Teen Pregnancy and Its Association with Education Completion and Depression

by
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Abstract

Teen pregnancy has been associated with increased rates of depression among adolescent girls. Additionally, teenage girls who are faced with pregnancy are often less likely to meet their educational goals, resulting in an incomplete education. The stress and other negative effects that come from unmet personal goals, such as incomplete education, are also associated with increased rates of depression. Research has found that a combination of the effects of teenage pregnancy and failure to accomplish goals can negatively affect mental health, specifically with depressive symptoms. This study aimed to further examine the mediating effect of incomplete education on the relationship between teen pregnancy and depression. A Sobel test for mediation revealed that incomplete education does mediate the effect of teen pregnancy on depression. However, control variables of race and income were also found to have significance in Chi-square tests of independence. The limited confidence of the mediation relationship is discussed.

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Key Terms

Adolescence: the age range that begins at puberty and ends at the beginning of adulthood (ages 12-19).

Depression: requires five or more symptoms to have been experienced in a two-week period; symptoms can include: depressed mood, anhedonia, loss or gain of appetite, loss or gain of weight, fatigue or loss of energy, difficulties thinking or concentrating, feeling worthless, and feeling suicidal (Tolentino and Schmidt, 2018).

Social support: feeling supported by peers, mentors, and family members in time of need; the support can be materialistic or psychological (Ioannou et al., 2019

Introduction

Doubling from 8.1% in 2009 to 15.8% in 2019, rates of adolescent depression have left the United States in a state of potential mental health crisis (Wilson & Dumornay, 2022). While the disorder is concerning for any individual, the real concern lies in the significantly larger percent change for adolescent girls versus boys—12.0% versus 3.7% (Wilson & Dumornay, 2022). This leaves adolescent girls at an increased risk for the various negative effects of depression. Perhaps the most concerning risk of adolescent depression is the increased risk of depression carrying over into adulthood as well (Wilson & Dumornay, 2022). In order to protect depressed adolescents from an adulthood also tainted with depression, risk factors of the disorder must be identified (Mossakowski, 2011). Early and unexpected parenthood is one of those risk factors.

Depression

Teen mothers face an increased risk of depression, which can impact their overall quality of life. While navigating the ups and downs of adolescence, teens face a unique set of biological, psychological, and social changes (Barber et al., 1998). These changes become even more difficult to navigate when an unexpected pregnancy is added to the picture. If not dealt with accordingly, these changes can also lead the teen mom down a path of unstable moods and depressive symptoms (Barber et al., 1998). Pregnancy and parenthood are also times of emotional change. Although parenting is both “emotionally rewarding and demanding” (Kerr et al., 2021, p. 545), its demands can lead to mental health issues such as depression. The emotions experienced while parenting are

complex, and if they are not managed in a healthy way, the parent-child relationship can be adversely affected (Kerr et al., 2021). Adolescent females are already at a higher risk for depression; motherhood may increase this risk with the increase in emotions (Russotti et al., 2020). An increase in emotions may cause the mother to feel incapable of completing critical life tasks such as her education.

Teen Pregnancy

Adolescent motherhood is not an issue that will go away any time soon. The issue will uphold its need to be examined and spoken about; even if the statistical number of teen mothers has declined, the topic demands continued attention (Herrman and Waterhouse, 2011). The image of teen pregnancy has grown more and more prevalent in the media and in society in general. However, familiarity with the issue has not brought about a decrease in its negative effects (Eshbaugh, 2011). People continue to criticize and isolate teen parents. Isolation hurts the already wobbly mental health of an adolescent, making this lack of support even more harmful. Teen moms are often stigmatized for their inability to participate in typical adolescent activities. Instead of being guided through the challenges they face as young mothers, they are left alone to deal with their dependence, stress, exhaustion, etc. (Eshbaugh, 2011). Social support theory holds that "perceived social support from family and friends were significantly related to lower depressive symptoms" (Ioannou et al., 2019). A lack of support leads to a downward mental health spiral fueled by low self-esteem, loneliness, and hopelessness (Eshbaugh, 2011). This negative state of mind can further discourage desires to reach out and ask for help (Ioannou et al., 2019).

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Incomplete Education

The sacrifices that come along with parenthood often involve things that are the most important, such as education. Mothers must redirect the investment of their time to their child. The redirection of time often results in taking time away from things such as pursuing an education (Diaz et al., 2016). The consequences spiral deeply. If a high school degree is not obtained, the likelihood of a stable job with a high income is low, and the chances of poverty only increase (Diaz et al., 2016). Thoughts of the potential outcome are enough to negatively impact one's mental health, so when it occurs, circumstances are even worse.

