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Pregnancy and miscarriage predict suicide attempts but not substance use among dual-systems involved female adolescents

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ABSTRACT

Background: To examine the associations between adolescent pregnancy and pregnancy outcomes on substance use and suicide attempts in a sample who is at greater risk for substance use and suicide attempts — those who have been involved with the juvenile justice and child welfare systems.

Methods: Using a prospective, longitudinal design, we examined the role of adolescent pregnancy outcomes on risk for suicide attempts and substance use among a sample of 166 female adolescents with juvenile justice system and child welfare involvement.

Results: Of participants, 36% ($n = 60$) reported at least one adolescent pregnancy with a total of 109 pregnancies reported. Adolescent pregnancy was associated with an increase in later suicide attempts (aOR = 1.68, 95% CI 1.06–2.72). Miscarriage was associated with a 2-fold increase in the likelihood of later suicide attempts, (aOR = 2.12, 95% CI 1.10–4.12). No participants who reported induced abortion ($n = 13$) reported suicide attempts. Adolescent pregnancy, miscarriage, and abortion were not significantly associated with later substance use ($Ps > 0.05$).

Conclusions: Healthcare professionals should conduct routine screening for suicidality in the months following a miscarriage, offer education to caregivers about how to support youth who experience pregnancy loss, provide additional social supports and familiarize themselves with local and virtual behavioral health resources to prevent suicide attempts among female adolescents who are at high risk and experience miscarriage.

1. Introduction

Suicide and accidental injuries such as alcohol-related deaths and accidental overdose are among the top five leading causes of death among female adolescents. (Heron, 2017) In 2017, the United States national rate of illicit substance use among high school-age females was approximately 14% and the rate of suicide attempts was approximately 9%. (Centers for Disease Control and Prevention, 2017) However, compared to the general population of female adolescents, those who are in foster care or are involved in the juvenile justice system (hereafter referred to as dual-system involved) are at substantially higher risk for illicit substance use (49%) (Vaughn, Ollie, McMillen, Scott, & Munson, 2007) and suicide attempts (41%). (Rabinovitch, Kerr, Leve, & Chamberlain, 2015) Dual-system involved adolescent females are also at higher risk for teen pregnancy. (Kerr, Leve, & Chamberlain, 2009; Oshima, Narendorf, & McMillen, 2013) Estimates of adolescent pregnancy outcomes suggest that of the approximately one million adolescent pregnancies within a given year, 60% will result in a live birth, 15% will end in fetal loss (including miscarriage and stillbirth), and the remaining quarter will end in induced abortion. (Kost, Maddow-Zimet, & Arpaia, 2017) Additional research is needed to determine whether adolescent pregnancy and pregnancy outcomes (e.g., miscarriage, induced abortion, stillbirth) are associated with increased risk for substance use and suicide attempts among female adolescents with dual-system involvement, given elevated rates of use and attempts among this population. Understanding the role of pregnancy and pregnancy outcomes on suicide attempts and substance use for dual-system involved female adolescents will help determine the potential role of care providers in delivering youth with supportive services following pregnancy.

There is strong evidence to suggest that compounding early disruptive experiences — pervasive among dual system-involved female adolescents — and polygenic risk coalesce to cause a cascade of behavioral challenges. (Bayatpour, Wells, & Holford, 1992; Rabinovitch et al., 2015; Richmond-Rakerd, Moffitt, & Arseneault, 2020) These common pathways result in shared expression of adolescent pregnancy,

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delinquent behaviors, substance use, and psychopathology, including risk for suicide attempts. (DuRant, Smith, Kreiter, & Krowchuk, 1999; O'Connell, Novins, & Beals, 2007; Thompson, Ho, & Kingree, 2007; Vermeiren, 2003) However, it is unknown whether specific pregnancy outcomes exacerbate extant risk for substance use and suicide attempts among female adolescents. Additionally, although there are increasing efforts to coordinate mental health services for dual system-involved youth, (Wasserman, Elkington, Robson, & Taxman, 2021) there continues to be a slow decline in adolescent justice involvement for females. (OJJDP, 2022) Thus, additional research on the dynamics of how risks unfold throughout adolescence for female, dual system-involved individuals has the opportunity to improve services delivery for these youth.

Pregnancy that results in fetal or infant death has been associated with an elevated risk for postpartum suicide attempt (Schiff & Grossman, 2006; Weng et al., 2018) and history of induced abortion is related to maternal substance use in the general female population (Coleman, Reardon, & Cougle, 2005). However, these risks may be particularly pronounced when pregnancy loss and termination occur in adolescence, given the psychological vulnerability of this age demographic (i.e., stressful life events in adolescence result in structural changes which increase the likelihood of emotional instability). (Romeo, 2017) A study of Finish women reported that women who had become pregnant as teenagers were at greater risk for premature mortality including suicide and alcohol-related causes. (Jalanko, Leppälahti, Heikinheimo, & Gissler, 2017) These risks were highest for women who had undergone an abortion in adolescence. (Jalanko et al., 2017) Similar results for the association between induced abortion and substance use were obtained by Reardon and colleagues in a representative sample of youth in the United States. (Reardon, Coleman, & Cougle, 2004) Although additional evidence is needed to confirm these findings, research on adolescent mothers highlights additional extant risk. Specifically, among adolescents, both history of induced abortion and history of miscarriage have been associated with repeated teenage pregnancy (Ashcraft, Fernández-Val, & Lang, 2013; Maravilla, Betts, Couto-e-Cruz, & Alati, 2017) and young maternal age is a risk factor for suicide attempt during pregnancy. (Gentile, 2011) However, there is a dearth of literature on this topic, particularly related to pregnancy loss, and additional work is needed to elucidate whether adolescents who experience miscarriage or induced abortion are at risk for suicide attempts and substance use.

1.1. The present study

The sample leveraged for this study is one of few studies leveraging quantitative, longitudinal data to observe the experiences specific to *female* adolescents who are dual-system involved. (Mulvey & Schubert, 2012; Teplin et al., 2021; Widom, 2014) It is the only such quantitative study that specifically focuses on females who have been mandated to out-of-home care because of severe and chronic offenses — a placement process which continues to occur today. This research is especially needed because dual-system involved females remain highly vulnerable to pregnancy, substance use, and suicide in adolescence. (Rabinovitch et al., 2015; Vaughn et al., 2007) As such, our research provides a basis for further exploration of associations between pregnancy loss and suicide among this population.

