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The impact of early childbirth on socioeconomic outcomes and risk indicators of females transitioning out of foster care

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A B S T R A C T

Few studies have documented the relationship between early childbirth and the adjustment of females transitioning out of foster care. In this study, data from the National Youth in Transition Database were used to evaluate the associations between childbirth at three time points (prior to age 17, ages 17–19, and ages 19–21) and females' socioeconomic outcomes and risk indicators at age 21 (n = 3173). Findings revealed that over 40% of females had given birth at least once by age 21, with a substantial increase in birth rates from adolescence to early adulthood. Multivariate analyses showed that childbirth between ages 17 and 19 and between ages 19 and 21 was associated with decreased likelihood of obtaining a high school diploma/GED or higher. However, only most recent childbirth (between ages 19 and 21) was associated with decreased likelihood of employment and increased likelihood of receiving public assistance. Contrary to the hypothesis, childbirth was unrelated to homelessness, substance abuse referrals and incarceration at age 21, once earlier presence of such risks was taken into account. Overall, while childbirth between ages 19 and 21 was linked to negative socioeconomic outcomes as females entered young adulthood, earlier births did not appear to confer a unique, prospective risk for the majority of the variables studied. These findings underscore the importance of expanding specialized services designed to promote educational and vocational opportunities for young mothers transitioning out of foster care, especially in the first years following childbirth. The importance of targeting foster youth for pregnancy prevention programs will also be discussed.

1. Introduction

The United States has one of the highest rates of adolescent childbirth in the industrialized world, despite a decline of > 60% from 1991 to 2014 (Hamilton, Martin, Osterman, Curtin, and Matthews, 2015). Females placed in foster care are especially vulnerable to adolescent childbirth, exhibiting birth rates two to three times higher than their peers in the general population (Svoboda, Shaw, Barth, and Bright, 2012). The rate of childbirth continues to increase as females transition out of foster care and begin living independently, generally between the ages of 18 and 21 (Putnam-Hornstein, Hammond, Eastman, McCrosky, and Webster, 2016; Shpiegel, Cascardi, and Dineen, 2017; Svoboda et al., 2012). Nevertheless, there is limited prospective research examining the impact of early childbirth[1] on the adjustment of female foster youth during the period of transition to adulthood (Shpiegel and Cascardi, 2015; Svoboda et al., 2012).

In the general population, early childbirth has been linked to a range of adverse outcomes for females, including educational underachievement, employment difficulties, and financial instability (Barnet, Liu, and DeVoe, 2008; Boden, Fergusson, and Horwood, 2008; Furstenberg, 2016). However, few studies have focused on the outcomes of females with foster care backgrounds (Massey Combs, Begun, Rinehart, and Taussig, 2017). Some scholars have argued that childbirth may exacerbate challenges commonly linked to foster care involvement, such as educational/vocational difficulties, homelessness, and engagement in risky behaviors (Dworsky and Gitlow, 2016; Hook and Courtney, 2011; Massey Combs et al., 2017). Others have pointed out that childbirth may provide a renewed sense of purpose and motivation to some youth, resulting in more favorable outcomes (Pryce and Samuels, 2010). Overall, longitudinal research on this topic has been limited, thus, the specific influence of childbirth on the adjustment of female foster youth is largely unknown. Moreover, research has not previously investigated whether the *timing* of childbirth differentially relates to variations in females' adjustment as they transition to adulthood. The current study aims to address these gaps by examining the impact of childbirth at three time points– prior to age 17, between

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[1] The term "early childbirth" will be used throughout the paper to refer to childbirth during adolescence and the period of transition to adulthood (i.e., until age 21).

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ages 17 and 19, and between ages 19 and 21– on socioeconomic outcomes and risk indicators of females aged 21.

1.1. Early childbirth and socioeconomic outcomes of foster youth

It has been well established that foster youth face multiple challenges as they leave the child welfare system and begin living independently (Courtney, 2009; Shpiegel, 2012). According to recent studies, these youth are less likely to complete high school and attend college, and more likely to experience unemployment and dependence on public assistance (Courtney, 2009; Naccarato, Brophy, and Courtney, 2010; Stott and Gustavsson, 2010; Yates and Grey, 2012). Findings from *qualitative* studies reveal that females who have children are especially likely to report a difficult transition to adulthood, often struggling to finish school, obtain employment and establish economic self-sufficiency (Chase, Maxwell, Knight, and Aggleton, 2006; Haight, Finet, Bamba, and Helton, 2009). *Quantitative* studies further demonstrate that childbirth is associated with poorer educational and vocational outcomes in young adulthood, particularly among females (e.g., Massey Combs et al., 2017). Nevertheless, existing research on this topic has been limited, and did not evaluate the relationship between the *timing* of giving birth and later socioeconomic outcomes. When childbirth occurs between the ages of 18 and 21, it generally coincides with the transition out of foster care and loss of valuable supports and resources provided by the child welfare system. The combined experience of navigating independent living while simultaneously caring for a child may significantly impair females' ability to complete education, obtain employment, and become financially independent (Shpiegel and Cascardi, 2015).

