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# Adverse Childhood Experiences and Complex Post-traumatic Stress in Pregnant Teens: A Pilot Study

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## Abstract

**Introduction** Pregnant teens are seen as a group at risk, yet one area that remains understudied is the impact of trauma on their mental health, maternal fetal attachment and pregnancy-related health behavior.

**Methods** A pilot study of urban pregnant teens receiving home visiting services examined trauma exposure, complex traumatic stress, maternal fetal attachment, and health behaviors of pregnancy. The sample (n = 36) was recruited over a period of 20 months from Nurse-Family Partnership of New York City (NFP-NYC) service sites. The teens interviewed completed scales measuring adverse childhood experiences (ACEs), symptoms of complex posttraumatic stress (TSCC), prenatal attachment (MAAS), and pregnancy health behaviors (HPQ-II).

**Findings** Over one third of participants reported 4 or more ACEs (36%), and scores on the Trauma Symptom Checklist subscales ranged from a low of 11% for anger to 25% for depression, anxiety and post-traumatic stress. Maternal–fetal attachment was strong and pregnancy health behaviors were positive. The number of ACEs was related to traumatic stress symptoms but not to maternal fetal attachment or health behaviors in pregnancy.

**Conclusions** Pregnant teens with trauma histories could benefit from access to trauma-informed mental health services integrated into the obstetrical or home-visiting services they receive.

**Keywords** Pregnant teens · Trauma · Adverse childhood experiences · Complex traumatic stress · Health behaviours in pregnancy · Trauma-informed mental health services

## Significance

Low income pregnant teens often report adverse childhood experiences (ACEs). This pilot study examined trauma history (ACEs) and symptoms of complex trauma (TSCC) in relation to prenatal maternal attachment (MAAS) and health behaviors of pregnancy (HPQ-II). Unlike in pregnant adults at risk, ACEs were not related to maternal–fetal attachment or to health behaviors in pregnancy, but they were related to various mental health symptoms and to current stress. The study adds to knowledge about ACEs and mental health symptoms in pregnant teens, suggesting that mental health services be integrated into other services received, especially for those in high risk environments.

Pregnant teens in the United States who are becoming young mothers are predominantly low-income young women of color. Since there is more research on teen mothers, this study focused on pregnant adolescents. Research and clinical observation have suggested high rates of trauma and mental health symptoms in pregnant teens (Ashby et al. 2016). This study focused on the effects of trauma history, specifically ACEs on mental health problems, prenatal attachment, and health behaviors in a sample of low-income urban pregnant teens. Teens in this sample were receiving home visiting services from the Nurse-Family Partnership Program of New York City (NFP-NYC) that encouraged prenatal care and other health-supporting behaviors during the pregnancy.

Trauma history and traumatic stress are known to negatively affect health, in this case prenatal health behaviors,

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and mental health in the form of symptoms of complex traumatic stress. Since ACEs are common in at-risk youth and pregnant teens may not receive adequate prenatal care, more knowledge about ACEs among pregnant teens and their effects on their mental health and ability to take good care of themselves during pregnancy was needed. The research questions guiding this study were: (1) What was the level of childhood trauma (ACEs) experienced by pregnant teens? (2) What was the level of complex traumatic stress symptoms (TSCC) in this sample? (3) What was the level of prenatal attachment that teens were reporting (MAAS)? (4) What were their self-reported levels of prenatal health behaviors (HPQ-II)? It was hypothesized the level of ACEs would positively correlate with TSCC scores and both in turn would negatively correlate with prenatal attachment and prenatal health behaviors.