Using a prospective, longitudinal design, we examined the role of adolescent pregnancy outcomes on risk for suicide attempts and substance use among a sample of female adolescents with juvenile justice and foster care system involvement (i.e. dual-system involved). Given the results from previous studies, we hypothesized that history of miscarriage and induced abortion would be associated with increased risk for suicide attempts and substance use in this population.

2. Methods

2.1. Participants

Participants were 166 female adolescents who participated in one of two consecutive RCTs ($n = 81$ and 85 for Cohort 1 and 2, respectively) conducted from 1997 to 2006. (Chamberlain, Leve, & Degarmo, 2007; Chamberlain, 2003) The participants had been mandated to community-based out-of-home care (i.e., placed in foster care with a non-relative) due to problems with chronic delinquency. The study attempted to enroll all referred female adolescents who were 13–17 years old, who had at least one criminal referral in the prior 12 months, and who were not pregnant at enrollment. If participants were not placed into out-of-home care within 12 months following referral to the study, they were no longer eligible to participate because this was also part of the inclusion criteria. In both cohorts, participants in this study were randomized at baseline to receive either services as usual, which was typically Group Care (GC) residential settings, or the intervention arm, which received Treatment Foster Care Oregon (TFCO). (Chamberlain, 2003) Cohort II recruitment began immediately upon the conclusion of Cohort I recruitment, using the same recruitment methods and inclusion/exclusion criteria. No group differences between cohorts were found for key study variables or demographic characteristics (see Supplemental Table 1). All procedures used in this study were approved and monitored by the institution's Office for the Protection of Human Subjects. Written informed consent was obtained from either the caseworker or legal guardian and assent was obtained from participants at the beginning of their first study visit.

Participants were 13–17 years old at baseline ($M = 15.31$, $SD = 1.17$); 68% were non-Hispanic White, 2% were African American/Black, 11% were Hispanic, 1% were Native American, 1% were Asian, and 17% reported mixed ethnic heritage. At baseline, 61% of adolescents lived with single-parent families and 32% lived in families earning less than $10,000. There were no differences in the rates or types of pre-baseline offenses or other demographic characteristics by intervention condition. No adverse events occurred during the study. Longitudinal data included in this study were drawn from the baseline assessment — when participants were in adolescence — and from follow-up assessments.. The study was reviewed and approved by the Oregon Social Learning Center and University of Oregon institutional review boards.

2.2. Measures

Assessment staff were unaware of group assignment at baseline and were not involved in the intervention delivery. Six-month follow-up assessments occurred at a research center or the youth's residence, depending on whether the participant was in a restrictive or locked residential setting. Thus, some follow-up assessments occurred in the original, randomized placement setting, and therefore assessors were made aware of group assignment. For subsequent interviews, nearly all adolescents had completed their treatment placement and, thus, assessors were generally unaware of study condition. Data were collected using both self-report and interview-administered methods, depending on the measure. Items that were more confidential (e.g., pregnancy history) were completed by self-report methods where the youth directly inputted their responses into a computer, without the interviewer having access to the responses. Table 1 presents the descriptive statistics for all key study variables that are described next.

2.2.1. Pregnancy and pregnancy outcomes

In Cohort 1, each adolescent and her caregiver were separately interviewed at 12 months post-baseline regarding pregnancies and pregnancy outcomes (i.e., miscarriage, induced abortion, live birth, stillbirth) that had occurred during the study. In Cohort 2, the adolescents reported at 6- and 12-months post-baseline on whether they had become pregnant in the past 6 months and the outcome of each

Table 1
Descriptive Statistics of Key Study Variables.

Categorical Variables	*N* (%)
Pregnancies between Baseline and 12-months Post-Baseline	
0	106
1	32
2	14
3	9
4	4
6	1
Pregnancy Outcomes	
Miscarriage between Baseline and 12-months Post-Baseline	
0	116
1	27
2	17
3	4
4	2
Abortion between Baseline and 12-months Post-Baseline	
0	152
1	13
2	1
Stillbirth between Baseline and 12-months Post-Baseline	
0	163
1	3
Live Birth between Baseline and 12-months Post-Baseline	
0	162
1	3
3	1
Adolescent Suicide Attempts between 12-months Post-Baseline and age 18	
0 – none	132 (80%)
1 – 1 or more suicide attempts	15 (9%)
Missing	19 (11%)
Adolescent Suicide Attempts at baseline	
0 – none	98 (59%)
1 – 1 or more suicide attempts	50 (30%)
Missing	18 (11%)
Continuous Variables	*M* (SD)
Baseline Depression Symptoms	24.53 (12.95)
Baseline Cannabis Use	2.82 (1.16)
12-months Post-Baseline Cannabis Use	1.96 (1.28)
Baseline Alcohol Use	2.89 (1.14)
12-months Post-Baseline Alcohol Use	2.05 (1.05)
Baseline Illicit Substance Use	1.16 (0.53)
12-months Post-Baseline Illicit Substance Use	1.12 (0.46)

Note. Participants could have endorsed multiple pregnancy outcomes within and between pregnancy outcome categories so percentages are not computed.

pregnancy; caregivers reported the adolescents' past year pregnancies and pregnancy outcomes at 12 months post-baseline. Caregiver report was only used when adolescent report was unavailable. For both cohorts, the presence or absence of a pregnancy, stillbirth, induced abortion, miscarriage, and live birth was coded as 1 = yes and 0 = no to indicate presence or absence of a pregnancy or pregnancy outcome that occurred between baseline and 12-months post-baseline. For all pregnancy variables, the yes/no responses were added to result in a continuous score for each pregnancy and pregnancy outcome variable.

2.2.2. Adolescent suicide attempts

Adolescent suicide attempts were assessed using the Columbia Suicide Severity Rating Scale (C–SSRS), Lifetime Version. (Posner, Brown, & Stanley, 2011) Participants completed this scale retrospectively, as young adults. Procedures for identifying actual suicide attempts are more fully outlined in Kerr et al. (Kerr, Gibson, Leve, & Degarmo, 2014). (Kerr et al., 2014) Briefly, standardized probes were used to elicit reporting of all acts potentially meeting criteria for Posner and colleagues' definition of *actual attempt*, that is, "a potentially self-injurious act committed with at least some wish to die, as a result of act" (p. 3). (Posner et al., 2011) For each act, interviewers then used further standardized probes to determine whether to consider it an actual attempt versus another act, such as *interrupted attempt* (being interrupted by an outside circumstance, such as another person, from starting a potentially self-injurious suicidal act that otherwise would have occurred), *aborted attempt* (stopping oneself when an attempt was imminent), or *nonsuicidal self-injury* (self-injurious act with no intent to die as a result of the act). (Posner et al., 2011) Hereafter, we refer to actual attempt as *suicide attempt,* and other acts (i.e., *interrupted attempt*, *aborted attempt*, *nonsuicidal self-injury*) were excluded from analysis.