An incomplete education sets the stage for a greater likelihood of a life bound by financial struggle. Many jobs are off the table for those without a degree. With jobs off the table, food is not able to be put on the table either. Teen mothers with limited education have a greater chance of living a life restricted by poverty (Cox et al., 2019). A poverty-ridden life is a life full of inevitable stressors. These economic stressors in combination with the stressors of being a teen parent often lead to more harsh parenting styles (Edwards and Yu, 2018). Economic stability provides a sense of security and peace. In turn, the mother can be more confident and secure in her parenting abilities, which saves the child from the effects of harsh parenting. These negative outcomes, along with others, can be preventable if the mother has the opportunities that come along with a complete education.

There is a significant difference in the number of teen mothers who complete their education and the number of women who were not teen mothers who complete their education. It was discovered that "only half of teen mothers receive a high school diploma by age 22, compared with nearly 90% of women who have not given birth during adolescence" (Harding et al., 2020). The percentage nearly doubles for women who were not teen mothers. The statistic illustrates that there is a simple cause and effect pattern at play. Teen mothers who do not complete their education are exposed to a chain of reactions that follow (Tremblay et al., 2021).

Contributing Factors

The examination of race and income are relevant to understanding the frequencies of teen pregnancy, incomplete education, and depression. Differences in race have been found to correspond with differences in expectations for age at first birth; specifically, non-Hispanic whites have fewer expectations of premarital childbearing than do African Americans and Hispanics (Carlson & Williams, 2011). Previous research has also been conducted on racial differences in depressive symptoms. This research found that among young black Americans, not meeting goals—such as education completion—can create stress that is associated with an increase in depressive symptoms (Mossakowski, 2011). Differences in income also correspond with differences in expectations for age at first birth. It has been found that adolescents from economically disadvantaged families have higher birth rates than adolescents from more privileged families (Whitworth, 2016). Income's association with quality of education is also

important to consider. A higher income often correlates with a higher quality of education. Therefore, adolescents in poorer families are less likely to have access to high-quality education and are less likely to be motivated to complete their education (Mossakowski, 2011). Income-related stresses are associated with depressive symptoms; failing economically is a form of an unfulfilled achievement, which can lead to a negative state of mental health or depression (Mossakowski, 2011). When coupled with teen pregnancy, economically challenged adolescents may face an increased risk of depression.

Purpose of Study

Becoming a mother inevitably forces a woman to make sacrifices. Often, this sacrifice involves giving up the opportunity to complete her education (Diaz et al., 2016). Teen mothers are especially affected by this loss. With depression already at an increase among adolescent girls, adding an unplanned pregnancy into the picture can make mental health quality even worse (Barber et al., 1998). The research question at hand is: What is the relationship between depression and having to stop education prematurely due to pregnancy among teenage women? Answering this question would allow the mental burdens of depression to be better understood and obtaining a complete education could become more likely. An education allows for a sense of accomplishment and purpose. Without a high school degree, a stable job with a reliable income is harder to obtain, and chances of poverty increase; thoughts of these outcomes alone can negatively impact mental health (Diaz et al., 2016). Not attending school results in missed opportunities to form important social connections. The lack of these support

systems has been associated with parenting stress and postpartum depression (Kumar et al., 2018). This study hypothesizes that the relationship between teen pregnancy and likelihood of depression is adversely mediated by an incomplete education. That is, teen pregnancy increases the likelihood of depression, and the significance of this is further increased by an incomplete education. Further research on these findings would enhance the field of psychology by allowing researchers to reach an explanation for the unique academic and psychological deficits that teen mothers are facing (Walker and Holtfreter, 2016).

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Methodology

Participants

This study utilizes data from participants involved in a previously conducted study by the U. S. Bureau of Labor Statistics. The study is called the National Longitudinal Survey of Youth 1979 cohort (NLSY79). The data in this study comes from a database containing the responses from a longitudinal study. Data was collected annually from 1979 to 1994; it was collected biennially from then on up until 2018. In the survey, the number of responses to each option was recorded. The participants of the NLSY79 come from a sample of 12,686 men and women who live in the United States and are of the ages 14 to 22. This study only focuses on the responses of participants from the NLSY79 who responded to each question for data on the independent, mediating, and dependent variables. The total number of participants in this mediation study is 10,195. The participants are nationally representative and include women, Hispanics, blacks,

and those who are economically disadvantaged. This study approaches the research question at hand by observing a mediator variable and its relationship with the independent and dependent variable.