## Background

Although teen pregnancy and birth rates in the United States have been dropping, rates of teen pregnancy are significantly higher among Blacks, Latinas, and Native Americans/Pacific Islanders than they are among non-Hispanic Whites (Akella and Jordan 2014). There has long been concern about the health and psychosocial outcomes for pregnant teens who choose to give birth and rear their children, usually as single mothers. Although there is evidence of negative proximal and distal outcomes for both teen mothers and their infants (e.g., Conde-Agudelo et al. 2005; Fraser et al. 1995; Jaffee et al. 2001; National Campaign to Prevent Teen and Unwanted Pregnancy [NCPTUP] 2013; Noria et al. 2007), there is indication that these outcomes might be accounted for by entrenched poverty (Breheny and Stephens 2010; Kaiser and Hays 2005; Mollborn and Morningstar 2009; SmithBattle 2009; Mollborn and Dennis 2012), by some risk factors particular to teens (Barn and Montovani 2007; Kaiser and Hays 2005; Payne and Anastas 2014), and by exposure to trauma (Renker 1999; Hillis et al. 2004; Gavin et al. 2010; Hillis et al. 2004; Renker 1999). Hillis et al. (2004) found that the number of ACEs women have experienced is strongly related to the likelihood of becoming pregnant as a teenager, to negative psychosocial outcomes, and to fetal death. Hillis et al. (2004) also found that negative birth outcomes only occurred among teens who had experienced any ACEs.

Other views of teen pregnancy and child-rearing have noted that the developmental tasks of adolescence may not fit well with what is needed for a healthy pregnancy and good childrearing practices. This viewpoint is often expressed in the catchphrase "children having children." However, maternal feelings of attachment to an unborn child, which are moderately correlated with attachment after birth, have been found to be quite similar in pregnant teens and adults (total MAAS scores; Rowe et al. 2013). Interventions like home visiting, including the NFP model, aim to encourage prenatal attachment and coach pregnant teens to achieve better health and developmental outcomes for both the young women and their children.

The trauma histories and mental health needs of pregnant teens have not been adequately addressed (Gavin et al. 2010). Studies involving adult pregnant women found that psychosocial risk early in life was associated with mental health problems and lower levels of prenatal health behavior (see Gavin et al. 2010; Seng et al. 2009) mental health problems, specifically depression and PTSD (Alhusen et al. 2012) and interpersonal trauma (Schwerdtfeger and Goff 2007) were predictive of lower levels of prenatal health and attachment. However, the relationship between ACEs and current stress, trauma-related mental health symptoms, prenatal attachment, and health behaviors has not previously been investigated in a sample of pregnant teens.

## Study Sample

### Study Site

NFP-NYC was willing to host this study because of reports from nurses and nurse supervisors that more mothers being served seemed to be experiencing considerable trauma exposure and related mental health problems. Nurse home visitors are directed to maintain fidelity to the NFP mission by focusing on the health and developmental needs of mothers and babies, not on mental health. While NFP-NYC had obtained limited additional funding for expanding NFP's mental health services for clients, these resources were not adequate to meet identified needs.

### Recruitment of Teen Participants

Because the teens in this study were receiving agency services, passive recruitment was employed. NFP nurses informed teens on their caseloads about the opportunity to participate in the study, but this was only done when the nurses felt that they had established an adequate working relationship with the teen. Home visitors provided a flyer giving information about the study that included a cell phone number to call or text if they wanted to participate. There was a modest cash incentive provided. Written consent was obtained from each teen at the time of interview.

Thirty-six (36) teens enrolled in the study over 20 months, reflecting a difficult recruitment process typical of this population. The interviews could only be conducted in English since the main measures did not have Spanish versions and the study did not have the resources to produce adequate

translations and back translations of them. Hence teens who spoke only Spanish and needed translation services to interact with English speakers could not participate. Overall, there is no way to calculate a response rate because the nurse home visitors did not supply information on how many teens they informed of the study. Of the 38 young women who made contact with the study, only 2 were not interviewed, 1 because her voice mail message did not include a complete phone number and 1 because she went into labor while the interviewer (second author) was en route to interview her.[1]

## Data Collection

Data were collected during face to face interviews conducted at a place of each teen's own choosing, such as NFP program sites and public libraries but most often at their homes, and in only 1 instance did a parent want information about the study before allowing the interview to take place. The second author or an MSW student trained by her conducted all of the interviews. About half of the teens opted for the questions to be read out loud, a quarter of them completed the questionnaire on their own, and the rest opted for a combination of methods. Responding to the survey took approximately 60 min, and a *de minimus* payment of $50 in cash was provided to each participant at completion. Specific protocols were designed with NFP-NYC to address issues of safety or high psychological distress during the interview, which did not occur.