1.2. Early childbirth and risk indicators of foster youth

Prior studies have also documented an association between early childbirth and various risk indicators among foster youth, including homelessness, criminal justice involvement, and running away (King and Van Wert, 2017; Massey Combs et al., 2017; Shpiegel et al., 2017). According to some scholars, these risks may serve as a proxy for recklessness and impulsivity more generally, possibly contributing to improper or irregular use of birth control, and subsequent pregnancy and birth (Matta Oshima, Carter Narendorf, and McMillen, 2013). At the same time, it has also been suggested that childbirth represents a major life stressor that may worsen existing problems (Hoffman and Maynard, 2008; Radey, Schelbe, McWey, Holtrop, and Canto, 2016), possibly heightening the risk of homelessness, criminal justice involvement, and other difficulties after birth. These challenges may be especially pronounced as youth transition out of foster care and lose eligibility for services provided by child welfare agencies (Shpiegel and Cascardi, 2015). As noted above, childbirth after age 18 frequently coincides with the transition out of foster care, possibly conferring greater risk than childbirth at a younger age, when youth continue to be under the care and supervision of child welfare. Overall, existing research has not yet attempted to isolate the unique influence of childbirth at different ages on females' adjustment at age 21, while also accounting for foster care status and prior risk indicators.

1.3. Gaps in research and the purpose of the present study

Although research on childbirth among foster youth has been limited, general population studies point to a strong relationship between early childbirth and subsequent negative outcomes, including decreased educational and vocational attainment, lower earnings, and higher incidence of psychopathology (Boden et al., 2008; Barnet et al., 2008; Falci, Mortimer, and Noel, 2010; Furstenberg, 2016). Nevertheless, early childbirth may not be the *root cause* of these difficulties, but rather, a marker of broader social and economic disadvantage (Furstenberg, 2016; Hoffman and Maynard, 2008). This may be especially relevant for foster youth, as the difficulties associated with early childbirth overlap substantially with the reduced life opportunities linked to child welfare involvement. Research on childbirth among foster youth has generally been cross-sectional in nature (King, Putnam-Hornstein, Cederbaum, and Needell, 2014; Massey Combs et al., 2017), and lacked comparison groups of youth who have not given birth (Chase et al., 2006), thus, the risk conferred specifically by early childbirth cannot be easily identified. A prospective examination of females transitioning out of foster care can help to determine whether childbirth, in general, and the *timing* of childbirth, in particular, contribute uniquely to adverse socioeconomic outcomes and other difficulties during the period of transition to adulthood. Conducting such research using large, national samples is of particular importance, given that most existing studies have been confined to one or few states (Dworsky and Gitlow, 2016; Hook and Courtney, 2011; King et al., 2014; Massey Combs et al., 2017).

To address the aforementioned gaps, the current study used data from the National Youth in Transition Database to examine the prospective associations between childbirth at three time points – before age 17, between ages 17 and 19, and between ages 19 and 21 – and females' socioeconomic outcomes and risk indicators at age 21. Specifically, this study aims to achieve the following goals:

(1) Document the proportion of females who had given birth at least once by age 21, and examine the rates of childbirth at different time points described above. We hypothesize that childbirth rates in this population will be higher than the rates reported among similarly-aged females in the general population. Moreover, we hypothesize that the rates of childbirth will increase with age.
(2) Compare females who had given birth and those who had not, on education attainment, employment, receipt of public assistance, homelessness, substance abuse referrals and incarceration, and explore the associations between the timing of giving birth and these variables. We hypothesize that childbirth, both overall and at each time point, will be significantly associated with socioeconomic outcomes and risk indicators at age 21.
(3) Examine the contribution of childbirth at each time point to socioeconomic outcomes and risk indicators at age 21, controlling for race/ethnicity, foster care status, and risk indicators prior to age 19. We hypothesize that childbirth will be *independently* associated with worse socioeconomic outcomes and more risk indicators at age 21, with stronger associations present for more recent births.

2. Methods

The present study uses data from the National Youth in Transition Database (NYTD). Created by the John H. Chafee Foster Care Independence Program (CFCIP), NYTD data collection began in federal fiscal year (FFY) 2011 and was designed to (a) track *services* provided through CFCIP; and (b) collect certain *outcome* measures to assess the effectiveness of the program. All 50 states and the District of Columbia were required to submit information to NYTD during designated reporting periods (National Data Archive on Child Abuse and Neglect, 2016).