Dependent Variable

Responses to depressive symptom questions were examined to assess the dependent variable—depression. The survey question used to examine this data included responses from the seven-item Center for Epidemiologic Studies Depression Scale (CESD_SCORE_7_ITEM). This seven-item score poses the following symptom-based questions:

1. I did not feel like eating; my appetite was poor.
2. I had trouble keeping my mind on what I was doing.
3. I felt depressed.
4. I felt that everything I did was an effort.
5. My sleep was restless.
6. I felt sad.
7. I could not get "going."

Respondents answered each question according to a point system that corresponds to the number of days they experienced the symptoms over the last week (*NLSY79 Appendix 25: Attitudinal Scale Scoring | National Longitudinal Surveys*, n.d.). The points were totaled into a summed score, with higher scores indicating the presence of more depressive symptoms (*NLSY79 Appendix 25: Attitudinal Scale Scoring | National Longitudinal Surveys*, n.d.). By measuring the extent of

depression that participants experienced, this survey provides insight into the degree of depression among teen mothers.

Independent Variable

Teen pregnancy serves as the independent variable in this study. Age at birth indicates whether the mother was a teen when she had her child. Responses of age thirteen to nineteen would indicate a teenaged pregnancy. The ages were recorded for first (AGE1B18) to determine if a teen pregnancy had occurred.

Mediating Variable

The mediator variable is incomplete education. The study aims to see if adding the mediator variable into the relationship between teen pregnancy and depression makes the direct effect larger. To test whether the independent variable predicts the mediator variable, participants were asked the main reason they decided to leave school at the time (Q3-2A). Pregnancy was included as a potential answer choice, and the selection of this answer choice indicates that education was terminated due to a teen pregnancy. The literature review suggests that absence from school during adolescent and teenage years imposes emotional and financial burdens among the mother.

Control Variables

The control variables of this study are race and income. These variables are controlled for by including responses from the first round of interview questions in 1979. Race is examined by asking survey participants which racial/ethnic origin they identify with most closely (SAMPLE_RACE). Income is

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assessed by looking at participants' responses to their total net family income in the past calendar year (TNFI_TRUNC). See Table 2 for the frequency of responses to questions regarding race and income.

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Analytic Strategy

This study's data analysis pulls from the longitudinal data from the National Longitudinal Study of Youth cohort 79. The dataset is comprised of categorical variables. The seven-item CES-D scales used to measure depression provide accurate results similar to the twenty-item CES-D scale (Levine, 2013). When utilizing a twenty-item score, the cutoff score for depression is typically greater than or equal to 16, and researchers have found that when utilizing a seven-item score, a cutoff score of greater than or equal to 8 provides the same results (Levine, 2013). In this study, responses totaling 0-7 will be "no," responses 8-29 will be "yes"; "no" indicates not being depressed, and "yes" indicates being depressed. To determine if the pregnancy was a teen pregnancy, "yes" will include responses of ages 13 to 19, and "no" will be ages 10 to 12 and 20 and higher. To determine if incomplete education was due to teen pregnancy, "yes" indicates that the reason for dropping out of school was pregnancy, and "no" indicates a reason other than pregnancy.

The specific questions from NLSY79 included in this research were strategically selected. The questions AGE1B18, Q3-2A, and CESD_SCORE_7_ITEM directly addressed each of the variables in this study. Participants were able to respond with a digit that corresponded to their exact age, reason for leaving school, and score on the CES-D 7-item depression scale. Since

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the survey is a longitudinal study in which the same questions were asked biennially, the selection of a specific year that the question was asked was also strategic. Results from AGE1B18 were analyzed from the 2018 round—which is the most recent round of the survey. Selecting the most recent year allowed for the maximum number of participants to respond. When the survey was first conducted, participants ranged from ages 14-22, so by including responses from 2018, this gave a chance for the question to apply to the maximum number of participants possible. Results from Q3-2A were analyzed from the 1979 round—which is the first round of the survey. Selecting the first round was beneficial in that it captured the participants at a time when this question was applicable to the greatest majority. In 1979, all participants were of ages 14-22, which guarantees the greatest proportion of participants in the school-aged population. Selecting a later year might put this research at risk of having a fewer number of respondents to the question since it may no longer apply to them and their stage of life. There also lies a risk of more participants already having the opportunity to complete school since they would have aged. Lastly, results from CESD_SCORE_7_ITEM were analyzed from the 1992 round. By choosing this round, participants had a 13-year period for depressive symptoms to occur. This gap allows the research to reflect a more long-term state of depression following teen pregnancy, which shows more significance.