## Measures

### Contextual Factors

To better understand study findings, measures of two contextual factors were included: current stress (PSS) and satisfaction with the relationship with the baby's father (RAS). Research has identified negative consequences of high stress levels for term and birth weight, whether stress related to psychosocial factors (Class et al. 2011; Dunkel-Schetter and Tanner 2012), or to pregnancy itself (Holub et al. 2007; Lobel et al. 2008). The 10-item Perceived Stress Scale (Cohen et al. 1983) was used in this study. The measure was normed on two samples of college students and on participants in a smoking cessation program (Cohen et al. 1983).

The second measure assessed relationship quality. The Relationship Assessment Scale (RAS—Hendrick et al. 1998) included 7 items about the nature of the teens' relationships with the father of their baby. Relationship quality has been found to moderate the adverse impact of both maternal stress and mental health problems on fetal development (Logsdon et al. 2002; Seiger and Renk 2007).

### Trauma History

The ACE measure (Felitti et al. 1998) includes 10 items about exposure to adverse interpersonal experiences during the first 18 years of life, including child abuse, neglect, and household dysfunction. The number of ACEs has been shown to have a strong and graded relationship with negative effects on health and psychosocial outcomes over the life span (Anda et al. 2006; Chapman et al. 2007; Dube et al. 2003; Felitti et al. 1998; Felitti and Anda 2010; Hillis et al. 2004) and on teen birth outcomes (Hillis et al. 2004). While first used with adults, the ACE measure and single items from it have been used with at risk adolescent samples (Baglivio et al. 2015; Basto-Pereira et al. 2016; Bethell et al. 2014; Cluver et al. 2015; Schilling et al. 2007). This measure only records the number of types of traumatic experiences; it does not record how many times an experience occurred. Since the sample includes young women < 18 years old, the ACE was modified to ask about experiences that happened up to the time of the interview.

### Mental Health Symptoms

Symptoms of complex trauma were assessed with the Trauma Symptom Checklist for Children (TSCC, Briere 1996). The TSCC includes a broad range of complex posttraumatic stress symptoms, which is appropriate when assessing the mental health consequences of complex interpersonal trauma (Cook et al. 2005; Ford 2011; Sar 2011; Van der Kolk et al. 2005; Van der Kolk 2014). The TSCC can be used with children and youth ages 8–16 and older adolescents as well (see Hodges et al. 2013). It is worded in such a way as to avoid triggering language that would predispose teens to minimize responses, a concern with this age group (Habib and Labruna 2011; Nader 2011). In addition to generating a total score, the TSCC has six subscales, five of which were used in the current study: Anxiety, Depression, Dissociation, PTS, and Anger. The subscale raw scores were standardized as T scores per Briere (1996). A T score of 60–64 represents sub-clinical significance and clinically significant scores are 65 and above. While some of the questions were sensitive, no participant asked to skip any of them.

### Prenatal Attachment

Maternal prenatal attachment, defined as a pregnant woman's emotional bond to her unborn infant was measured with

[1] For additional methodological details contained in Anastas and Payne (2017), please contact the first author for a copy of the report.

the Maternal Antenatal Attachment Scale (MAAS, Condon 1993; Condon and Corkindale 1997). This scale has 19 items and distinguishes between a mother's "attitude toward the fetus" from her "attitude toward the state of pregnancy and motherhood." Rowe et al. (2013) found attachment levels on the MAAS to be high in pregnant teens in the second or third trimester of pregnancy, the stages of pregnancy of the teens in this study.

### Health Behaviors in Pregnancy

Prenatal health behaviors were measured using the Health Practices in Pregnancy II (HPQ II, Lindgren 2001, 2005). This questionnaire assesses the extent to which pregnant women engaged in behaviors indicative of good self-care during pregnancy. The HPQ-II includes questions about risk factors, such as drug and alcohol use, and about protective factors, such as taking prenatal vitamins and adequate sleep and diet. Scoring on the negative items was reversed so that the total score represents positive behaviors. Lindgren (2005) reports good internal consistency ($\alpha = .81$) and construct validity.