The NYTD dataset includes two separate components; one consists of service-related information, and the other includes self-reported youth outcomes. The present study used the *outcome component only*, which was collected in three waves: a baseline survey with youth who were in foster care at age 17 (FFY 2011), and two follow-up surveys, the first at age 19 and the second at age 21 (FFY 2013 and FFY2015). All youth who reached their 17th birthday in FFY2011, and were in foster care within a 45-day period beginning on their birthday, were eligible to complete the baseline survey. States could choose to administer the survey in person, via the Internet or over the phone, provided that it was administered to the youth directly. Youth participation was voluntary, with freedom to refuse without adverse consequences, or to

decline to answer specific survey questions. Those youth who at least partially completed the survey during the designated 45-day window were included in FFY2011 cohort, and followed at ages 19 and 21. The follow-up surveys were administrated to the youth during the six-month reporting periods that contained their 19th and 21st birthday. States could choose to invite all youth included in FFY2011 cohort to complete the follow-up surveys, or to use probabilistic sampling to determine the follow-up population (i.e., randomly select a certain number of youth from the FFY2011 cohort, using a pre-determined formula included in the NYTD regulations).

The national response rate for the baseline NYTD survey was 54%, and about half of the youth who completed the baseline survey also completed the first and second follow-up surveys. Of note, response rates varied significantly by state, possibly reflecting variations in data collection procedures. For more information about the NYTD design and procedures, see National Data Archive on Child Abuse and Neglect (2016). Approval for the present analysis was granted by Montclair State University Institutional Review Board.

2.1. Participants

The present investigation included females who completed all three waves of the NYTD surveys, representing all states and the District of Columbia (n = 3173). About 44% were Non-Hispanic White (n = 1364), 31% were Black (n = 962), 18% were Hispanic (irrespective of race; n = 572) and 7% were of "other" races (American-Indian/Alaska Native; Asian; Native Hawaiian/Other Pacific Islanders; n = 232). Compared to the overall population of females in the NYTD database, our sample included a slight *overrepresentation* of non-Hispanic White females (44% vs. 41%), and females of "other" races (7% vs. 6%), and a slight *underrepresentation* of Hispanic (18% vs. 21%) and Black (31% vs. 32%) females. To evaluate possible bias resulting from attrition, we compared females who completed all three waves of the NYTD survey (n = 3173) and those who completed the baseline survey, but not one or both follow-up surveys (n = 4357). This analysis has indicated that females who completed all three waves were slightly *more* likely to be enrolled in school at baseline (96% vs. 94%) and report either full-time or part-time employment (15% vs. 13%), but *less* likely to report baseline substance abuse referral (22% vs. 26%) and incarceration (23% vs. 28%). The baseline rates of childbirth in the two groups were 9% and 11% respectively, and this difference was not statistically significant.

Approximately 19% of females in the current sample (n = 602) were still in foster care at age 21, while > 80% (n = 2571) had already exited foster care (about 66% exited between ages 17 and 19, and 15% exited between ages 19 and 21). Similar to other administrative datasets, missing data were present for several variables (generally between 1% and 5%), resulting in a modest decrease in sample size for some analyses.

2.2. Measures

2.2.1. Childbirth status

Information about childbirth status was collected with one yes/no question at each of the three surveys. At age 17, participants were asked if they had *ever* given birth. At ages 19 and 21, participants were asked if they had given birth during the *past two years only*.

2.2.2. Socioeconomic outcomes

Each of the socioeconomic outcomes described below was measured at age 21.

2.2.2.1. Educational attainment. Participants selected their highest educational achievement from the following options: high school diploma or GED; vocational certificate; vocational license; associate's degree; bachelor's degree; master's degree or higher; or "none of the above". Since few youth (10%, n = 298) achieved a higher level of education than the high school diploma/GED, and because young people with and without children were similar in this regard (9% and 10% respectively), this variable was recoded as following: high school diploma/GED or higher (1) or no educational certificate (0).

2.2.2.2. Employment status. Participants reported if they were currently employed full-time (35 h or more), part-time (34 h or less), or not currently employed. Full-time or part-time employment (i.e. any current employment) was coded as (1) and not currently employed as (0).

2.2.2.3. Receipt of public assistance. Public assistance was assessed with two yes-no questions: (1) receiving ongoing cash welfare payments from the government to cover some of the youths' basic needs, not including unemployment insurance, child care subsidies, education assistance, food stamps or housing assistance (i.e., financial); and (2) living in government-funded public housing, or receiving a government-funded housing voucher to pay for part of the housing costs, not including CFCIP room and board payments (i.e., housing). Youths receiving *either* of these forms of public assistance were coded (1), while those not receiving assistance were coded (0).[2] Of note, public assistance questions applied only to those youth who had exited foster care by age 21; therefore, the sample size available for the analysis of this variable did not include youth who were still in foster care at age 21.