The IBM Statistical Package for the Social Sciences (SPSS) 26 was utilized to perform a descriptive statistical analysis of frequency on this data (see Table 3). A Chi-Square Test of Independence was conducted to analyze the

relationships between the timing of pregnancy, unfulfilled educational attainment, and depressive symptoms. A Chi-Square Test of Independence was also run for each of these relationships with the inclusion of race and income to ensure that the relationships remain statistically significant. Analysis of *Cramer's V* was also utilized to determine the strength of these relationships. Furthermore, the Sobel test was used to test the significance of the mediation effect of incomplete education on teen pregnancy and depression. By running these tests, this study strives to explain the relationship between the mediator variable, incomplete education, within the relationship between the independent variable, teen pregnancy, and the dependent variable, depression, and its symptoms—with and without the inclusion of race or income.

Results

Results indicate that the relationship between teen pregnancy and depression is mediated by an incomplete education. This relationship is supported by the individual relationships that exist between teen pregnancy and depression, teen pregnancy and incomplete education, and incomplete education and depression. Participants were categorized based on their status of teen pregnancy, their reason for incomplete education, and their depression classification (see Table 1). The categorical variables were broken down into yes/no options to which the participants were assigned based on their response to the survey question for each variable. Participants were also categorized based on their responses to the control variables—race and income (see Table 2). The results of statistical significance were analyzed using $p < .05$.

Table 1

Frequency of Responses for Teen Pregnancy, Incomplete Education, and Depression

		Frequency	Percent	Valid Percent	Cumulative Percent
Teen Pregnancy	not a teen pregnancy	9154	89.8	89.8	89.8
	teen pregnancy	1041	10.2	10.2	100.0
	Total	10195	100.0	100.0	
Incomplete Education	didn't leave for pregnancy	10043	98.5	98.5	98.5
	left for pregnancy	152	1.5	1.5	100.0
	Total	10195	100.0	100.0	
Depression	not depressed	5953	58.4	58.4	58.4
	depressed	4242	41.6	41.6	100.0
	Total	10195	100.0	100.0	

Table 2

Frequency of Responses for Income & Race

		Frequency	Percent	Valid Percent	Cumulative Percent
Income	1	731	7.2	7.2	7.2
	2	2606	25.6	25.6	32.7
	3	2919	28.6	28.6	61.4
	4	3939	38.6	38.6	100.0
	Total	10195	100.0	100.0	
Race	Hispanic	1653	16.2	16.2	16.2
	Black	2539	24.9	24.9	41.1
	Non-Black, Non-Hispanic	6003	58.9	58.9	100.0
	Total	10195	100.0	100.0	

Note: Values for income are 1: 0-2999, 2: 3000-6999, 3: 7000-14999, 4: 15000-9999999. Values for race are 1: Hispanic, 2: Black, 3: Non-Black, Non-Hispanic.

A Chi-Square Test of Independence was performed to assess the relationship between teen pregnancy and depression (see Table 3). There was a significant relationship between the two variables, X^2 (1, N =10195) = 65.698, p = .000. The relationship between teen pregnancy and depression indicates that any differences observed between the two groups was not due to chance. The Chi-square test also provided a *Cramer's V* of .080 (see Table 4), which typically indicates that there is little to no association between the two variables (*Chi Square Measures of* Association, n.d.). A Chi-Square Test of Independence was also run for teen pregnancy and incomplete education (see Table 5). A statistically significant relationship was found between the two variables, X^2 (1, N = 10195) = 382.669, p = .000. The relationship between teen pregnancy and incomplete education did not occur randomly. The resulting *Cramer's V* for this variable relationship was .194 (see Table 6), which supports a low association between the two variables (*Chi Square Measures of* Association, n.d.). Lastly, a Chi-Square Test of Independence was run to analyze the relationship between incomplete education and depression (see Table 7). Given the results, X^2 (1, N = 10195) = 6.823, p = .009, it can be concluded that this is a significant relationship. The *Cramer's V* for the relationship between incomplete education and depression was .026 (see Table 8).