### Data Analysis

Subscale scores from the TSSC were calculated according to the procedures required for each measure. Although multivariate data analysis was initially planned, the obtained sample (n = 36) was too small to permit that. Therefore, statistical analysis was limited to bivariate correlations among study measures.

The statistically significant correlation coefficients found in this study ranged from .33 to .88. Post-hoc power analysis related to correlation coefficients using an $\alpha$ of .05 and a $\beta$ value of .20 found that a sample size of 36 could reliably identify a correlation coefficient of .45 (clincalc.com/stats/power.aspx). Twelve of the 14 statistically significant correlation coefficients described in Table 2 were higher than .45.

### Ethical Review

Participants in this study were especially vulnerable because, aside from being pregnant, many of them were under 18 (n = 21) and some of them (n = 12) were or had been (n = 3) in foster care. All aspects of the conduct of this study were reviewed and approved by the IRB at the authors' home university. In addition, 3 of the 6 NFP-NYC program sites where teens were recruited required IRB review within their own agencies, which was also completed. All IRBs permitted waiver of parental consent since locating all parents and guardians would have been impossible and some teens were expected to be alienated from one or more of their parents because of the pregnancy. For those teens in foster care (34% of the sample), their NFP nurse was present as an advocate when the consent process took place. Due to face-to-face interviewing, there was no anonymity, but strict confidentiality was maintained in all aspects of the study. Participants' privacy was protected in a variety of ways including storing signed consent forms (the only identifiable data) separate from any other form of data, keeping paper data in a locked file cabinet in a locked private office, and storing all electronic data, which was de-identified, in password-protected computer files accessible only to project researchers. In addition, the Research and Publications Committee of the Nurse-Family Partnership approved the original study and the final report on it from which these findings are drawn.

**Table 1** Demographic characteristics of the pregnant teens interviewed (n = 36)

| Demographic characteristics | | N, % |
|---|---|---|
| Race/ethnicity | Hispanic | 20 (57%) |
| | Non-Hispanic Black | 11 (37%) |
| | Other | 4 (6.7% |
| Age | 15 | 4 (11%) |
| | 16 | 5 (13%) |
| | 17 | 12 (33%) |
| | 18 | 5 (14%) |
| | 19 | 10 (28%) |
| Currently living | Foster home | 7 (20%) |
| | With others at home | 17 (47%) |
| | Group home, shelter, residential facility | 7 (19%) |
| | Other | 4 (11%) |
| Educational status | Enrolled in middle or high school | 23 (63%) |
| | Completed high school or GED | 6 (17%) |
| | Did not complete high school/GED | 5 (14%) |
| | Enrolled in college or vocational school | 2 (6%) |
| Currently working | Yes | 2 (6%) |
| | No, due to school | 9 (25%) |
| | No, but looking for a job | 10 (28%) |
| | No | 15 (42%) |
| Foster care | Never in foster care | 20 (57%) |
| | Yes, in foster care now | 12 (34%) |
| | Not now, but in past | 3 (9%) |

## Findings

Table 1 provides information on the demographic characteristics of the study. The teens ranged in age from 15 to 19, with an average age of 17. Eighty percent had either completed high school or were enrolled in high school or middle school. The teens were predominantly Hispanic (57%) and non-Hispanic Black (37%). Over a quarter of the teens had

**Table 2** Correlations between measures of childhood trauma, mental health symptom subscales, maternal fetal attachment, and health behaviors during pregnancy (n = 32)

