9.3%)	
Concordia	6 (12.5%)	4 (9.8%)	0 (0%)	10 (6.6%)	
Citizenship					ns
Canada	36 (75%)	29 (70.7%)	34 (54.8%)	99 (65.6%)	
USA	5 (10.4%)	8 (19.5%)	21 (33.9)	34 (22.5%)	
Asia	4 (8.3%)	1 (2.4%)	1 (1.6%)	6 (4.0%)	
Europe	3 (6.3%)	3 (4.9%)	3 (4.8%)	10 (2.6%)	
Other	0 (0%)	1 (2.4%)	2 (3.2%)	5 (2.0%)	
Race					ns
Caucasian	31 (64.6%)	29 (70.7%)	41 (66.1%)	101 (66.9%)	
Asian	10 (20.8%)	7 (17.1%)	12 (19.4)	29 (19.2%)	
First nation	4 (8.3.%)	2 (4.9%)	6 (9.7%)	12 (7.9%)	
African	2 (4.2%)	2 (4.9%)	3 (4.8%)	7 (4.6%)	
Latina	1 (2.1%)	1 (2.4%)	0 (0%)	2 (1.3%)	
Religion					ns
None declared	30 (62.5%)	21 (51.2%)	28 (45.2%)	79 (52.3%)	
Protestant	3 (6.25%)	4 (9.8%)	9 (14.5%)	16 (10.6%)	
Catholic	12 (25.0%)	9 (22.0%)	14 (22.6%)	35 (23.2%)	
Jewish	0 (0%)	2 (4.9%)	8 (12.9%)	10 (6.6%)	
Muslim	2 (4.2%)	3 (7.3%)	2 (3.2%)	7 (4.6%)	
Buddhist/other	1 (2.1%)	2 (4.8%)	1 (1.6%)	4 (2.6%)	
Religious attendance					ns
Never/rarely	37 (77.1)	34 (84.0%)	41 (66.1%)	112 (74%)	
Occasional	7 (14.6%)	6 (14.6%)	11 (17.2%)	24 (15.9%)	
Regular	4 (8.3%)	1 (2.4%)	10 (16.1%)	15 (9.9%)	
Housing		Chi squared=21.1, df=6, p<0.05			
Off-campus	39 (81.2%)	35 (85.4%)	38 (61.3%)	112 (74.2%)	
On campus	5 (10.4%)	2 (4.9%)	20 (32.3%)	27 (17.9%)	
With parents	4 (8.3%)	4 (9.8%)	4 (6.5%)	12 (7.9%)	

reported. Of note, however, was that suicidal ideation was lowest in the *Control* group and highest among the *Abortion Treatment-Seeking* group. Almost half of the *Abortion Treatment-Seeking* group reported a history of suicidal ideation or attempt (N=20, 42%) as opposed to about one third of the *Abortion Non-treatment-Seeking* group (N=13, 32%) and one quarter of the *Control* group (N=15, 25%).

Among students who had abortions, length of time since the abortion ranged from 1 month to 10 years with a mean of 3 years. (See Table 3) No statistically significant differences in the characteristics of the pregnancy and abortion experience were found between the *Abortion Treatment Preferring* and the *Abortion Non-treatment Preferring* groups. However, a higher

Table 2

Analysis of variance for age and educational years by group

		Sum of squares	df	Mean square	F	Sig.
Age	Between groups	424.657	2	212.328	18.250	<0.0001
	Within groups	1,721.886	148	11.634		
	Total	2146.543	150			
Ed years	Between groups	31.843	2	15.921	5.400	0.005
	Within groups	436.330	148	2.948		
	Total	468.172	150			

incidence of suicidal ideation after the abortion ($n=14$, 32% versus $n=6$, 15%), viewing the embryo via ultrasound prior to abortion ($n=31$, 68% versus $n=21$, 54%), and surgical complications ($n=16$, 41% versus $n=7$, 21%), were notable in the *Abortion Treatment Preferring group* compared with the *Abortion Non-treatment Preferring* group. (See Table 4)

Results for Reliability of Measures

The internal consistencies for the measure used in this study showed excellent reliability and included the following Chronbach Alpha Coefficients: Brief Symptom Inventory was 0.967, the Beck Depression Inventory was 0.885, the State-Trait Anxiety Inventory was 0.965, the Impact of Event Scale was 0.929, and the Perinatal Grief Scale was 0.889.