Table 3

Chi-Square Tests: Teen Pregnancy & Depression

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	65.698	1	.000
N of Valid Cases	10195		

Table 4

Cramer's V: Teen Pregnancy & Depression

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Cramer's V	.080	.000
N of Valid Cases	10195		

Table 5

Chi-Square Tests: Teen Pregnancy & Incomplete Education

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	382.669	1	.000
N of Valid Cases	10195		

Table 6

Cramer's V: Teen Pregnancy & Incomplete Education

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Cramer's V	.194	.000
N of Valid Cases	10195		

Table 7

Chi-Square Tests: Incomplete Education & Depression

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.823	1	.009
N of Valid Cases	10195		

Table 8

Cramer's V: Incomplete Education & Depression

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Cramer's V	.026	.009
N of Valid Cases	10195		

After running these tests, Chi-Square Tests of Independence for each variable relationship were run again to include race and income. The test for the relationship between teen pregnancy and depression including race (see Table 9) provided results for a significant relationship, X^2 (1, N = 10195) = 65.698, p = .000. However, testing the individual responses for Hispanic X^2 (1, N = 1653) = 1.516, p = .218 and Black X^2 (1, N = 2539) = 1.797, p = .180, produced insignificant results. Testing the individual responses for Non-Black, Non-Hispanic produced significant results, X^2 (1, N = 6003) = 66.051, p = .000. The Chi-Square Test of Independence between teen pregnancy and depression with income (see Table 10) showed an overall significant relationship between the two variables, X^2 (1, N = 10195) = 65.698, p = .000. The individual results for Income 1: X^2 (1, N = 731) = 46.224, p = .000; Income 2: X^2 (1, N = 2606) = 84.692, p = .000; and Income 3 X^2 (1, N = 2919) = 25.483, p = .000 all showed that the relationship between teen pregnancy and depression remained significant when these incomes were included. The Chi-Square Test that included Income 4 demonstrated an insignificant relationship between teen pregnancy and depression, X^2 (1, N = 3939) = .127, p = .722.

Table 9

Chi-Square Tests: Teen Pregnancy & Depression with Race

Chi-Square Tests				
Race		Value	df	Asymptotic Significance (2-sided)
Hispanic	Pearson Chi-Square	1.516	1	.218
	N of Valid Cases	1653		
Black	Pearson Chi-Square	1.797	1	.180
	N of Valid Cases	2539		
Non-Black, Non-Hispanic	Pearson Chi-Square	66.051	1	.000
	N of Valid Cases	6003		
Total	Pearson Chi-Square	65.698	1	.000
	N of Valid Cases	10195		

Note: This table tests the relationship between teen pregnancy and depression when race is utilized as a control variable.

Table 10

Chi-Square Tests: Teen Pregnancy & Depression with Income

Chi-Square Tests				
Income		Value	df	Asymptotic Significance (2-sided
1	Pearson Chi-Square	46.224	1	.000
	N of Valid Cases	731		
2	Pearson Chi-Square	84.692	1	.000
	N of Valid Cases	2606		
3	Pearson Chi-Square	25.483	1	.000
	N of Valid Cases	2919		
4	Pearson Chi-Square	.127	1	.722
	N of Valid Cases	3939		
Total	Pearson Chi-Square	65.698	1	.000
	N of Valid Cases	10195		

Note: This table tests the relationship between teen pregnancy and depression when income is utilized as a control variable.

A Chi-Square Test of Independence including the control variables was performed to assess their effect on the relationship between teen pregnancy and incomplete education. When race was included (see Table 11), the relationship between the two variables was significant overall, X^2 (1, N = 10195) = 382.669, p = .000. Among each of the individual race responses, statistical significance remained: Hispanic [X^2 (1, N = 1653) = 42.049, p = .000]; Black [X^2 (1, N = 2539) = 90.843, p = .000], Non-Black, Non-Hispanic [X^2 (1, N = 6003) = 217.583, p = .000]. When income was included (see Table 12), the relationship between the two variables was significant overall, X^2 (1, N = 10195) = 382.669, p = .000. When analyzing the individual income responses, statistical significance was also upheld: Income 1 [X^2 (1, N = 731) = 53.999, p = .000], Income 2 [X^2 (1, N = 2606) = 132.551, p = .000], Income 3 [X^2 (1, N = 2919) = 63.818, p = .000], Income 4 [X^2 (1, N = 3939) = 115.327, p = .000].