| | ACE Score | TSCC Anxiety | TSCC Depress. | TSCC Anger | TSCC PTS | TSCC Dissoc | MAAS | HPQII |
|---|---|---|---|---|---|---|---|---|
| ACE | | | | | | | | |
| Score | 1.00 | | | | | | | |
| TSCC | 0.39 | | | | | | | |
| Anxiety | **0.018** | 1.00 | | | | | | |
| TSCC | 0.40 | 0.83 | | | | | | |
| Depress. | **0.015** | > **0.001** | 1.00 | | | | | |
| TSCC | 0.52 | 0.64 | 0.72 | | | | | |
| Anger | **.001** | > **0.001** | > **0.001** | 1.00 | | | | |
| TSCC PTS | 0.48 | 0.88 | 0.88 | 0.73 | | | | |
| | **0.003** | > **0.001** | < **0.001** | > **0.001** | 1.00 | | | |
| TSCC | 0.19 | 0.79 | 0.84 | 0.64 | 0.75 | | | |
| Dissoc. | 0.225 | < **0.001** | < **0.001** | > **0.001** | > **0.001** | 1.00 | | |
| MAAS | 0.25 | 0.08 | 0.06 | 0.22 | 0.05 | 0.08 | | |
| | 0.147 | 0.652 | 0.729 | 0.919 | 0.755 | 0.626 | 1.00 | |
| HPQII | 0.10 | − 0.09 | − 0.24 | − 0.16 | − 0.06 | 0.35 | 0.33 | |
| | 0.576 | 0.594 | 0.162 | 0.350 | 0.726 | **0.036** | .053 | 1.00 |

Bold values indicate correlations that were statisticaly significant and the p values corresponding to each

*ACE* adverse childhood experiences, *TSCC subscales* trauma symptoms related anxiety, depression, anger, PTSD and dissociation, *MAAS* Maternal Antenatal Attachment Scale, *HPQ* Health Practices of Pregnancy Questionnaire

been born outside of the United States (28%) but we deliberately did not ask about citizenship status. Most teens resided at home (49%), 20% lived with a foster family, and 17% in a group home or shelter. One third of the teens (33%) had changed residence once they became pregnant but there was no information on the nature of these changes. About 42% of the teens had been or were currently in foster care. Only 2 teens were working, and 28% were looking for work. All of the teens in the study were in the second or third trimester of their pregnancies. While we had hoped to compare the characteristics of the teens in our sample with others served by NFP-NYC, their data on pregnant adolescents served were compiled on a quarterly basis and the teens who participated in our study volunteered over a 20-month period.

## Relationship Satisfaction

The mean score on the RAS in this sample was 3.4, indicating somewhat lower relationship satisfaction with the baby's fathers compared to the norming samples At the time they became pregnant, most teens regarded their relationships with the fathers of their babies as a "serious" one (80%), while a few called it a casual relationship (10%). However, when asked about their relationships currently, 60% reported that the relationship to be ongoing and "serious" while 23% said there was now no relationship with the baby's father. Teens were pretty evenly divided among those who said there were many problems in this relationship (36%), some problems, 29%, and "not any" problems (35%).

## Perceived Stress

The mean score on the PSS measure was 18.6, lower than college students in norming samples, which ranged from 24 to 26. In a prior norming study, means for samples of female college student samples and others ranged from were 23.57 and 25.7.

## Adverse Childhood Experiences

The number of adverse experiences reported by teens ranged from 0 to 5. The mean number of ACE items reported by the teens was 3.94, or near the cut-off score (4) for high risk of later problems. The levels of self-reported traumatic experiences in this sample was high: 36% of the teens reported having had 4 or more adverse experiences (see Table 2). In a study of juvenile offenders (Baglivio et al. 2015), 30% of the sample had ACE scores of 5 or greater. The ACE scores found in these pregnant teens were similar to those of teens with other psychosocial problems.

Not surprisingly, having been in foster care was correlated with ACE scores (r = .51, p = .002). Teens who were or had been in foster care reported on average of 5.5 ACEs while the mean number for the others was 2.9. While one might expect teens in protective care to have had more traumatic events in childhood, foster care was not significantly related to any of the other scales used in the study.

In addition, higher ACE scores were associated with lower RAS scores (r = − .455, p = .005). As might be

expected, the teens' scores on the ACEs measure were also correlated with their level of current stress (PSS, r = .551, p = .001).

### Mental Health Symptoms

The mean raw score from the total TSCC in this sample was 42.6, with a range of scores from 4 to 108. While no prior study utilizing the TSCC employed a sample of teens comparable to this one, the average raw TSCC score from a sample of girls in public high school was 42.0 (Singer et al. 1995). The average TSCC raw scores on these five subscales from a sample of 335 early adolescents identified to have ACE histories and receiving trauma-focused treatment in several California treatment centers was 39.6 (Hodges et al. 2013).