Multivariate results of three group comparison

First, MANCOVA was used to examine the effects of group status and the covariate, co-existing mental health, on the dependent variables of depression (BDI), situational anxiety (STATE), and character logical anxiety (TRAIT) among the three groups. These results found that group status had a significant effect on outcome (Wilk's Lambda=0.902, F=2.489, $p=0.023$). Co-existing mental health had a significant effect on outcome as well (Wilk's Lambda=0.522, F=43.053, $p=0.000$). Since the interaction between group status and co-existing mental health was also significant (Wilk's Lambda=0.883, F=3.013, $p=0.007$), the between-subject effects for each outcome were examined. After adjusting for co-existing mental health, depression was found to be slightly higher in the *Abortion Treatment Preferring* group and mild in severity

Table 3

Time post-abortion in months for abortion groups

	Group	N	Mean	SD	SEM
Group Abortion Treatment Preferring	1	48	35.1869	35.35010	5.10235
Group Abortion Non-treatment Preferring	2	41	29.7615	32.25419	5.03726

Table 4

Characteristics of reproductive experiences between abortion groups

Variable	Group 1 Abortion Treatment Preferring (*n*=48)	Group 2 Abortion Non-treatment Preferring (*n*=41)	Total (*n*=89)	*P* value
Abortions				ns
One	42 (87.5%)	36 (87.8)	78 (87.6%)	
Two	4 (8.3%)	4 (9.8%)	8 (9.0%)	
Three	2 (4.2%)	1 (2.4%)	3 (3.5%)	
Gestational				ns
Age, weeks				
6 or less	14 (31.8%)	10 (25%)	24 (27.5%)	
12 or <	32 (64.0%)	30 (72.7%)	62 (69%)	
13 or >	2 (4.2)	1 (2.4%)	3 (3.5%)	
Abortion type				ns
Surgical	44 (91.7%)	39 (95.1%)	83 (93.2%)	
Medical	4 (8.3%)	1 (2.4%)	5 (3.3%)	
Saline	0 (0.0%)	1 (2.4%)	1 (0.7%)	
Surgical			3.516, df=1	(*p*=0.061)
Complications				
No	23 (59.0%)	27 (79.4%)	50 (68.5%)	
Yes	16 (41.0%)	7 (20.6%)	23 (31.5%)	
Post-abortion			3.483, df=1	(*p*=0.062)
Suicidal ideation				
No	30 (68.2%)	35 (85.4%)	65 (76.5%)	
Yes	14 (31.8%)	6 (14.6%)	20 (23.5%)	
Anesthesia type				ns
Local	18 (37.5%)	16 (43.9%)	34 (38.2%)	
General	12 (25.0%)	18 (43.9%)	30 (33.7%)	
None	18 (37.5%)	7 (17.1%)	25 (23.6%)	
Abortion				ns
Location				
Hospital	13 (27.7%)	10 (25.0%)	23 (26.4%)	
Clinic	3 (6.4%)	1 (2.5%)	4 (4.6%)	.
Abortion				
Facility	28 (59.6%)	29 (72.5%)	57 (65.5%)	
Other	3 (6.4%)	0 (0%)	3 (3.4%)	
Viewed			1.827, df=1	(*p*=0.176)
Embryo				
No	15 (31.9%)	18 (46.2%)	33 (38.4%)	
Yes	31 (68.1%)	21 (53.6%)	53 (61.6%)	

(BDI *M*=10.66, 95% CI 8.9–12.3) compared with no depression in the *Abortion Non-treatment Preferring* (BDI *M*=8.99; 95% CI 7.0–10.7) and *Control* (BDI *M*=8.95) groups. Likewise, situational anxiety was found to be slightly higher (STATE *M*=41.26; 95% CI 38.4-48.1) for the *Abortion Treatment Preferring* compared with the *Abortion Non-treatment Preferring* (STATE *M*=38.4; 95% CI 35.7–41.9) and *Control* (STATE *M*=38.1; 95% CI 35.7–40.6) groups. However, no differences in character logical anxiety among the three groups were found. A post hoc Bonferroni comparison found that the *Abortion Treatment Preferring* group had greater co-existing psychopathology (*p*=0.047) and depression (*p*=0.016) compared with the other two groups.

Multivariate results of two group comparison

A *t* test and ANOVAs were used to examine differences in the covariates of age, time since the abortion, and number of abortions in the *Abortion Treatment Preferring* group compared with the *Abortion Non-treatment Preferring* group, and no differences were found.