Table 11

Chi-Square Tests: Teen Pregnancy & Incomplete Education with Race

Chi-Square Tests				
Race		Value	df	Asymptotic Significance (2-sided)
Hispanic	Pearson Chi-Square	42.049	1	.000
	N of Valid Cases	1653		
Black	Pearson Chi-Square	90.843	1	.000
	N of Valid Cases	2539		
Non-Black, Non-Hispanic	Pearson Chi-Square	217.583	1	.000
	N of Valid Cases	6003		
Total	Pearson Chi-Square	382.669	1	.000
	N of Valid Cases	10195		

Note: This table tests the relationship between teen pregnancy and incomplete education when race is utilized as a control variable.

Table 12

Chi-Square Tests: Teen Pregnancy & Incomplete Education with Income

Chi-Square Tests				
Income		Value	df	Asymptotic Significance (2-sided)
1	Pearson Chi-Square	53.999	1	.000
	N of Valid Cases	731		
2	Pearson Chi-Square	132.551	1	.000
	N of Valid Cases	2606		
3	Pearson Chi-Square	63.818	1	.000
	N of Valid Cases	2919		
4	Pearson Chi-Square	115.327	1	.000
	N of Valid Cases	3939		
Total	Pearson Chi-Square	382.669	1	.000
	N of Valid Cases	10195		

Note: This table tests the relationship between teen pregnancy and incomplete education when income is utilized as a control variable.

A final set of the Chi-Square Test of Independence was performed to examine the impact of race and income on the relationship between incomplete education and depression. The test including race (see Table 13), provided significant results overall, X^2 (1, N = 10195) = 6.823, p = .009. Significance was disturbed within the individual responses Hispanic [X^2 (1, N = 1653) = 2.758, p = .097] and Black [X^2 (1, N = 2539) = 3.134, p = .077]. When including the responses Hispanic or Black, the relationship between incomplete education and depression was no longer significant. The relationship between incomplete education and depression when race was accounted for proved to be significant only for the Non-Black, Non-Hispanic response, X^2 (1, N = 6003) = 8.504, p = .004. The test including income (see Table 14), demonstrated that the relationship between incomplete education and depression is significant overall, X^2 (1, N = 10195) = 6.823, p = .009. However, when each individual income level was assessed, there was no significance for any of the income levels individually: Income 1 [X^2 (1, N = 731) = .002, p = .962], Income 2 [X^2 (1, N = 2606) = .344, p = .558], Income 3 [X^2 (1, N = 2919) = 2.961, p = .085], Income 4 [X^2 (1, N = 3939) = .102, p = .749].

Table 13

Chi-Square Tests: Incomplete Education & Depression with Race

Chi-Square Tests				
Race		Value	df	Asymptotic Significance (2-sided)
Hispanic	Pearson Chi-Square	2.758	1	.097
	N of Valid Cases	1653		
Black	Pearson Chi-Square	3.134	1	.077
	N of Valid Cases	2539		
Non-Black, Non-Hispanic	Pearson Chi-Square	8.504	1	.004
	N of Valid Cases	6003		
Total	Pearson Chi-Square	6.823	1	.009
	N of Valid Cases	10195		

Note: This table tests the relationship between incomplete education and depression when race is utilized as a control variable.

Table 14

Chi-Square Tests: Incomplete Education & Depression with Income

Chi-Square Tests				
Income		Value	df	Asymptotic Significance (2-sided
1	Pearson Chi-Square	.002	1	.962
	N of Valid Cases	731		
2	Pearson Chi-Square	.344	1	.558
	N of Valid Cases	2606		
3	Pearson Chi-Square	2.961	1	.085
	N of Valid Cases	2919		
4	Pearson Chi-Square	.102	1	.749
	N of Valid Cases	3939		
Total	Pearson Chi-Square	6.823	1	.009
	N of Valid Cases	10195		

Note: This table tests the relationship between incomplete education and depression when income is utilized as a control variable.

A Sobel test for mediation was conducted to support the mediating relationship of incomplete education between teen pregnancy and depression *(Interactive Mediation Tests*, n.d.) (see Table 15). The Sobel test included the input of the raw regression coefficient for the association between the independent variable (teen pregnancy) and the mediating variable (incomplete education); the raw coefficient for the association between the mediating variable (incomplete education) and the dependent variable (depression); the standard error of the raw regression coefficient for the association between the independent variable (teen pregnancy) and the mediating variable (incomplete education); and the standard error of the raw coefficient for the association between the mediating variable (incomplete education) and the dependent variable (depression) *(Interactive Mediation Tests*, n.d.). The Sobel test was performed to assess whether incomplete education had a significant mediating effect on the relationship between teen pregnancy and depression. The results of the test were significant: test statistic = 4.170, $p = .000$; therefore, it was concluded that a mediation occurred between teen pregnancy and depression via incomplete education. Given the combined results of the Chi-square test and the Sobel test, the relationship between teen pregnancy and depression is mediated by having to stop education prematurely due to pregnancy among teenage women.