2.2.3. Risk indicators

Three risk indicators were evaluated with yes (1) or no (0) questions at ages 17, 19 and 21; at age 17, youth were asked about their *lifetime* experiences; at ages 19 and 21 they were asked about *past two years only*. Risk indicators prior to age 19 (i.e., either before age 17 and/or between ages 17 and 19) were used as covariates; at age 21, they were examined as unique indicators associated with early childbirth.

2.2.3.1. Homelessness. Youth were asked if they did not have a regular or adequate place to live, such as living in a car, on the street, or staying in a homeless or other temporary shelter.

2.2.3.2. Substance abuse referral. Youth reported if they had been referred for an alcohol or drug abuse assessment or counseling, including either a self-referral or a referral by a social worker, school staff, physician, mental health worker, foster parent or another adult.

2.2.3.3. Incarceration. Youth reported if they had been confined in a jail, prison, correctional facility, or juvenile or community detention facility in connection with allegedly committing a crime (a felony or a misdemeanor).

2.2.4. Foster care status

Based on the NYTD definitions, a youth was considered to be in foster care if he/she was under the placement and care responsibility of the State Title IV–B/IV–E agency in accordance with the definition of foster care. In the present analysis, we recoded youths' foster care status as following: 0 = still in foster care at age 21; 1 = exited foster care between ages 17 and 19; 2 = exited foster care between ages 19 and 21.

[2] The NYTD survey also included a "food assistance" question (i.e., receiving food stamps, etc.). However, this variable was excluded from the present study, since its definition for the NYTD purposes included food assistance through the Women, Infants, and Children (WIC) program, possibly inflating the differences between females with and without children.

Table 1
Descriptive statistics for childbirth rates, socioeconomic outcomes and risk indicators (n = 3172).[a]

Variables	% (n)[a]
Childbirth information (all ages)	
Any childbirth	44.0 (1328)
Childbirth prior to age 17	9.2 (282)
Childbirth between ages 17 and 19	17.3 (538)
Childbirth between ages 19 and 21	36.2 (1127)
Socioeconomic outcomes (age 21)	
High school diploma/GED or above	81.7 (2546)
Current employment	51.6 (1599)
Any public assistance	19.7 (473)
Financial assistance	12.9 (311)
Housing assistance	9.8 (238)
Risk indicators (age 21)	
Homelessness	27.4 (848)
Substance abuse referral	8.4 (254)
Incarceration	12.2 (377)
Risk indicators before age 19 (covariates)	
Homelessness	32.2 (988)
Substance abuse referral	26.9 (830)
Incarceration	28.5 (879)

[a] Valid percent is presented. The extent of missingness for each variable is < 10%, with the exception of public assistance variables that apply only to youth who were no longer in foster care, thus have higher missingness (i.e. about 20%).

3. Analytic strategy

All analyses for the present study were conducted in SPSS version 22.0. To test the first hypothesis, we calculated the proportion of females reporting childbirth prior to age 17, between ages 17 and 19, and between ages 19 and 21, as well as the overall birth rate by age 21. Descriptive statistics for socioeconomic outcomes and risk indicators were also reported. To test the second hypothesis, chi-square tests and simple logistic regression analyses (i.e., logistic regression with one predictor) were performed to evaluate the link between *any* childbirth and females' socioeconomic outcomes and risk indicators at age 21, and between the *timing* of childbirth (i.e., prior to age 17, between ages 17 and 19, and between ages 19 and 21) and the above-mentioned variables. The final hypothesis was tested using multivariate logistic regression analyses examining the link between childbirth at each time point and females' socioeconomic outcomes and risk indicators at age 21, controlling for race/ethnicity, foster care status, and risk indicators prior to age 19.

4. Results

4.1. Univariate analyses

As shown in Table 1, about 44% (n = 1328) of females in the present sample reported *any* childbirth by age 21. The proportion of females reporting childbirth increased substantially from adolescence to early adulthood – specifically, 9% had given birth prior to age 17, 17% had given birth between ages 17 and 19, and 36% had given birth between ages 19 and 21.[3] Results from McNemar tests indicated that these differences were statistically significant (p < 0.001).

At age 21, approximately 80% of females achieved a high school diploma/GED or higher; however, only half reported current employment, and about one in five received public financial and/or housing assistance. With regard to risk indicators at age 21, more than one-fourth reported homelessness, and approximately 1 in 10 reported substance abuse referrals and incarceration. The presence of risk indicators in prior years (i.e., before age 19) was more substantial, with nearly one-third reporting homelessness, and about one-fourth reporting substance abuse referrals and incarceration (see Table 1).

[3] The percentages do not sum up to 44% because some youth had given birth more than once.

Table 2
Simple logistic regression analyses: bivariate relationships between the timing of childbirth and females' socioeconomic outcomes and risk indicators at age 21.