Additionally, MANCOVA was used to examine group status and the covariate, co-existing mental health, on the dependent variables of depression (BDI), situational anxiety (STATE), character logical anxiety (TRAIT), psychological stress (IES), and perinatal grief (PGS) between the *Abortion Treatment Preferring* and the *Abortion Non-treatment Preferring* groups. Results showed that the *Abortion Treatment Preferring* group and the *Abortion Non-treatment Preferring* group were significantly different on the dependent variables (Wilk's Lambda=0.856, F=2.9, *p*<0.05).

Furthermore, the severity of co-existing mental health was significantly different in the *Abortion Treatment Preferring group* compared with the *Abortion Non-treatment Preferring* group (*p*<0.001). Moreover, the interaction between group status and co-existing mental health was significant (*p*<0.05). Since co-existing mental health was the only significant covariate between the two groups, it was statistically controlled. After controlling for co-existing mental health, there were still significant differences in psychological outcome in the *Abortion Treatment Preferring* compared with the *Abortion Non-treatment Preferring* groups (Wilk's Lambda=0.856. F=2.9, df=79.00, *p*<0.05). Therefore, the between-subject effects of each group were analyzed. After adjusting for co-existing mental health conditions, depression, and situational anxiety remained significantly higher for the *Abortion Treatment Preferring* group, indicative of mild depression (BDI *M*=11.10 versus *M*=9.28, *p*<0.05) and moderate

Table 5
Differences in depression, anxiety, PTSD, and perinatal grief between the two groups who obtained abortions

Dependent	Group	M	Standard error	95 % Confidence interval	
Variable				LL	UL
BDI	1	11.098	0.766	9.575	12.622
	2	9. 283	0.889	7.515	11.052
STATE	1	41.863	1.515	38.850	44.876
	2	39. 361	1.759	35.862	42.859
TRAIT	1	43.857	1.401	41.071	46.643
	2	43. 955	1.626	40.720	47.190
IES	1	26.868	1.969	22.952	30.784
	2	16.848	2.286	12.301	21.394
PGS	1	62.541	2.283	58.001	67.082
	2	50.889	2.651	45.617	56.162

Group 1=Abortion Treatment Preferring group, Group 2=Abortion Non-treatment Preferring group

situational anxiety (STATE $M=41.86$ versus $M=39.36$, $p<0.05$), compared with the *Abortion Non-treatment Preferring* group. In contrast, no differences in character logical anxiety were found (TRAIT $M=43.86$ to $M=43.95$) between the *Abortion Treatment Preferring* group when compared with the *Abortion Non-treatment Preferring* group. Of further significance, adjusted scores showed psychological stress associated with the abortion remained significantly higher for the *Abortion Treatment Preferring* group, indicative of moderate to severe PTSD (IES $M=26.87$ versus $M=16.84$, $p<0.05$) than for the *Abortion Non-treatment Preferring* group, who experienced moderate PTSD. Adjusted scores for perinatal grief were also significantly higher for the *Abortion Treatment Preferring* group (PGS $M=62.54$ versus $M=50.89$, $p<0.05$) suggesting moderate grief related to the pregnancy as compared with the *Abortion Non-treatment Preferring* group. (See Table 5)

A t test comparing differences in adjusted group means of the Intrusion and Avoidance subscales of the IES was conducted to further delineate characteristics of distress after abortion. This analysis found that the *Abortion Treatment Preferring* group had significantly higher avoidant symptoms of PTSD related to their abortion experience as compared with that of the *Abortion Non-treatment Preferring* group (IES-A $M=17.56$ versus 9.80, $p<0.001$). Following this same trend, the *Abortion Treatment Preferring* group, also had significantly higher intrusive symptoms of PTSD related to their abortion experience as compared with the *Abortion Non-treatment Preferring* group (IES-I $M=10.79$ versus 4.51, $p<0.001$).

Discussion

Several new findings emerged from this study towards recognizing and treating PAD within the population at highest risk. First, this study found that more than 50% ($N=48$) of the 89 students in this study who had an abortion preferred to have psychological follow-up services, which are typically not offered within healthcare, to address distress after their abortion. A 50% incidence of persistent distress after abortion is significantly higher than the 30%[2] to 40%[16] incidence that was previously thought. Furthermore, while researchers are starting to recommend psychological services after abortion,[25,26] this is the first known study to evaluate whether students would want treatment as well to specify what symptoms such psychological follow-up services would target.