There was a significant correlation between the ACE scores and the total TSCC scores (r = .441, p = .007). As shown in Table 2, the percentage of teens with sub-clinical or clinically significant subscale scores on the TSCC was: depression (25%), posttraumatic stress (25%), anxiety (25%), dissociation (12%), and anger (11%). Total scores on the TSCC were also correlated with their total scores on the PSS measure (r = .613, p < .001) as well as its subscales measuring depression (r = .628, p = < .001), anger (r = .542, p = .001), PTSD (r = .664, p < .001), anxiety (r = .48, p = .003) and dissociation (r = .475, p = .003). It is important to note that the PSS asked specifically about feelings in the past month, while the TSCC asked about feelings "at any point in your life." As expected, the number of ACEs reported by the pregnant teens was moderately correlated with 4 of the 5 TSCC symptom subscales: anxiety (r = .39), depression (0.40), anger (0.52), and PTSD (0.48). In addition, the depression subscale scores were negatively associated with the RAS (r = − .33, p = .048). However, the relationship between RAS scale scores and the total raw score on the TSCC just missed significance (r = − .39, p = .058).

### Prenatal Attachment and Health Practices in Pregnancy

As shown in Table 2, trauma history and trauma-related mental health were not significantly related to prenatal attachment (as measured by the MAAS scale) or positive health behaviors of pregnancy (HPQ-II) as had been predicted. One exception was that TSCC dissociation scores were weakly but significantly negatively related to HPQII scores (r = − 0.35, p = 0.036). Prenatal attachment was not related to any other variable in the study; the hypothesized correlation between prenatal attachment and scores on the HPQ-II was low (r = .33, p = .053), just missing statistical significance. In sum, childhood trauma and mental health symptoms were consistently related to each other but unrelated to prenatal attachment or health practices in pregnancy, a finding that differs from studies of adult women at risk. One reason for these findings might be a ceiling effect since the scores were comparable to findings in studies of adults (see Condon and Corkindale 1997; Lindgren 2005).

## Conclusions

This trauma-informed study has enhanced our understanding of pregnant teens' experiences of ACEs and mental health challenges, and concurrently, their connection to their infants from both an attachment and health behavior perspective. The ACE measure or similar measures have been used in prior studies of pregnant teens (Bailey et al. 2007; Madigan et al. 2014; Mayer and Thursby 2012). Studies by Bailey et al. (2007), Herrenkohl et al. (1998), and Hillis et al. (2004) provide evidence that ACE exposure is much higher in pregnant and parenting teens than the general population. In their retrospective study, Hillis et al. (2004) found that high levels of childhood trauma made a teen pregnancy more likely but also that only those pregnant teens who had high levels of childhood trauma had negative birth outcomes. The average ACE score in this sample indicated high risk for short-term and long-term health and psychosocial problems. Collecting data on trauma history should be part not only of research but also of assessment in service delivery.

As expected, this study also found that ACE scores correlated with elevated trauma symptoms, including depression and anxiety. These findings on the ACE measure and the TSCC subscales support the observation of NFP nurses and supervisors that trauma and trauma-related symptoms occurred in a significant number of these teens. Not only are ACEs and metal health symptoms associated with poor birth outcomes, they also may manifest in insecure attachment or anomalous parenting relationships between teen parents and their children (Lyons-Ruth and Block 1996,; Madigan et al. 2012). Access to mental health services would benefit teens with such symptoms or with elevated levels of current stress, which was also associated with higher ACE scores.

The level of maternal–fetal attachment in this sample was high, as had been previously found in pregnant teens in the second or third trimester (Rowe et al. 2013). The teens in this study were receiving NFP-NYC services that encouraged attachment and being healthy during pregnancy. The teens had also agreed to receive these services in the first place, perhaps because their prenatal attachment was already high or because they were already committed to being healthy during pregnancy.

In contrast with studies of adult women with similar psychosocial risk, our study did not find that ACEs and TSCC scores significantly related to maternal–fetal attachment or health behaviors in pregnancy. However, MAAS scores were

correlated with health behaviors; the relationship might have demonstrated statistical significance had the sample been larger.