In this study, we examined adolescent suicide attempts having occurred prior to baseline as a covariate. Suicide attempts occurring between 12-months post-baseline and 18 years of age (i.e., events coded as actual attempt in adolescence) comprised the dependent variable. Attempts that occurred after baseline until 12-months post-baseline were excluded because we were unable to determine temporal precedence of pregnancy and pregnancy outcomes during that timeframe. Attempt history between 12-months post-baseline and 18 years of age was coded as number of attempts (range 0–2). Given the low frequency of attempts, we dichotomized adolescent suicide attempts into 0 = no attempts and 1 = 1 or 2 attempts. The C–SSRS was completed by 148 participants (90% of the available sample, $n = 164$). One additional participant (assigned to GC in Cohort 1) is known to have died by suicide prior to age 18 because a caregiver reported this information to study personnel, and was coded as having a positive suicide attempt history; death record searches did not identify other participant deaths by suicide prior to age 18.

2.2.3. Adolescent substance use

Substance use, namely, illicit substance use, alcohol use, and cannabis use were collected at baseline (i.e., upon study enrollment) and 12-months post-baseline. Participants were asked three single-item questions that asked if in the past year they had used: (1) illicit drugs such as uppers, downers, or acid (i.e., drugs other than tobacco, alcohol, or cannabis); (2) alcohol; or (3) cannabis (assessed as marijuana). Responses were provided based on frequency of use as either, 1 = never, 2 = once or twice, 3 = occasionally, 4 = often (on a weekly basis). Thus, all substance use variables were continuous variables, with lower scores indicating less substance use and higher scores indicating more frequent substance use.

2.2.4. Covariates

Depressive symptoms at baseline were included as a covariate. Depressive symptoms were measured with the 20-item Center for Epidemiologic Studies–Depression instrument (CES–D) (Lewinsohn, Seeley, Roberts, & Allen, 1997). The score ranges from 0 to 60 and is based on summed items using a 4-point scale (0–3) indicating frequency of events during previous week, ranging from rarely or none (0–1 day) to most or all of the time (5–7 days). Sample items are *felt depressed*, *fearful*, *lonely*, and *hopeful about the future*. Cronbach's alpha for the CES-D in the sample was acceptable ($\alpha = 0.91$).

Participant age at baseline was included as a covariate because there was variability in participant age at enrollment (12.5–17.8 years).

As participants were involved in a randomized control trial (ClinicalTrials.gov Identifier: NCT01341626) testing a clinical intervention designed to improve psychological well-being and decrease sexual risk-taking behavior, we also included intervention group status in analyses as a covariate. Intervention status was coded as 0 for the control group and 1 for the intervention group. Prior reports from this sample identified intervention effects on pregnancy rates and adolescent mental health. As such, including intervention group condition increases our confidence that any findings from the current study would not be confounded by intervention condition. (Kerr et al., 2009, 2014).

2.3. Analyses

We used binary logistic regression to examine the association between pregnancy and pregnancy outcomes and suicide attempts, while adjusting for baseline suicide attempts, baseline depression symptoms,

intervention group condition, and participant age. Model coefficients were exponentiated to adjusted odds ratios (AORs) to aid in interpretability of effect sizes and 95% confidence intervals were presented to assess the magnitude of effect sizes. The area under the receiver operating characteristic curve (AUC) was used as a classification metric for logistic regression analyses. AUC values of 0.5 indicate that that the model with included predictors discriminates the two outcome levels no better than by chance and a value of 1 indicates that the model perfectly discriminates between the two outcome levels. To assess model specification and fit of logistic regression models we used the DHARMa package for R. (Hartig, 2020).

We conducted multiple linear regression analyses to examine the associations between pregnancy and pregnancy outcomes and substance use, while adjusting for baseline substance use, baseline depressive symptoms, participant age, and intervention group condition. We computed separate regression analyses for each pregnancy and pregnancy outcome (i.e., number of adolescent pregnancies, adolescent miscarriages, and adolescent abortions) due to multicollinearity between the number of pregnancies and number of miscarriages. Thus, we examined associations between each pregnancy and pregnancy outcome between baseline and 12-months post-baseline and each of the three substance use outcomes (i.e., illicit substance use, alcohol use, cannabis use) at 12-months post-baseline. Adjusted R-squared is presented as a measure of effect size and to describe the percent of variance in illicit substance use the predictor variables in each model collectively explain. All data analyses were conducted using R and RStudio. (RStudio Team, 2020; R Core Team).

For all models, sensitivity analyses were conducted comparing the results of the complete case analyses presented in tables and results to results from multiple imputation analyses. A sensitivity analysis was also conducted to evaluate the models without intervention group status as a covariate (see online supplement Tables 2–5). Last, we also provide descriptive data for pregnancy variables and suicide and substance use outcomes for those pregnancy variables that had low variability, which were therefore excluded from main analyses.

3. Results

During the study period, 36% (n = 60) of participants reported adolescent pregnancy with a total of 109 pregnancies reported. Participants reported on the outcome of each pregnancy, indicating miscarriage, live birth, stillbirth, or induced abortion (see Table 1).

Table 2
Multiple Logistic Regression Analyses of Suicide Attempts (12-months Post-Baseline to Age 18) Regressed on Adolescent Pregnancy and Miscarriages between Baseline and 12-months Post-Baseline (n = 142).

	Model 1			Model 2		
	AOR	95% CI for *AOR*	*P*	*AOR*	95% CI for *AOR*	*P*
Number of Pregnancies	**1.68**	**1.06–2.72**	**0.03**	–	–	–
Number of Miscarriages	–	–	–	**2.12**	**1.10–4.12**	**0.02**
Group Condition	1.45	0.41–5.25	0.56	1.42	0.41–5.09	0.58
Baseline Suicide Attempts	**1.98**	**1.10–4.09**	**0.04**	**1.90**	**1.07–3.89**	**0.05**
Baseline Depression	0.96	0.09–1.01	0.11	0.95	0.89–1.00	0.09
Baseline Age	**0.45**	**0.23–0.78**	**0.01**	**0.41**	**0.21–0.74**	**0.01**
AUC	0.81			0.81		

Note. AOR = adjusted odds ratio; CI = 95% confident interval; Group Condition is coded 0 = GC, Group Care; 1 – TFCO, Treatment Foster Care Oregon; AUC = area under receiver operating characteristic curve. Statistically significant values in boldface.

