Washington University School of Medicine

Digital Commons@Becker

Open Access Publications

2018

Associations between childhood weight status and timing of first sex in an ethnically diverse sample

Jennifer C. Duckworth
Indiana University - Bloomington

Mary Waldron
Washington University School of Medicine in St. Louis

Follow this and additional works at: https://digitalcommons.wustl.edu/open_access_pubs

Please let us know how this document benefits you.

Recommended Citation

Duckworth, Jennifer C. and Waldron, Mary, "Associations between childhood weight status and timing of first sex in an ethnically diverse sample." *Childhood Obesity*. 14, 8. 566-572. (2018).
https://digitalcommons.wustl.edu/open_access_pubs/7345

This Open Access Publication is brought to you for free and open access by Digital Commons@Becker. It has been accepted for inclusion in Open Access Publications by an authorized administrator of Digital Commons@Becker. For more information, please contact vanam@wustl.edu.

Associations between Childhood Weight Status and Timing of First Sex in an Ethnically Diverse Sample

Jennifer C. Duckworth, PhD¹ and Mary Waldron, PhD^{1,2}

Abstract

Background: Most research linking weight status and timing of first sexual intercourse is cross-sectional in design, with few longitudinal analyses published to date. We examined associations between childhood weight status and subsequent onset of first sexual intercourse within a survival analytic framework, testing for differences among Hispanic, black, and white females and males.

Methods: Data were drawn from 6379 child respondents of the 1979 National Longitudinal Survey of Youth aged 13 and older at last assessment. Cox proportional hazards regression models were estimated predicting age at first sexual intercourse from weight status during childhood without and with adjustment for correlated risk factors. Analyses were conducted separately by sex and race/ethnicity, with interactions among weight status, respondent sex, and race/ethnicity modeled in subsidiary analyses.

Results: Overweight status predicted earlier sexual intercourse among Hispanic females, whereas obese status predicted delayed sexual intercourse among white males, both relative to peers of the same race/ethnicity with healthy weight. Underweight status predicted delayed sexual intercourse among Hispanic males relative to peers with healthy weight. Significant differences by sex and race/ethnicity were observed in tests of interactions.

Conclusions: Findings document associations between childhood weight status and subsequent onset of first sexual intercourse, especially among Hispanic females and males and white males. Together, results highlight respondent sex and race/ethnicity as potential moderators and also unique risk for Hispanic females who were overweight as children, and who may benefit from early screening and education to delay sexual initiation to reduce risk of early unplanned pregnancy and sexually transmitted infections.

Keywords: childhood obesity; NLSY79; racial/ethnic differences; sexual intercourse; survival analyses

Introduction

According to recent data from the Youth Risk Behavior Surveillance Survey (YRBSS), a cross-sectional, nationally representative sample of US high school students,¹ over 41% of high school students have had sexual intercourse (hereafter referred to as *sex*). Approximately 24% of students report having sex by ninth grade, with 4% reporting first sex before age 13. Although sexual behavior is increasingly normative over the course of adolescence, negative consequences of early sex are well documented and include decreased likelihood of condom use at first and subsequent sex, which in turn increases risk of early and unintended pregnancy and contraction of sexually transmitted infections (STI).²⁻⁴

Identifying risk factors for early-onset sex is important to inform targeted prevention programs aimed at delaying

sexual onset. One potential risk factor to receive increasing attention is obesity.⁵⁻⁷ Of the handful of published studies linking obesity with timing of first sex, two utilized data from YRBSS, both of which conducted logistic regression to examine associations between current weight status and early-onset sex, defined as sex before age 13. In the 2005 YRBSS, Akers et al. found that females who were overweight or obese (analyzed jointly as “obese/overweight”) were at increased risk of early sex when pooling across racial/ethnic group, relative to females coded as having healthy weight.⁵ When examined separately by race/ethnicity, Hispanic females who were overweight/obese were at increased risk of early sex, compared with Hispanic females with healthy weight. Associations between weight status and early sex were nonsignificant for non-Hispanic white and black females.

In a second study, Sanderson, Desai, and White analyzed data from the 2011 YRBSS.⁶ Sanderson et al. observed that

¹Department of Counseling and Educational Psychology, Indiana University, Bloomington, IN.

²Department of Psychiatry, Midwest Alcoholism Research Center, Washington University School of Medicine, St. Louis, MO.

females who were obese (but not overweight) were at increased risk of early sex, relative to peers with healthy weight, with no significant associations found among males. When examined separately by race/ethnicity, neither overweight nor obese statuses were associated with early sex among females; however, white males who were obese and Hispanic males who were overweight were at increased risk of early sex relative to peers of the same race/ethnicity with healthy weight.

Findings from cross-sectional studies just reviewed suggest that adolescents of unhealthy weight status may be at increased risk of very early sex and highlight both sex and race/ethnicity as potential moderators of observed risk. However, few longitudinal analyses have been conducted where temporal primacy of weight status relative to first sex can be achieved, leaving open the question of whether unhealthy weight status predicted or was consequent to sexual onset. To date, two longitudinal studies have been published,^{7,8} both using survival analysis to examine associations between weight status and timing of first sex using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), a nationally representative sample of US students first assessed in grades 7 through 12 in 1994–95.⁹ Use of survival analysis is particularly advantageous when predicting early-onset behavior because timing of the behavior can be examined in addition to its occurrence by a certain age.