Second, and perhaps the most significant finding of this study, was that for the *Abortion Treatment Preferring* group, PAD appeared to be multi-factorial stemming from the stress incurred from the unintended pregnancy and abortion experience as well as co-existing mental health problems. These findings support previous single studies associating abortion with PTSD,[11–14] depression,[4,7–9] anxiety,[3,10] and perinatal grief.[30]

Third, for those who preferred services, PAD comprised moderate to severe symptoms of psychological trauma (IES $M=26.86$), indicative of partial or full post-traumatic stress disorder even up to years after the target abortion. It is worrisome that PTSD persisting beyond 3 months can progress to overall functional impairment.[35] Specifically, the significantly higher avoidance symptoms of PTSD (IES-A $M=17.56$ vs. 9.80, $p<.001$) among those who preferred treatment suggests that they were unable to manage the overwhelming thoughts and feelings associated with the abortion and desired assistance to do so. Similarly, those who preferred services also had significantly more intrusive recall about the abortion (IES-I $M=10.80$ versus 4.51, $p<0.001$) than did than those who did not prefer services. Indeed, avoiding the abortion experience appeared to be the primary means of coping among those in the *Abortion Treatment Preferring group* (IES-A 17.56 versus 10.80). Moreover, even those who preferred no psychological counseling experienced lingering symptoms of PTSD (IES $M=16.84$. Thus, it is evident that, among university women, the psychological impact of having an abortion may be more severe and of longer duration than was previously estimated.

Additionally, those most distressed reported lingering symptoms of perinatal grief which was moderate in severity and significantly higher than those who did not prefer services (PGS $M=62.54$ versus 50.89). Losing a pregnancy can represent the genuine loss of a fetal child, and for most of

the sample, the target pregnancy was their first pregnancy and, for that reason, may be more meaningful.

The study also found that, for those who preferred counseling, PAD also stemmed from significantly higher co-existing ($p<0.05$), but not pre-existing, mental health conditions compared with the other two groups. Higher co-existing mental health problems among the *Abortion Treatment Preferring* group may be explained by symptoms common to severe PTSD, such as somatic symptoms, insomnia, or hyper-vigilance; indeed, the higher rates of depression (BDI $M=$ 11.09 versus 9.28 $p<0.05$) and situational anxiety (STAI $M=41.86$ versus 39.36, $p<0.05$) among those who preferred treatment supports this explanation. However, because there were no differences in reported mental health history (i.e., past psychiatric diagnoses, medication use, out- or in-patient psychiatric service utilization) as well as characterological anxiety ($M=43.86$ versus 43.95)—a trait that remains constant over time—findings indicate that there were no major differences in pre-existing mental health between the *Abortion Treatment Preferring* group and the *Abortion Non-treatment Preferring* groups. Moreover, the finding that all students who had an abortion, including those who preferred treatment and those who did not, experienced some distinct and persistent symptoms of PTSD (IES $M=16.84$) indicate that the abortion experience may independently contribute to distress and recognizing this is critical to shaping effective follow-up services.

One reason why higher co-existing mental health problems were evident among those who preferred treatment, relates to circumstances of the unintended pregnancy as well as the abortion experience. While not statistically significant, this study was the first known to identify several contextual variables that may have influenced distress, with notable implications for clinical practice. First, those who viewed the embryo via ultrasound prior to the abortion procedure and received no counseling before or afterward often reported this as a stressful experience. Counseling before and after viewing the embryo may be required to aid in decision-making about whether to continue with the abortion procedure. Additionally, physical complications such as excess bleeding, pain, and incomplete evacuation prolonged the abortion procedure and may have compounded anxiety for those who were already distressed. Moreover, more suicidal ideation and attempts after abortion were associated with those who preferred psychological follow-up services. These results support other research which associates elective abortion with subsequent suicidal behavior for some sub-groups of women.[3–6] However, more research is required to explore the association between suicide and psychological distress after abortion, specifically for younger women. These findings also add to and elucidate previous research, which identified factors surrounding an abortion can contribute to PAD.[4]

Conclusion

This study has implications for clinical practice and future research. First, healthcare providers have an ethical and professional obligation to develop and offer interventions that address the psychological aftermath of abortion for those women that want such services. The study identified important target symptoms in young women who have abortions, thus providing a first step to developing an evidence-based intervention. Interventions that treat psychological distress after abortion need to be developed, tested for efficacy, and replicated. Such services that relieve distress after abortion have the potential to decrease psychiatric morbidity associated with abortion.