Table 15

Sobel Test Input & Results

Variable	Value
a	.078
b	.175
s_a	.004
s_b	.041
test statistic	4.170
standard error	.003
p-value	.000

Note: *a* = raw regression coefficient for the association between teen pregnancy and incomplete education; *b* = raw coefficient for the association between incomplete education and depression (where teen pregnancy is also a predictor of depression); s_a = standard error of *a*; s_b = standard error of *b*; *a*, *b*, s_a, and s_b represent inputs, and test statistic, standard error, and *p*-value represent results

Discussion

The purpose of the current study was to further understand the significance of the relationship between teen pregnancy and depression by examining the mediating effects of an incomplete education on that relationship. The study utilized responses to the National Longitudinal Survey of Youth 1979 cohort (NLSY79) to analyze these relationships. This study specifically looked at the age a woman gave birth at her first birth, the reason the participant left school, and the participant's results from the CES-D 7-item scale for depression. Overall, this research aimed to examine the relationship between giving birth as a teen and its association with depression, while also considering the potential role that ending education prematurely due to giving birth as a teen played in depression.

Although the asymptotic significance of $p < .05$ shows that there is a statistically significant relationship between teen pregnancy and depression, the *Cramer's V* value explains that the severity of this relationship is little to none. While it is true that teen pregnancy is associated with an increased likelihood of adult depression, the effects of teen pregnancy on mental health symptoms, such as depression, do not apply to all women (Whitworth, 2017). There is not enough statistical significance to support that teen mothers face a uniquely high rate of depression when compared to adult mothers (Whitworth, 2017).

Results from the Chi-Square Test of Independence for the relationship between incomplete education and depression provided significant results. The *Cramer's V* for incomplete education and depression (see Table 14) equates to little to no relationship between the variables—even with an asymptotic significance of $p < .05$ *(Chi Square Measures of Association*, n.d.). While it is true that the failure to obtain a desired level of education due to teen pregnancy predicts an increase in depressive symptoms in adulthood, these predictions are simply predictions (Mossakowski, 2011). Similar to the relationship between teen pregnancy and depression and its lack of a one-size-fits-all application, the relationship between incomplete education and depression is also far from one-size-fits-all. The *Cramer's V* value reiterates that the relationship between incomplete education and depression cannot be defined by a single expected value of depression for individuals who terminate their education prematurely due to teen pregnancy.

The *Cramer's V* for teen pregnancy and incomplete education (see Table 15) is the strongest out of the three variable pairings. Although it is stronger, this value only supports a low association between the variables *(Chi Square Measures of Association*, n.d.). The three *Cramer's V* values for the three variable pairs explain that even though the Chi-square tests produced statistically significant correlations, the strength of these correlations is not as high as the research initially anticipated. There is a relationship between depression and having to stop education prematurely due to pregnancy among teenage women; however, its strength is lacking. Teen-aged births are associated with a lower level

of educational attainment (Carlson, 2011). Although the strength is insignificant overall, the *Cramer's V* for teen pregnancy and incomplete education retains some value. Giving birth at a young age negatively affects educational attainment; failing to obtain a desired level of education has been associated with a more negative state of mental health (Carlson & Williams, 2011).

In order to determine if a mediation relationship with incomplete education exists between teen pregnancy and depression, a Sobel test was conducted (see Table 1). The mediating effect of the ordinary least square regression estimates of *a* and *b*, divided by the standard error of both *a* and *b* produced a test statistic of the mediating effect (Yay, 2017). The Sobel test for mediation provided results that the mediating effect of incomplete education on the relationship between teen pregnancy and depression is significant, test statistic = 4.170, $p = .000$. The test statistic value for statistical significance in a Sobel test is 1.96. Since the test statistic for the mediation relationship in this study is greater than that value, it can be reasoned that the effect of the observed relationship is larger than what would be expected by chance (Yay, 2017). Because of this, the mediating effect of incomplete education on the relationship between teen pregnancy and depression is significant. The *p*-value that was determined was also less than .05, which further proves statistical significance in the mediating relationship. Incomplete education is a statistically significant mediating variable in the relationship between teen pregnancy and depression.