Table 2 presents the associations between pregnancy and pregnancy outcomes and suicide attempts. In Model 1, adolescent pregnancy was associated with an increase in suicide attempts (aOR = 1.68, 95% CI 1.06–2.72, Table 2). In Model 2, miscarriage was associated with a 2-fold increase in the likelihood of suicide attempts, (aOR = 2.12, 95% CI 1.10–4.12, Table 2). For both models, the AUC of 0.81 indicated that models showed excellent discrimination among suicide attempt outcome levels.

Because there were few participants who reported stillbirth (n = 3) and live birth (n = 4), these predictors were not regressed on suicide attempts. Out of the 3 participants who experienced stillbirth, 1 participant reported a suicide attempt. Of the 4 participants who experienced a live birth in the study window, none attempted suicide. Additionally, because none of the participants who reported abortion (n = 13) reported suicide attempts, we also removed induced abortion as a predictor in analyses.

Table 3 presents the associations between pregnancy and pregnancy outcomes and illicit substance use. Adolescent pregnancy, miscarriage and abortion were not significantly associated with illicit substance use (P >.05, Table 3). Table 4 presents the associations between pregnancy and pregnancy outcomes and adolescent alochol use. Adolescent pregnancy, miscarriage, and abortion were not significantly associated with alcohol use (P >.05, Table 4). Table 5 presents the associations between pregnancy and pregnancy outcomes and adolescent cannabis use. Adolescent pregnancy, miscarriage, and abortion were not significantly associated with cannabis use (P >.05, Table 5).

As a sensitivity analysis, we ran Independent Samples t-Tests to determine if levels of illicit substance use significantly differed between those participants who had and had not experienced stillbirth and live birth. Participants who had experienced stillbirth did not have significantly different illicit substance use (M = 1.67, P >.05) from those who had not experienced stillbirth (M = 1.87, P >.05). Additionally, participants who had experienced live birth did not have significantly different illicit substance use (M = 2.25, P >.05) from those who had not experienced live birth (M = 1.85, P >.05).

4. Discussion

The majority of research about adolescent pregnancy and associated risks and outcomes has focused on adolescent pregnancy that results in live birth. The purpose of this study was to understand whether adolescent pregnancy and pregnancy outcomes were differentially associated with increased risk for suicide attempts and substance use in sample of adolescents who were at greater risk for suicide attempts and substance use. Specifically, we leverage data from one of the only studies to date to assess experiences of female adolescents who are dual-system involved who have been mandated of out-of-home care because of severe and chronic offenses. Results emphasize the importance of understanding how pregnancy outcomes, unique from pregnancy resulting in live birth, may be associated with greater risk for this population of female adolescents. Though approximately 80% of adolescent pregnancies are unintended, (Mosher, Jones, & Abma, 2012) experiencing pregnancy loss through miscarriage may be acutely distressing for female adolescents with dual-system involvement, as marked by elevated risk for suicide attempt.

4.1. Results in context

For suicide attempts, we similarly hypothesized that induced abortion and miscarriage would be related to increased risk for suicide attempts. We found that adolescent pregnancy, without accounting for pregnancy outcome, was associated with increased risk for suicide attempts. When examining specific pregnancy outcomes as predictors of suicide attempts, we found that history of miscarriage was associated with elevated risk for suicide attempts. These results held regardless of the covariates included in the model. Although a previous study found

Table 3
Multiple Linear Regression Analyses of Past-Year (12-months Post-Baseline) Illicit Substance Use Regressed on Adolescent Pregnancy and Pregnancy Outcomes between Baseline and 12-months Post-Baseline (n = 145).

	Model 1			Model 2			Model 3		
	B	95% CI for B	*P*	B	95% CI for B	*P*	B	95% CI for B	*P*
Number of Pregnancies	0.09	−0.07–0.25	0.25	–	–	–	–	–	–
Number of Miscarriages	–	–	–	0.15	−0.06–0.36	0.15	–	–	–
Number of Abortions	–	–	–	–	–	–	−0.22	−0.81–0.36	0.45
Group Condition	0.10	−0.26–0.46	0.59	0.10	−0.26–0.47	0.57	0.09	−0.27–0.46	0.62
Baseline Illicit Substance Use	**0.37**	**0.22–0.52**	**<0.001**	**0.37**	**0.22–0.51**	**<0.001**	**0.37**	**0.23–0.52**	**<0.001**
Baseline Depression	−0.01	−0.03–0.00	0.08	−0.01	−0.03–0.00	0.06	−0.01	−0.03–0.00	0.09
Baseline Age	−0.09	−0.25–0.06	0.25	−0.09	−0.25–0.06	0.24	−0.08	−0.24–0.08	0.32
Adjusted R^2	0.14			0.14			0.14		

Note. B = unstandardized regression coefficient; Group Condition is coded 0 = GC, treatment as usual; 1 – TFCO, Treatment Foster Care Oregon; Statistically significant values in boldface.

Table 4
Multiple Linear Regression Analyses of Past-Year (12-months Post-Baseline) Alcohol Use Regressed on Adolescent Pregnancy and Pregnancy Outcomes between Baseline and 12-months Post-Baseline (n = 147).

	Model 1			Model 2			Model 3		
	B	95% CI for B	*P*	B	95% CI for B	*P*	B	95% CI for B	*P*
Number of Pregnancies	0.13	−0.02–0.27	0.09	–	–	–	–	–	–
Number of Miscarriages	–	–	–	0.15	−0.03–0.34	0.11	–	–	–
Number of Abortions	–	–	–	–	–	–	0.24	−0.29–0.77	0.37
Group Condition	−0.12	−0.45–0.20	0.45	−0.12	−0.45–0.21	0.48	−0.12	−0.45–0.21	0.46
Baseline Alcohol Use	**0.23**	**0.08–0.37**	**<0.01**	**0.23**	**0.09–0.38**	**<0.01**	**0.24**	**0.10–0.38**	**< 0.001**
Baseline Depression	**−0.01**	**−0.03–0.00**	**<0.05**	**−0.01**	**−0.03–0.00**	**<0.05**	−0.01	−0.02–0.00	0.06
Baseline Age	0.05	−0.09–0.19	0.48	0.05	−0.09–0.21	0.48	0.05	−0.45–0.21	0.46
Adjusted R^2	0.09			0.09			0.07		

Note. B = unstandardized regression coefficient; Group Condition is coded 0 = GC, treatment as usual; 1 – TFCO, Treatment Foster Care Oregon; Statistically significant values in boldface.