	High School diploma/ GED or above (OR)	Current employment (OR)	Public assistance (OR)[a]
Childbirth prior to age 17	**0.52*****	0.95	**1.51***
Childbirth between 17 and 19	**0.47*****	0.87	**1.78*****
Childbirth between 19 and 21	**0.46*****	**0.52*****	**2.84*****

	Homelessness (OR)	Substance abuse (OR)	Incarceration (OR)
Childbirth prior to age 17	1.17	1.19	**1.56****
Childbirth between 17 and 19	**1.34****	1.33	**1.49****
Childbirth between 19 and 21	**1.40*****	1.21	**1.35****

Bolded results are significant.
[a] The extent of missingness for each variable is < 10%, with the exception of public assistance variables that apply only to youth who were no longer in foster care, thus have higher missingness (i.e. about 20%).
* < 0.05.
** < 0.01.
*** < 0.001.

4.2. Bivariate Analyses

Results from chi-square analyses revealed that females who had given birth by age 21 were less likely to obtain a high school diploma/GED or higher (75% vs. 87%, $\chi^2(1, n = 2978) = 65.82$, p < 0.001), and less likely to be employed (44% vs. 57%; $\chi^2(1, n = 2956) = 48.00$, p < 001). Moreover, females who had given birth were *more* likely to receive public financial and/or housing assistance (29% vs. 12%; $\chi^2(1, n = 2300) = 98.83$, p < 0.001), and more likely to report homelessness (31% vs. 25%; $\chi^2(1, n = 2967) = 15.61$, p < 0.001) and incarceration (14% vs. 11%; $\chi(1, n = 2962) = 9.18$, $p = 0.002$). However, the rates of substance abuse referrals did not differ significantly between females who had given birth and those who had not (9% vs. 8%; $\chi^2(1, n = 2918) = 1.93$, $p = 0.16$).

Simple odds ratios of the associations between childbirth at various time points and females' socioeconomic outcomes and risk indicators at age 21 are shown in Table 2. Findings indicate that childbirth at all time points (i.e., prior to age 17; between ages 17 and 19; between ages 19 and 21) was associated with *decreased* likelihood of obtaining a high school diploma/GED or higher. Childbirth at all time points was also associated with *increased* likelihood of receiving public assistance. However, only most recent births (i.e., between ages 19 and 21) were significantly associated with *decreased* likelihood of employment at age 21.

When risk indicators at age 21 were examined, childbirth between ages 17 and 19, and 19 and 21 was associated with *increased* likelihood of homelessness. Childbirth at all time points was also associated with *increased* likelihood of incarceration. Nevertheless, no significant relationship has emerged between childbirth at any point and the presence of substance abuse referrals at age 21.

4.3. Multivariate analyses

4.3.1. Covariates

As demonstrated in Table 3, many covariates were significantly

Table 3
Multivariate logistic regression analyses: associations between the timing of childbirth and females' socioeconomic outcomes and risk indicators at age 21.

Variable	Diploma/GED or Above (n = 2767) OR (CI)	Current Employment (n = 2748) OR (CI)	Any Public Assistance (n = 2138) OR (CI)	Homelessness (n = 2759) OR (CI)	Substance Abuse Referral (n = 2719) OR = (CI)	Incarceration (n = 2760) OR (CI)
Race/Ethnicity[a]						
Black	0.88 (0.69–1.12)	1.05 (0.87–1.26)	**1.40 (1.08–1.82)***	**1.30 (1.05–1.61)***	0.88 (0.63–1.24)	1.15 (0.86–1.53)
Hispanic	0.93 (0.69–1.24)	0.96 (0.77–1.19)	1.23 (0.89–1.69)	0.91 (0.69–1.19)	0.67 (0.44–1.03)	0.78 (0.53–1.14)
Other	1.23 (0.81–1.85)	**1.48 (1.08–2.01)***	1.23 (0.81–1.88)	**1.46 (1.04–2.05)***	1.02 (0.61–1.68)	1.25 (0.81–1.93)
Age of Exit from Care[b]						
Between 17 and 19	**0.59 (0.43–0.80)****	**0.64 (0.52–0.80)*****	N/A[d]	**2.96 (2.19–3.9)*****	0.87 (0.58–1.29)	**2.12 (1.3–3.2)****
Between 19 and 21	1.07 (0.71–1.61)	**0.62 (0.47–0.81)****	N/A[d]	**3.03 (2.12–4.3)*****	0.92 (0.55–1.53)	**2.16 (1.3–3.5)****
Risk Indicators[c]						
Homelessness	**0.75 (0.61–0.92)****	0.96 (0.81–1.14)	1.16 (0.91–1.46)	**3.29 (2.73–3.9)*****	**1.54 (1.15–2.0)****	**1.47 (1.1–1.8)****
Substance abuse	0.83 (0.66–1.05)	0.99 (0.82–1.19)	0.97 (0.75–1.27)	**1.38 (1.21–1.69)****	**3.59 (2.6–4.8)*****	**1.64 (1.2–2.1)*****
Incarceration	**0.53 (0.43–0.67)*****	**0.63 (0.52–0.76)*****	0.98 (0.76–1.25)	**1.50 (1.23–1.8)*****	**1.55 (1.15–2.0)****	**3.88 (3.0–5.0)*****
Childbirth Age						
Prior to 17	0.76 (0.55–1.06)	1.27 (0.95–1.69)	1.05 (0.73–1.51)	0.97 (0.70–1.34)	1.05 (0.65–1.70)	1.26 (0.84–1.87)
Between 17 and 19	**0.67 (0.51–0.88)****	1.19 (0.94–1.50)	1.03 (0.76–1.38)	1.13 (0.87–1.46)	1.19 (0.80–1.75)	1.10 (0.79–1.55)
Between 19 and 21	**0.65 (0.53–0.81)*****	**0.52 (0.43–0.62)*****	**2.65 (2.09–3.36)*****	1.11 (0.91–1.35)	0.98 (0.72–1.33)	0.93 (0.71–1.22)