Given that the inclusion of the control variables—race and income—altered the significance of the three separate variable relationships within the

mediation relationship, the mediation effect observed in the Sobel test is only significant when these variables are excluded. Since particular race and income responses led to insignificant Chi-Square results, it cannot be confidently concluded that the relationship between teen pregnancy and depression is explained entirely by incomplete education.

Limitations

Commented [GU6]: Make sure you include any potential control variables not included in the analysis here.

Because the effect of control variables was statistically significant, the relationship between variables is likely more complex than originally hypothesized. By not including them in the Sobel test, the knowledge of their full effect on the mediating relationship is limited. Race would be a beneficial factor to consider given that a previous study found that adolescent birth rates are significantly higher among black and Hispanic adolescents than white adolescents (Whitworth, 2017). Income would also be a beneficial factor to consider. A similar study found that the relationship between age at first birth and depressive symptoms is influenced by differences in socioeconomic status (Carlson, 2011). The significance of this study could hold more confidence if other influencing variables, such as race and income, could be incorporated with greater confidence.

By including other questions from the NLSY79, this research could examine other potential factors that affect the relationships between teen pregnancy, incomplete education, and depression. The lack of peer support, social involvement, satisfaction, life meaning, and preparedness for life greatly influence parenthood—especially teenage parenthood (Carlson, 2011). Instead of utilizing a comprehensive depression question from the survey, individual depressive

symptom questions could have been included. The NLSY79 poses specific prompts such as: During this past week... I felt depressed; During this past week... I felt lonely; and during this past week... I had trouble keeping my mind on things. A greater sample of participants could have been included if the study focused more on depressive symptoms rather than depression as a disorder.

Conclusion

Despite the current decline in teen birth rates in the United States, the teen birth rate in the United States remains the highest among industrialized countries (Whitworth, 2017). Depression is an ever-present risk among teen parents. The World Health Organization speaks to the severity of depression as it is "one of the most disabling mental disorders worldwide because the symptoms can become chronic or recurrent and drastically impair social functioning throughout people's lives" (Mossakowski, 2011). Depression is especially harmful to mothers. The harm carries over into the lives of their children as maternal depression poses risks for various health and behavioral problems for the child (Whitworth, 2017). Teen mothers are at an even greater risk due to the sacrifices and changes their lives will undergo following pregnancy. Failure to complete educational goals leads to disappointment and regret that ultimately result in depression (Mossakowski, 2011).

The findings of this study show that teen pregnancy, incomplete education, and depression are significantly related. The relationship between teen pregnancy and depression is mediated by having to stop education prematurely due to pregnancy among teenage women. Teenage girls who get pregnant face an

Commented [GU7]: This is where you reiterate the significancof your findings. Given the overturn of Roe vs Wade and the expected increase in teen pregnancies as a result, what do these findings mean in a practical sense? Should society put additional social supports into place to prevent teen mothers from prematurely ending their education? Should we expect to see an increase in depression long term?

Commented [ET8R7]:

increased risk of developing depression, and their risk only increases when they are unable to meet their educational goals. Further research should be conducted to determine methods that decrease the negative effects of unexpected pregnancy, failure to complete education, and depression on adolescent girls.

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Appendix A: NLSY79 Survey Questions

1. AGE1B18: Age of R at 1st birth (2018)

   No 1st birth has occurred

   10 to 14

   15 to 17

   18 to 19

   20 to 24

   25 to 29

   30 to 34

   35 to 39

   40 to 44

   45 to 60: 45 or older

2. AGEATINT: Age of R at interview date (1979)

   14

   15

   16

   17

   18

19

20

21

22

3. CESD_SCORE_7_ITEM: 7 item CES-D score (CESD) (1992)

   0

   1 to 4

   5 to 9

   10 to 14

   15 to 19

   20 to 24

   25 to 29

4. SAMPLE_RACE: R's racial/ethnic cohort from screener (1978 screener)

   Hispanic

   Black

   Non-black, non-Hispanic

5. Q3-2A: Reason R left school (not enrolled) (1979)

   Received degree

Getting married

Pregnancy

Other reasons didn't like school

Poor grades

Home responsibilities

Chose to work

Financial difficulties

Entered military

Expelled or suspended

School too dangerous

Moved away from school

Other

6. TNFI_TRUNC: Total net family income in past calendar year (1979)

0

1 to 999

1000 to 1999

2000 to 2999

3000 to 3999

4000 to 4999

5000 to 5999

6000 to 6999

7000 to 7999

8000 to 8999

9000 to 9999

10000 to 14999

15000 to 19999

20000 to 24999

25000 to 49999

50000 to 9999999: 50000+