Table 5
Multiple Linear Regression Analyses of Past-Year (12-months Post-Baseline) Cannabis Use Regressed on Adolescent Pregnancy and Pregnancy Outcomes between Baseline and 12-months Post-Baseline (n = 147).

	Model 1			Model 2			Model 3		
	B	95% CI for B	*P*	B	95% CI for B	*P*	B	95% CI for B	*P*
Number of Pregnancies	0.09	−0.06–0.25	0.25	–	–	–	–	–	–
Number of Miscarriages	–	–	–	0.12	−0.09–0.32	0.27	–	–	–
Number of Abortions	–	–	–	–	–	–	−0.16	−0.73–0.42	0.60
Group Condition	−0.12	−0.48–0.24	0.51	−0.12	−0.48–0.24	0.52	−0.12	−0.48–0.23	0.50
Baseline Cannabis Use	**0.30**	**0.15–0.46**	**<0.001**	**0.30**	**0.14–0.46**	**<0.001**	**0.31**	**0.15–0.46**	**< 0.001**
Baseline Depression	−0.01	−0.02–0.00	0.13	−0.01	−0.03–0.00	0.12	−0.01	−0.02–0.00	0.16
Baseline Age	0.03	−0.25–0.19	0.68	0.03	−0.12–0.19	0.68	0.04	−0.11–0.20	0.59
Adjusted R^2	0.09			0.09			0.09		

Note. B = unstandardized regression coefficient; Group Condition is coded 0 = GC, treatment as usual; 1 – TFCO, Treatment Foster Care Oregon; Statistically significant values in boldface.

that induced abortion, but not miscarriage, in adolescence was associated with increased risk for suicide in adulthood, (Jalanko et al., 2017) our study found that miscarriage but not induced abortion was associated with risk for suicide attempts in adolescence. However, past year induced abortion and miscarriage have both been associated with suicide attempts for adults. (Weng et al., 2018) The current sample of female adolescents with histories of dual-system involvement have been shown to have elevated psychosocial and contextual risk experiences relative to community-based samples, (Baglivio & Epps, 2015; Kerr et al., 2009; Oshima et al., 2013) and this context of elevated trauma may contribute to the divergent findings observed between abortion and miscarriage and subsequent suicidality risk. Additionally, there are multiple possible explanations for this difference in results between studies. First, it is possible that individuals who experience induced abortion experience a lag in suicidality or that induced abortion was mis-reported as a miscarriage, as a result of the stigmatization of induced abortion. (Biggs, Brown, & Foster, 2020) Conversely, adolescents who reported an induced abortion may have received more support or guidance in their decision-making process or may have felt more self-efficacy in their decision making or empowered by the opportunity to make such a choice. (Upadhyay, Gipson, & Withers, 2014) In contrast, adolescents who experienced pregnancy loss, whether as a result of a wanted or unwanted pregnancy, and who had not experienced an induced abortion, may have complicated feelings of guilt or beliefs that their thoughts or actions contributed to the loss, a common experience to people who have experienced miscarriage across the lifespan. (Bardos, Hercz, Friedenthal, Missmer, & Williams, 2015) Regardless of the mechanism by which adolescent report of miscarriage was associated with adolescent suicide attempt, the need for supportive care following adolescent pregnancy loss to prevent suicide is warranted as is additional research to replicate findings.

We hypothesized that induced abortion and miscarriage would be related to increased risk for substance use. We found that the only predictor of substance use at 12-months post-baseline was baseline

substance use. Although we did not find associations between pregnancy outcome and any of the substance use variables in our models, the stability of each type of substance use over time clarifies that neither adolescent pregnancy nor specific pregnancy outcome seem to disrupt the general continuity of use in this population. Among women with substance use disorders, pregnancy is often a natural disrupter of substance use and is often followed by relapse in the postpartum period. (Forray, Merry, Lin, Ruger, & Yonkers, 2015) Although our study could not determine temporal decreases in substance use (i.e., whether adolescents decreased their substance use during pregnancy), it does provide evidence that adolescent pregnancy, regardless of outcome, does not appear to be associated with adolescent substance use behaviors following pregnancy.

4.2. Implications for adolescent care

Miscarriage has been largely ignored in the adolescent literature in the United States, despite the fact that adolescent pregnancy rates in the United States are high and approximately 15% or more of adolescent pregnancies result in fetal loss. (Kost et al., 2017; Sedgh, Finer, Bankole, Eilers, & Singh, 2015) The narrative about adolescent pregnancy has, understandably, focused on the prevention of pregnancy, and when adolescents do become pregnant, programs have been developed to support young mothers. (College, 2017; Fleming, O'Driscoll, & Becker, 2015) However, there is a critical need to provide enhanced supports to adolescents who experience pregnancy loss. Narratives that perpetuate the inappropriateness of adolescent pregnancy influence the communication of well-meaning care providers (e.g., physicians, nurses, social workers, parole officers). For example, care providers may express harmful sentiments following loss that support the notion that the adolescent may be "better off without having to deal with pregnancy or a child." (Brady, Brown, Letherby, Bayley, & Wallace, 2008) In the general population, research has demonstrated that even adults often report a lack of information, insensitive provider comments, and a lack of empathy while being treated in medical settings during the experience of miscarriage. (Rowlands & Lee, 2010) Additionally, when an individual has not disclosed their pregnancy in their social networks, the loss of pregnancy can be particularly isolating because there is no one to share the experience with. (Bellhouse, Temple-Smith, & Bilardi, 2018) This may be particularly exaggerated for adolescents who experience heightened pressure to keep their pregnancy a secret due to the fear of parental, partner, or societal consequences. (Osborne & Ankrum, 2020).