As to contextual factors, there was a relationship between relationship satisfaction and depression in this sample. The mechanisms explaining the relationship between relationship satisfaction and depression are not clear, but Edwards et al. (2012) and Pires et al. (2014) also found a significant association between depressive symptoms in pregnant teens and lack of partner involvement. Our study also found that despite what most would regard as a stressful situation, the teens in our sample did not have high scores on the measure of current stress. Inherent resilience or the buffering effect of support provided by the NFP-NYC may account for this.

## Limitations of the Study

The study has several limitations. First, the sample was both small and limited to pregnant teens receiving services from NFP-NYC (Solivan et al. 2015). Not only would a larger sample result in greater statistical power, most importantly it would allow for the use of multivariate statistical analysis, as originally planned, to tease out the many and complex relationships among the variables studied. Second, the study was cross-sectional, and future inquiries would be well served by a longitudinal design where teens at risk, particularly those living in entrenched poverty or in foster care, were followed from childhood over time. Third, teens are known to underreport in general, particularly traumatic experiences, clinical symptoms and substance use (Habib and Labruna 2011); teens enrolled in the NFP may also be reluctant to discuss less than optimal prenatal health behavior with researchers, perceived to be authority figures connected to the services they are receiving to support positive behaviors. In addition, this was a sample of pregnant teens who were largely Black and Hispanic, and we did not assess consciousness of historical trauma and the level of race- and ethnicity-based microaggressions as sources of trauma and stress, which we would do in any future study.

## Future Research

The original ACE measure focuses on experiences of interpersonal violence. Adaptations of the ACE items in studies of teens have added an item about neighborhood violence exposure (Bethell et al. 2014; Schilling et al. 2007), which may add to our understanding of stresses and mental health in low-income pregnant teens. Future research should also find ways to recruit pregnant teens from non-clinical sources or from other service sites, such as specialized educational settings or from prenatal clinics for teens.

Our findings concerning prenatal attachment and positive health behaviors imply that many pregnant teens do better than might be expected, although further studies are necessary to see whether *these findings occur* in other samples as well. The possibility of post-traumatic growth suggests that a measure of resilience be used in future studies like this one. In addition, since the ACE scale measures adverse experiences in childhood, it would also be useful to measure sources of strength from childhood, as the Benevolent Childhood Experience scale does (Narayan et al. 2018). Adding such variables to studies like this one might help explain why outcomes like positive health behaviors can occur even in the face of adversity. Finally, as in most research, the focus here has been on the problems and needs of pregnant teens, but the study of the boys and men who are also responsible for these pregnancies is growing and should continue.

## Implications

Despite this study's limitations, its findings suggest that, in this era of integrated health and mental health services, trauma-informed mental health services should be part of other systems of care. Feldman (2012) and Ashby et al. (2019) have suggested that attachment-informed treatment supporting prenatal health be integrated into prenatal opr medical home care. Attention to trauma and making services for mental health needs part of the program model might further strengthen home visiting services like those provided by NFP-NYC. Integrated and on site mental health services in prenatal clinics, especially those focused on teens, would no doubt make the use of them easier. How these might be provided in educational settings, such as school-based health clinics, alternative programs, or schools for pregnant and parenting teens, should also be considered.

Adolescence is often a time of great hope and positive expectations even when to adults they may seem unrealistic. However, with proper supports, such as the Second Chance Home network provides, many of the health and psychosocial risks of early childbearing can be mitigated (see Andrews and Moore 2011; Desiderio et al. 2010; Hudgins et al. 2014). Hillis et al. (2004) specifically cite the Nurse Family Partnership as a program that can provide pregnant and parenting teens the support they need to succeed. However, consideration should also be given to models of self-help and empowerment. Rains et al. (1998) described a program for pregnant and parenting teens that consisted of a weekly drop-in center where the teens gained support from one another while running an exchange program for clothes and toys. Having shared experiences with one another, the teens at the center began collective advocacy at local and state levels for better benefits for them and their children. Such activities do not pathologize pregnant and parenting teens but rather empower them.

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## Compliance with Ethical Standards

**Conflict of interest** The authors have no conflict of interest to declare with respect to this study.

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