Bolded results are statistically significant.
[a] Non-Hispanic White is used as a reference category.
[b] In foster care at age 21 is used as a reference category.
[c] Risk indicators prior to age 19 (i.e., covariates)
[d] Youth still in foster care at age 21 were not asked the public assistance questions; thus, these comparisons were not conducted.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

associated with socioeconomic outcomes and risk indicators at age 21. Specifically, earlier exit from foster care was associated with *decreased* likelihood of obtaining a high school diploma/GED or higher and being employed, and *increased* likelihood of experiencing homelessness and incarceration. Moreover, homelessness, substance abuse referrals and incarceration prior to age 19 were consistently associated with continued presence of such risks at age 21. Interestingly, there were relatively few statistically significant racial/ethnic differences in both socioeconomic outcomes and risk indicators among the females in the present sample.

4.3.2. Socioeconomic outcomes and risk indicators at age 21

Controlling for race/ethnicity, foster care status, and risk indicators prior to age 19, childbirth between ages 17 and 19, and between ages 19 and 21, was significantly associated with *decreased* likelihood of obtaining a high school diploma/GED or higher (OR = 0.67 $p = 0.004$ and OR = 0.65, $p < 0.001$ respectively). However, childbirth prior to age 17 did not contribute significantly to educational attainment. Additionally, only most recent childbirth (i.e., between ages 19 and 21) was significantly associated with *decreased* likelihood of employment (OR = 0.52, $p < 0.001$), and *increased* likelihood of receiving public assistance (OR = 2.65, $p < 0.001$). Contrary to the hypothesis, once homelessness, substance abuse referrals, and incarceration prior to age 19 were accounted for, childbirth at all time points was unrelated to homelessness, substance abuse referrals and incarceration at age 21 (see Table 3).

5. Discussion

The current study examined the link between early childbirth and the adjustment of female foster youth during the period of transition to adulthood. Consistent with prior studies (Courtney et al., 2007; Massey Combs et al., 2017; Svoboda et al., 2012), childbirth rates were disproportionately high among this population – > 40% of females in our sample had given birth at least once by age 21, and there was a significant increase in birth rates from adolescence to early adulthood. In contrast, recent general population estimates have shown that < 3% of females aged 15–19, and about 8% of females aged 20–24, had given birth in 2015 (Martin, Hamilton, Osterman, Driscoll, and Mathews, 2017).

5.1. Early childbirth and socioeconomic outcomes at age 21

Overall, females who had given birth reported poorer socioeconomic outcomes at age 21 as compared to those who had not given birth; however, this effect was limited primarily to recent childbirth (between ages 17 and 19, or between ages 19 and 21). There was no indication for a *prospective* negative effect among those females who had given birth in adolescence (i.e. prior to age 17), once subsequent births were taken into account. In general, worse socioeconomic outcomes appeared to be associated primarily with childbirth between ages 19 and 21, making it difficult to determine the causal direction of this relationship, as the NYTD dataset does not provide information about the exact timing of birth. One possibility that arises from our data is that giving birth may interrupt school completion, which, in turn, makes it difficult for females to obtain employment, and increases their likelihood of receiving public assistance. Conversely, the observed associations may also indicate that females who have disconnected from school and employment during late adolescence or the period of transition to adulthood are more vulnerable for becoming pregnant and giving birth (Thompson, Bender, Lewis, and Watkins, 2008). The impact of educational attainment may be especially influential in this regard, such that females who perceive that they have limited options for educational advancement (e.g., through completing high school or pursuing higher education) may choose motherhood as an alternative path for self-realization. In general, although early childbirth appears to coincide with worse socioeconomic outcomes among the females in the current sample, these associations may not be *causal* in nature, or may develop from a range of pre-existing challenges.