There is potential for care providers to play a role in supporting adolescents experiencing pregnancy and particularly pregnancy loss. The current American College of Obstetricians and Gynecologists (ACOG) committee opinion on Adolescent Pregnancy, Contraception, and Sexual Activity makes a single reference to pregnancy loss, and only to clarify the need to offer long-acting reversible contraception following loss. (College, 2017) The American Academy of Pediatrics (AAP) offers a statement about the need for counseling referrals for pregnant adolescents but only mentions support needed for grief and loss following induced abortion and does not mention miscarriage. (Hornberger, 2017) Recommendations from ACOG and AAP should provide guidance about supportive practices to facilitate the psychological well-being of adolescents who experience pregnancy loss. This includes respecting cultural beliefs about miscarriage, including special considerations for the handling of fetal remains, (Fleming et al., 2015) connecting adolescents to supportive care such as doula support or mental health services, and providing screening for suicidality at follow-up appointments to provide appropriate mental health referrals as needed. Care providers may consider conducting routine screening for suicidality in the months following a miscarriage, offering education to caregivers about how to support youth experiencing pregnancy loss, and familiarizing themselves with local and virtual resources to prevent suicide attempts among female adolescents who may be at elevated risk for suicide as a result of dual-system involvement and experiences of miscarriage. Additionally, it is important to consider potential avenues to provide supportive counseling following miscarriage to justice- and welfare-involved adolescents. A trained mental health workforce with knowledge specific to pregnancy and pregnancy loss is essential to avoid further stigmatization of pregnancy loss.

4.3. Limitations and future directions

Results should be interpreted in the context of limitations. First, our results may not be generalizable to the general population of female adolescents because the sample was drawn from a population who had experienced multiple risks and adverse life events. Second, White participants were overrepresented relative to the national U.S. juvenile justice system racial demographic proportions for female adolescents (68% versus 46% White; 32% vs. 54% minority). (Sickmund, Sladky, & Kang, 2020) While this may limit generalizability of study findings, within the current sample, racial and ethnic minorities are slightly overrepresented from the population in the Pacific Northwest region of the U.S. from which participants were drawn. (Sickmund et al., 2020; United States Census Bureau, 2019) Our measures of substance use were inprecise and had low variability, which may have contributed to the lack of asssociations between pregnancy and substance use outcomes. In addition, this study only looked at the temporal consequences of adolescent pregnancy outcomes on adolescent substance use and suicide attempts to identify ways to improve care for this patient population. It is possible that pregnancy outcomes may have lasting psychological consequences into adulthood that were not captured in this study. Finally, the current study is composed of a small sample of participants who were recruited over 15 years ago. Despite this limitation, there are no published data to suggest that more recent samples of female adolescents who are dual system-involved are different from this sample. To the contrary, rates of justice involvement for females have declined at much slower rates compared to their male counterparts. (OJJDP, 2022) Researchers, clinicians, and policymakers should keep this is mind when generalizing study findings; however, this sampe of justice-involved females remain an underserved and understudied population today with elevated risk for substance use and mental health challenges. (Herrera & Boxer, 2019; Rizk & Alderman, 2012; Sanders, Jolivette, & Harris, 2021).

Ours is one of few studies to collect quantitative, longitudinal data on female adolescents with documented dual-system involvement. Additional research to corroborate study findings in warranted. Future data collection efforts should consider a mixed-methods approach to both validate associations between miscarriage and suicide attempts and identify intervention approaches to best support female adolescents who are dual system-involved. Prior work demonstrates that mindfulness and cognitive behavioral therapy (CBT) may be beneficial strategies to support adult women following miscarriage. (Thieleman, Cacciatore, & Hill, 2014; Wenzel, 2017) However, to our knowledge, there are no tailored interventions that exist to provide supportive care to this population following the experience of pregnancy loss. Researchers and care providers may consider tailoring CBT and mindfulness interventions to enhance care options for female adolescents who are dual system-involved to reduce miscarriage-related distress and ultimately suicide attempts. Additional research is needed to elucidate the transactional processes between miscarriage and suicide attempts throughout adolescence for dual system-involved females. This may include using temporal observations to assess changes in substance use and suicide attempts at pre-pregnancy, pregnancy, and postpartum.

4.4. Conclusions

This study fills an important gap on associations between pregnancy and pregnancy outcomes and how those experiences relate to suicide attempts and substance use among female adolescents with dual-system involvement. This is a population of key interest because they

experience pregnancy, suicide, and substance use at higher rates than the general adolescent population. We found that miscarriage was associated with increased risk of suicide attempts and substance use was unrelated to pregnancy or pregnancy outcomes. Research and care providers seeking to reduce suicide attempts among this population should consider identifying therapeutic intervention approaches to better support female adolescents with dual-system involvement following miscarriage.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. This study was supported by R01 DA024672 (P.I., Leve.) and R01 DA015208 (P.I., Chamberlain) from the National Institute on Drug Abuse and R01 MH054257 (P.I., Chamberlain) from the National Institute of Mental Health. The preparation of this manuscript was supported by P50 DA048756 (PIs: Leve and Fisher) and NIJ 2020-JX-FX-0003 (PIs: Leve and Schweer-Collins). The opinions expressed in this article are the authors' own and do not reflect the view of the National Institutes of Health, the Department of Health and Human Services, or the United States government. Funding agencies only provided funding. They had no involvement in the design, execution, analysis, and reporting.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.childyouth.2022.106494.

References

Ashcraft, A., Fernández-Val, I., & Lang, K. (2013). The consequences of teenage childbearing: Consistent estimates when abortion makes miscarriage nonrandom. *The Economic Journal (London)., 123*(571), 875–905. https://doi.org/10.1111/ecoj.12005

Baglivio, M. T., & Epps, N. (2015). The interrelatedness of adverse childhood experiences among high-risk juvenile offenders. *Youth Violence Juv Justice., 14*(3), 179–198. https://doi.org/10.1177/1541204014566286

Bardos, J., Hercz, D., Friedenthal, J., Missmer, S. A., & Williams, Z. (2015). A national survey on public perceptions of miscarriage. *Obstetrics and Gynecology, 125*(6), 1313–1320. https://doi.org/10.1097/AOG.0000000000000859

Bayatpour, M., Wells, R. D., & Holford, S. (1992). Physical and sexual abuse as predictors of substance use and suicide among pregnant teenagers. *Journal of Adolescent Health, 13*(2), 128–132. https://doi.org/10.1016/1054-139X(92)90079-Q

Bellhouse, C., Temple-Smith, M. J., & Bilardi, J. E. (2018). "It's just one of those things people don't seem to talk about..." women's experiences of social support following miscarriage: a qualitative study. *BMC Womens Health., 18*(1), 176. https://doi.org/10.1186/s12905-018-0672-3

Biggs, M. A., Brown, K., & Foster, D. G. (2020). Perceived abortion stigma and psychological well-being over five years after receiving or being denied an abortion. *PLoS ONE, 15*(1), Article e0226417. https://doi.org/10.1371/journal.pone.0226417

Brady, G., Brown, G., Letherby, G., Bayley, J., & Wallace, L. M. (2008). Young women's experience of termination and miscarriage: A qualitative study. *Human Fertility (Camb)., 11*(3), 186–190. https://doi.org/10.1080/14647270802121367

Centers for Disease Control and Prevention. *Youth Risk Behavior Survey: Data Summary and Trends Report 2007-2017*. https://www.cdc.gov/healthyyouth/data/yrbs/pdf/trendsreport.pdf.