Next, changes in clinical practice need to include screening, monitoring, and preventing psychological distress after abortion, especially for those who may be vulnerable. Women need to be followed up for the emergence of adverse outcomes after abortion that may occur long after the abortion.

Further research is needed regarding the determinants of the abortion procedure that may be associated with greater distress after abortion for some women such as the emotional impact of

viewing the embryo or experiencing medical complications. Thus, determinants associated with the abortion procedure itself, such as medical complications, viewing the embryo, and suicidal ideation after the abortion, while not significant in this study, need further exploring. It is worth identifying whether some of these factors are modifiable in order to prevent or lessen the degree of psychological distress after abortion.

Finally, this study found that length of time since abortion, multiple abortions, later gestational abortions, recent abortions, and religious affiliation were not associated with greater psychological distress after abortion. In contrast, this study found that the stress of a single, early, elective abortion contributed to significant and persistent psychological sequelae afterward among students who preferred psychological follow-up services. This finding supports other studies suggesting that an abortion may have more of an impact on mental health than was previously thought among some sub-groups of younger women. In addition, while the passage of time after abortion may have modified some distress, contrary to assumptions that time heals, time alone was not sufficient to resolve distress, particularly for students who desired follow-up services.

Study limitations

The study had several limitations. First, a revised version of the Impact of Event Scale would have captured more symptoms with PTSD, particularly those of hyper-vigilance. Next, those who viewed the embryo prior to undergoing the abortion procedure may have experienced more distress compared with those who did not view it and may have represented a sub-group within the sample. Additionally, a convenience sample may not have been representative of the full spectrum of student emotional experiences after abortion. Third, student preferences for services may change over time according to variations in levels of distress after abortion, which may result in changes in treatment preference in either direction. Finally, the severity and determinants of PAD may vary within sub-groups between those who had an abortion in less than a year and those who had an abortion beyond 1 year. Different sub-groups may require different interventions services.

Implications for Behavioral Health

Students who experience adverse psychological outcomes to abortion and desire psychological follow-up services have a right to treatment that addresses their experience. However, recognition of adverse psychological outcomes to abortion includes significant changes in practice for behavioral health providers. First, mental health providers need to recognize that some populations of students may experience abortion as a stressful event and be at a higher risk for developing adverse post-abortion mental health problems. Second, similar to the course of mental health problems which develop following other types of stressful events, the course of PAD can develop as an immediate, short-term, or long-term response to the abortion experience. Third, post-abortion mental health problems may manifest as DSM-IV diagnostic criteria for psychiatric disorders including acute stress disorder and chronic or delayed PTSD or as sub-clinical conditions. Finally, psychological stress responses after abortion may change over time ranging from immediate relief after abortion to longer-term affective or stress disorder according to individual characteristics.

As a result, mental health providers who refer students for abortion may need to improve educational and screening efforts for students considering abortions *prior* to the actual abortion experience in an effort to prevent adverse responses. Educational efforts aimed toward preventing mental health problems after abortion include: (1) informing students of the potential psychological risks of abortion, (2) making students aware of available and supportive resources after abortion, such as literature, support groups, post-abortion counseling websites, and mental health services that recognize their experience, as well as (3) exploring alternative options to abortion such as adoption or delivery.

Similarly, mental health providers may need to improve psychological evaluation before the abortion experience to include: (3) assessing student expectations, coping skills, and individual risk factors associated with the unintended pregnancy and abortion experience, and after abortion (4) monitoring, managing, and intervening of negative post-abortion psychological sequelae, especially to determine if the patient has any self-destructive or suicidal tendencies, and (5) providing psychological follow-up services and support for processing the abortion experience. Similar to psychological follow-up services, which are targeted and made available to women who experience postpartum disorders, psychological follow-up services are needed for students who experience psychological problems after an abortion, in order to modify or prevent psychological distress.

Young women who seek help for distress after abortion are fast becoming a new underserved population within healthcare, primarily because they have been marginalized by the politics surrounding abortion and thus, remain untreated. Moreover, the lack of recognition among health care providers to identify and treat young women who experience psychological distress after abortion may be the major contributing factor as to why this population is growing. However, the recent proliferation of post-abortion websites, support groups, and self-help resources support the idea that young women would greatly benefit from post-abortion counseling services. Thus, future research needs to focus on developing interventions to treat populations who are most vulnerable to PAD, and their development should be considered a public health priority.

Conflict of Interest There are no conflicts of interest declared.

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