5.2. Early childbirth and risk indicators at age 21

Bivariate analyses showed that the rates of homelessness and incarceration at age 21 were higher among females who had given birth, as compared to those who had not. These findings are consistent with prior research, revealing higher rates of homelessness and criminal

involvement among foster youth reporting pregnancy and childbirth (e.g., Massey Combs et al., 2017; Matta Oshima et al., 2013). Nevertheless, multivariate analyses revealed that childbirth at any age was unrelated to homelessness and incarceration once prior presence of these risk indicators was taken into account. This pattern of findings suggests that homelessness and incarceration may increase vulnerability to subsequent childbirth, rather than serve as distinct consequences of giving birth. This interpretation is consistent with prior research, which suggests that factors such as delinquency and homelessness may be linked to risky sexual behaviors and later pregnancy and childbirth (Hoffman and Maynard, 2008; Matta Oshima et al., 2013; Thompson et al., 2008). Overall, our findings demonstrate that while all risk indicators tend to persist from adolescence into young adulthood, early childbirth does not seem to confer *additional* risk for homelessness, substance abuse referral or incarceration at age 21.

5.3. The importance of foster care status

In line with existing research (e.g., Courtney, 2009), earlier exit from foster care was associated with lower educational attainment, decreased employment, and increased homelessness and incarceration at age 21. Although both exit from foster care and childbirth conferred risk for adverse socioeconomic outcomes, only exit from foster care was also linked to homelessness and incarceration. Taken together, these findings suggest that earlier exit from foster care may be more influential than childbirth in understanding the complex set of negative outcomes as foster youth transition to adulthood. Although the reasons for earlier exit from foster care have not been evaluated in the present study, it is possible that the combination of childbirth with the transition out of foster care makes the challenges of the young mothers especially pronounced, particularly as they become ineligible for the supports and services provided by the child welfare system (Shpiegel and Cascardi, 2015).

When considering the impact of exit from foster care on youths' outcomes, it is important to note that selection bias may at least partially explain these findings. First, many states impose school and/or employment requirements on youth in extended foster care (i.e., past the age of 18), forcing those not meeting these requirements to exit care earlier (Child Welfare Information Gateway, 2017). Second, females who become pregnant may feel forced to exit foster care, either due to absence of placement options that accommodate them and their children, or because they are unable to comply with the education and/or employment requirements of extended foster care. That said, numerous prior studies indicate that earlier exit from foster care independently contributes to negative outcomes during the period of transition to adulthood (Courtney, 2009; Narendorf and McMillen, 2010; Shpiegel, 2012). This negative effect is likely linked to reductions in both tangible and intangible supports once youth exit from foster care and embark on adult independence (Courtney, 2009; Shpiegel, 2012).

In general, encouraging youth who have children to remain in foster care for the maximum amount of time allowable by state legislation is likely to yield protective effects, including better socioeconomic outcomes and decreased homelessness and incarceration. Early exit from foster care may be part of a larger constellation of risk, such that youth who are at highest risk for problematic outcomes disengage from the child welfare system earlier, which further limits their supports and resources, and heightens the risk for subsequent maladaptation. Keeping youth actively engaged with the child welfare system may mitigate existing difficulties and promote better functioning during the period of transition to adulthood. Additionally, allowing temporary exceptions to the school enrollment and/or employment requirements of extended foster care, and providing placement options that are suitable for mothers and their children, may encourage youth to remain in care longer and fully benefit from the supports and services provided.

5.4. Implications, limitations and future directions

Consistent with research on early childbirth, current findings indicate that females who had given birth are at higher risk for socioeconomic difficulties as they transition to adulthood. Also consistent with prior research is the notion that early childbirth may not be the *root cause* of these difficulties, but rather, a marker of broader social and economic disadvantage (Furstenberg, 2016). Previous studies suggest that females who leave foster care earlier, who are disengaged from educational and vocational settings, and who report various risky behaviors, are more likely to experience early childbirth (King and Van Wert, 2017; Putnam-Hornstein et al., 2016; Shpiegel et al., 2017; Shpiegel and Cascardi, 2015). The current analysis reveals that many of these young women will struggle to complete education, obtain employment, and establish economic self-sufficiency as they transition to adulthood. Some may also succumb to stress and engage in various risky behaviors that may have been part of their adolescent lives (e.g. delinquency). Overall, this constellation of vulnerabilities may generate a cycle of continued social and economic disadvantage, especially in the absence of substantial supports and services for these young women and their children.