Chamberlain, P., Leve, L. D., & Degarmo, D. S. (2007). Multidimensional treatment foster care for girls in the juvenile justice system: 2-year follow-up of a randomized clinical trial. *Journal of Consulting and Clinical Psychology, 75*(1), 187–193. https://doi.org/10.1037/0022-006X.75.1.187

Chamberlain, P. (2003). *Treating Chronic Juvenile Offenders: Advances Made through the Oregon Multidimensional Treatment Foster Care Model*. American Psychological Association; 2003. doi:10.1037/10596-000.

Coleman, P. K., Reardon, D. C., & Cougle, J. R. (2005). Substance use among pregnant women in the context of previous reproductive loss and desire for current pregnancy. *British Journal of Health Psychology, 10*(2), 255–268. https://doi.org/10.1348/135910705X25499

American College of Obstetricians and Gynecologists (2017). Committee Opinion No 699: Adolescent Pregnancy, Contraception, and Sexual Activity. *Obstetrics & Gynecology* 129(5). https://journals.lww.com/greenjournal/Fulltext/2017/05000/Committee_Opinion_No_699__Adolescent_Pregnancy,.49.aspx.

DuRant, R. H., Smith, J. A., Kreiter, S. R., & Krowchuk, D. P. (1999). The relationship between early age of onset of initial substance use and engaging in multiple health risk behaviors among young adolescents. *Archives of Pediatrics and Adolescent Medicine, 153*(3), 286–291. https://doi.org/10.1001/archpedi.153.3.286

Fleming, N., O'Driscoll, T., Becker, G., et al. (2015). Adolescent pregnancy guidelines. *Journal of Obstetrics and Gynaecology Canada., 37*(8), 740–756. https://doi.org/10.1016/S1701-2163(15)30180-8

Forray, A., Merry, B., Lin, H., Ruger, J. P., & Yonkers, K. A. (2015). Perinatal substance use: A prospective evaluation of abstinence and relapse. *Drug and Alcohol Dependence, 150*, 147–155. https://doi.org/10.1016/j.drugalcdep.2015.02.027

Gentile, S. (2011). Suicidal mothers. *Journal of Injury and Violence Research, 3*(2), 90–97. https://doi.org/10.5249/jivr.v3i2.98

Hartig, F. (2020). *DHARMa: Residual Diagnostics for Hierarchical (Multi-Level / Mixed) Regression Models*. R package version 0.3.3.0. https://cran.r-project.org/package=DHARMa.

Heron, M. (2019). Deaths: Leading causes for 2017. *National Vital Statistics Reports, 68*(6). https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_06-508.pdf.

Herrera, C. M., & Boxer, P. (2019). The role of gender in risk for substance use among justice-involved youth. *Children and Youth Services Review, 100*, 485–493. https://doi.org/10.1016/j.childyouth.2019.03.023

Hornberger, L. L. (2017). Options counseling for the pregnant adolescent patient. *Pediatrics, 140*(3), Article e20172274. https://doi.org/10.1542/peds.2017-2274

Jalanko, E., Leppälahti, S., Heikinheimo, O., & Gissler, M. (2017). Increased risk of premature death following teenage abortion and childbirth–a longitudinal cohort study. *European Journal of Public Health, 27*(5), 845–849. https://doi.org/10.1093/eurpub/ckx065

Kerr, D. C. R., Gibson, B., Leve, L. D., & Degarmo, D. S. (2014). Young adult follow-up of adolescent girls in juvenile justice using the Columbia suicide severity rating scale. *Suicide and Lifethreatening Behavior, 44*(2), 113–129. https://doi.org/10.1111/sltb.12072

Kerr, D. C. R., Leve, L. D., & Chamberlain, P. (2009). Pregnancy rates among juvenile justice girls in two randomized controlled trials of multidimensional treatment foster care. *Journal of Consulting and Clinical Psychology, 77*(3), 588–593. https://doi.org/10.1037/a0015289

Kost, K., Maddow-Zimet, I., & Arpaia, A. (2017). Pregnancies, Births and Abortions among Adolescents and Young Women in the United States, 2013: National and State Trends by Age, Race and Ethnicity.. https://www.guttmacher.org/sites/default/files/report_pdf/us-adolescent-pregnancy-trends-2013.pdf.

Lewinsohn, P. M., Seeley, J. R., Roberts, R. E., & Allen, N. B. (1997). Center for Epidemiologic Studies Depression Scale (CES-D) as a screening instrument for depression among community-residing older adults. *Psychology and Aging, 12*(2), 277–287. https://doi.org/10.1037/0882-7974.12.2.277

Maravilla, J. C., Betts, K. S., Couto-e-Cruz, C., & Alati, R. (2017). Factors influencing repeated teenage pregnancy: A review and meta-analysis. *American Journal of Obstetrics and Gynecology, 217*(5). https://doi.org/10.1016/j.ajog.2017.04.021, 527-545.e31.

Mosher, W. D., Jones, J., & Abma, J. C. (2012). Intended and unitended births in the United States. *National Health Statistics Reports, 55*, 1–28.

Mulvey, E. P., & Schubert, C. A. (2012). Some initial findings and policy implications of the Pathways to Desistance Study. *Vict Offender., 7*(4), 407–427. https://doi.org/10.1080/15564886.2012.713903

O'Connell, J. M., Novins, D. K., Beals, J., et al. (2007). Childhood characteristics associated with stage of substance use of American Indians: Family background, traumatic experiences, and childhood behaviors. *Addictive Behaviors, 32*(12), 3142–3152. https://doi.org/10.1016/j.addbeh.2007.07.012

OJJDP (2022). *OJJDP Statistical Briefing Book*. http://www.ojjdp.gov/ojstatbb/crime/JAR_Display.asp?ID=qa05230&selOffenses=1. Published 2020. Accessed February 2, 2022.