The high rates of childbirth by age 21, coupled with the risk for problematic outcomes during the period of transition to adulthood, reinforce the need for pregnancy prevention programs specifically targeting foster youth. Providing comprehensive, trauma-informed sexual health education programs to foster youth, and evaluating the availability and use of long-acting contraception methods, are two important strategies to consider in this regard. Moreover, given the evidence that risk indicators such as homelessness and criminal justice involvement may serve as vulnerability factors for subsequent childbirth (Hoffman and Maynard, 2008; Matta Oshima et al., 2013; Thompson et al., 2008), there should be a greater focus on these indicators in prevention programs. Outreach to youth living on the streets or in homeless shelters, as well as those in detention facilities, may provide an avenue for reaching females who are particularly vulnerable to early childbirth. Encouraging high-risk youth to remain in extended foster care may also be an effective mechanism for promoting better educational, vocational and economic opportunities during the period of transition to adulthood.

The findings of this study also emphasize the importance of supporting young mothers, as they exit from foster care and begin living independently. Although it is unclear whether the youth in the current sample retained parental rights or custody of their children, the act of having a child may disadvantage these youth socioeconomically, at least in the short term. For those females who maintain custody and/or an ongoing relationship with their children, providing adequate resources seems to be especially important during the early years of a child's life, when the burden on young mothers is substantial, and may interfere with tasks such as school and employment. Discussing flexible education and/or employment opportunities that are suitable for parents of young children, increasing access to safe and affordable childcare, and securing stable housing for mothers and their children, is instrumental for facilitating their successful transition to adulthood. Given recent research on the high rates of child welfare involvement among the children of young parents in foster care (e.g., Dworsky, 2015), the provision of such specialized services may also help prevent intergenerational transmission of child maltreatment and out-of-home placement.

The results of this study should be interpreted in light of its limitations. First, although the present sample included females from 50 states and the District of Columbia, response rates were highly variable across states. The reasons for non-response are not entirely clear, and it is possible that the most vulnerable youth are difficult to locate for the NYTD interviews. This explanation is especially likely, given that the females in the present sample were more likely to still be in foster care at age 21, and less likely to report certain baseline risk indicators (e.g.,

incarceration and homelessness), as compared to females who have been excluded. Although the low response rate for the NYTD surveys may limit the generalizability of our findings, this limitation is partially offset by the prospective study design using a large, national sample, allowing to examine the timing of childbirth and its impact on subsequent outcomes.

Second, the present study does not include information about child welfare experiences that may be relevant to later socioeconomic outcomes and risk indicators, such as placement types or any services provided by child welfare agencies. Overall, our ability to make causal inferences is limited by the possibility of many unexamined influences, especially given the long time periods between the data collection points. Additionally, the NYTD variables are limited in the amount of detail they provide. For instance, it is not known how many children the youth had, or whether or not they were actively parenting their children at the time of the interviews (of note, previous studies indicate that the majority of young mothers in foster care tend to reside with and actively parent their children; see Courtney, Dworsky, Ruth, Havlicek, and Perez, 2007; Massey Combs et al., 2017). Moreover, the specific circumstances associated with experiencing homelessness are also not clear, and some youth may become homeless due to discontinuation of services following their exit from foster care. Finally, although receiving public assistance is often conceptualized as a negative outcome, it may also be considered an adaptive strategy for foster youth, especially if received temporarily. Young mothers transitioning out of foster care may be at risk for economic disconnection, thus, caseworkers may promote application for public assistance to ensure that their basic needs are met. To fully evaluate the meaning of receiving public assistance, future studies should examine its duration, and explore youths' educational and/or vocational engagement during the assistance period.

Finally, although the NYTD dataset identifies youth who are no longer in foster care at ages 19 and 21, it does not explicitly identify the mechanisms for exiting care. The majority of youths over the age of 17 tend to exit foster care through emancipation; however, it is possible that a small number of youth had exited care through other mechanisms. Relatedly, while the majority of states currently offer some form of extended foster care after the age of 18 (Child Welfare Information Gateway, 2017), some states still do not offer this option.

Future research would benefit from the examination of specific mechanisms that explain how childbirth influences socioeconomic outcomes, as well as whether or not the adverse influence of childbirth persists into adulthood. Furthermore, future studies should evaluate whether interventions designed to support adolescent mothers in foster care, or reduce the rates of childbirth in this population, are effective. In particular, studies should evaluate the impact of receiving Chafee services on the likelihood of childbirth as youth transition to adulthood, as well as explore the impact of service receipt on socioeconomic outcomes and risk indicators at age 21. Additional research is also needed on the link between earlier exit from foster care and giving birth, including identifying possible intervening factors (e.g., service receipt, variations in state policies). Finally, research involving males is greatly needed, as little information currently exists about early fatherhood among emancipating foster youth.

Conflict of interest

The authors report no known conflict of interests.

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