Osborne, C., & Ankrum, N. (2020). "Mom, I'm Pregnant": The Adolescent Pregnancy Reveal. *Social Service Review, 94*(2), 339–372. https://doi.org/10.1086/708749

Oshima, K. M. M., Narendorf, S. C., & McMillen, J. C. (2013). Pregnancy risk among older youth transitioning out of foster care. *Children and Youth Services Review, 35*(10), 1760–1765. https://doi.org/10.1016/j.childyouth.2013.08.001

Posner, K., Brown, G. K., Stanley, B., et al. (2011). The Columbia-Suicide Severity Rating Scale: Initial validity and internal consistency findings from three multisite studies with adolescents and adults. *American Journal of Psychiatry, 168*(12), 1266–1277. https://doi.org/10.1176/appi.ajp.2011.10111704

R Core Team. R: A language and environment for statistical computing (version 3.5.1). https://www.r-project.org/.

Rabinovitch, S. M., Kerr, D. C. R., Leve, L. D., & Chamberlain, P. (2015). Suicidal behavior outcomes of childhood sexual Abuse: Longitudinal study of adjudicated

girls. *Suicide and Lifethreatening Behavior, 45*(4), 431–447. https://doi.org/10.1111/sltb.12141

Reardon, D. C., Coleman, P. K., & Cougle, J. R. (2004). Substance use associated with unintended pregnancy outcomes in the national longitudinal survey of youth. *American Journal of Drug and Alcohol Abuse, 30*(2), 369–383. https://doi.org/10.1081/ADA-120037383

Richmond-Rakerd, L. S., Moffitt, T. E., Arseneault, L., et al. (2020). A polygenic score for age-at-first-birth predicts disinhibition. *Journal of Child Psychology and Psychiatry, 61*(12), 1349–1359. https://doi.org/10.1111/jcpp.13224

Rizk, R., & Alderman, E. (2012). Issues in gynecologic care for adolescent girls in the juvenile justice system. *Journal of Pediatric and Adolescent Gynecology, 25*(1), 2–5. https://doi.org/10.1016/j.jpag.2011.01.060

Romeo, R. D. (2017). The impact of stress on the structure of the adolescent brain: Implications for adolescent mental health. *Brain Research, 1654*, 185–191. https://doi.org/10.1016/j.brainres.2016.03.021

Rowlands, I. J., & Lee, C. (2010). 'The silence was deafening': Social and health service support after miscarriage. *Journal of Reproductive and Infant Psychology, 28*(3), 274–286. https://doi.org/10.1080/02646831003587346

RStudio Team (2020). *RStudio: Integrated Development for R*. Boston, MA. http://www.rstudio.com.

Sanders, S., Jolivette, K., & Harris, C. (2021). Improving the Reading Comprehension Skills of Systems-Involved Youth: A Preliminary Investigation of an Underserved Population. *Learning Disabilities Research & Practice, 36*(3), 201–212. https://doi.org/10.1111/ldrp.12254

Schiff, M. A., & Grossman, D. C. (2006). Adverse perinatal outcomes and risk for postpartum suicide attempt in Washington State. *Pediatrics, 118*(3), e669–e675. https://doi.org/10.1542/peds.2006-0116

Sedgh, G., Finer, L. B., Bankole, A., Eilers, M. A., & Singh, S. (2015). Adolescent pregnancy, birth, and abortion rates across countries: Levels and recent trends. *Journal of Adolescent Health, 56*(2), 223–230. https://doi.org/10.1016/j.jadohealth.2014.09.007

Sickmund, M., Sladky, A., & Kang, W. (2020). *Easy Access to Juvenile Court Statistics: 1985–2020*.

Teplin, L. A., Potthoff, L. M., Aaby, D. A., Welty, L. J., Dulcan, M. K., & Abram, K. M. (2021). Prevalence, comorbidity, and continuity of psychiatric disorders in a 15-year longitudinal study of youths involved in the juvenile justice system. *JAMA Pediatr., 175*(7), Article e205807. https://doi.org/10.1001/jamapediatrics.2020.5807

Thieleman, K., Cacciatore, J., & Hill, P. W. (2014). Traumatic bereavement and mindfulness: A preliminary study of mental health outcomes using the ATTEND model. *Clinical Social Work Journal, 42*(3), 260–268. https://doi.org/10.1007/s10615-014-0491-4

Thompson, M. P., Ho, C., & Kingree, J. B. (2007). Prospective associations between delinquency and suicidal behaviors in a nationally representative sample. *Journal of Adolescent Health, 40*(3), 232–237. https://doi.org/10.1016/j.jadohealth.2006.10.016

United States Census Bureau (2019). *No Quick facts, Oregon-population estimates*. https://www.census.gov/quickfacts/OR. Published 2019. Accessed February 2, 2022.

Upadhyay, U. D., Gipson, J. D., Withers, M., et al. (2014). Women's empowerment and fertility: A review of the literature. *Social Science and Medicine, 115*, 111–120. https://doi.org/10.1016/j.socscimed.2014.06.014

Vaughn, M. G., Ollie, M. T., McMillen, J. C., Scott, L., Jr, & Munson, M. (2007). Substance use and abuse among older youth in foster care. *Addictive Behaviors, 32*(9), 1929–1935. https://doi.org/10.1016/j.addbeh.2006.12.012

Vermeiren, R. (2003). Psychopathology and delinquency in adolescents: A descriptive and developmental perspective. *Clinical Psychology Review, 23*(2), 277–318. https://doi.org/10.1016/S0272-7358(02)00227-1

Wasserman, G. A., Elkington, K. S., Robson, G., & Taxman, F. (2021). Bridging juvenile justice and behavioral health systems: Development of a clinical pathways approach to connect youth at risk for suicidal behavior to care. *Heal Justice., 9*(1), 36. https://doi.org/10.1186/s40352-021-00164-4

Weng, S., Chang, J., Yeh, M., Wang, S., Lee, C., & Chen, Y. (2018). Do stillbirth, miscarriage, and termination of pregnancy increase risks of attempted and completed suicide within a year? A population-based nested case–control study. *BJOG, 125*(8), 983–990. https://doi.org/10.1111/1471-0528.15105

Wenzel, A. (2017). Cognitive behavioral therapy for pregnancy loss. *Psychotherapy., 54*(4), 400–405. https://doi.org/10.1037/pst0000132

Widom, C. S. (2014).In J. E., Korbin, R. D. Krugman, (Eds.) *Longterm consequences of child maltreatment BT - handbook of child maltreatment* (pp. 225–247). Dordrecht: Springer Netherlands. doi:10.1007/978-94-007-7208-3_12.