In the first longitudinal analysis, Cheng and Landale predicted age at first sex as a function of adolescent weight status, examining associations between weight status at Wave II, when respondents were aged 13–21, and subsequent sexual initiation retrospectively reported in Wave III, when respondents were aged 18–25.⁷ To ensure temporal precedence of weight status, respondents who initiated sex before Wave II were excluded from analyses, potentially excluding respondents at the greatest risk of earlier sex. Pooling across sex and racial/ethnic group, individuals who were obese (but not overweight) reported *delayed* sexual initiation through adolescence into young adulthood, relative to peers with healthy weight. Analyses were not conducted separately by race/ethnicity nor by respondent sex.

In a second study, drawing data from Add Health Wave I (when respondents were ages 11–18) and Wave III, Cheng and Landale investigated associations among weight status, subsequent sexual initiation, and the role of social relationship characteristics, including feelings of social marginalization, popularity as measured by friendship nominations, time spent with peers, and ever having a romantic relationship.⁸ Cheng and Landale found that obesity (but not overweight status) likewise predicted delayed sexual initiation between Wave I and Wave III. In analyses stratified by respondent sex, females who were obese or overweight were at reduced risk of sexual initiation. Among males, associations with obese or overweight statuses were nonsignificant. In analyses stratified by race/ethnicity, but not respondent sex, white adolescents who were obese were at reduced risk of sexual initiation. Social relationship characteristics were

modeled in analyses where a significant association was observed; in all of these models, neither obesity nor overweight status remained predictive.

Although adolescents who are overweight or obese may be more likely to have sex during the early teen years, findings from Add Health suggest an overall pattern of delayed sex when weight-related risk is examined over the course of adolescence into young adulthood. Our goal in the present study was to examine this latter possibility in an independent sample, modeling childhood as opposed to adolescent weight status. Weight status is relatively stable from childhood through adolescence,¹⁰ however, prediction from younger ages ensures for the majority of adolescents that weight status predates first sex without need to exclude early initiators. To examine the roles of both sex and race/ethnicity, we also tested for differences among Hispanic, black, and white females and males, further extending previous research.

Method

Participants

Data were drawn from Children of the National Longitudinal Survey of Youth 1979 (CNLSY).¹¹ The original NLSY79 cohort is a large, nationally representative sample of 12,686 females and males, aged 14–22 when initially surveyed.¹² NLSY79 interviews were conducted annually through 1994 and biennially since 1996. Biennial assessments of the biological children of the female participants began in 1986. By 2012, a total of 11,512 offspring had participated in at least one of 14 waves of CNLSY. Present analyses were limited to offspring aged 13 or older, when assessment of sexual initiation commenced. Of 8362 offspring aged 13 or older as of 2012, 6379 (76%) had data available to code age at sexual initiation and weight status at age 7/8, including 1352 Hispanic (636 female, 716 male), 2030 non-Hispanic black (black; 1030 female, 1000 male), and 2997 non-Hispanic, nonblack (predominantly white; 1473 female, 1524 male) offspring, who compose our final sample. Sample characteristics are summarized in Table 1. Institutional Review Board approval was not needed for this study because analyses were limited to publicly available de-identified secondary data.

Measures

Onset of sexual intercourse. History of sexual intercourse and age at first sexual intercourse were assessed by self-report as part of the Child Self-Administered Supplement and the Young Adult Self-Report surveys. From these measures, onset of sexual intercourse was coded, with virgins censored at age at last assessment.

Childhood weight status. Offspring height and weight were assessed as part of Mother Supplement and Child Supplement surveys, administered biennially through offspring age 14. BMI was calculated at age 7 or age 8, predating pubertal onset for the majority of children. Mother's report was analyzed for ~13% of the offspring whose

Table 1. Descriptive Statistics, Separately by Offspring Sex and Racial/Ethnic Group

	Female			Male		
	Hispanic, n = 636	Black, n = 1030	White/other, n = 1473	Hispanic, n = 716	Black, n = 1000	White/other, n = 1524
Age at last interview, M (SD)	25.02 (4.83)	25.90 (4.69)	24.00 (4.83)	24.96 (4.65)	25.36 (4.83)	23.61 (4.85)
Sexual intercourse						
Ever sex, n (%)	491 (77.20)	909 (88.25)	1055 (71.62)	607 (84.78)	906 (90.60)	1141 (74.87)
Age at onset, M (SD)	16.11 (2.69)	15.74 (2.76)	16.30 (2.54) ^{a,b}	15.46 (2.87) ^{c,d}	14.22 (3.13) ^d	16.30 (2.58) ^{a,b}
Childhood weight status, n (%)						
Obese	102 (16.04)	215 (20.87) ^e	153 (10.39) ^{a,b}	128 (17.88)	167 (16.70) ^f	214 (14.04) ^{a,d}
Overweight	93 (14.62)	136 (13.20)	193 (13.10)	92 (12.85)	138 (13.80)	203 (13.32)
Healthy	368 (57.86)	571 (55.44)	971 (65.92)	412 (57.54)	603 (60.30)	949 (62.27)
Underweight	73 (11.48)	108 (10.49)	156 (10.59)	84 (11.73)	92 (9.20)	158 (10.37)
Maternal education, n (%)						
No HS diploma	270 (42.65)	327 (31.81)	269 (18.34)	304 (42.76)	307 (30.70)	282 (18.57)
HS diploma	176 (27.80)	336 (32.69)	565 (38.51)	234 (32.91)	346 (34.60)	570 (37.53)
Postsecondary	187 (29.54)	365 (35.51)	633 (43.15)	173 (24.33)	346 (34.60)	667 (43.91)
Maternal age at first birth, n (%)						
<Age 20	293 (46.07)	547 (53.11)	342 (23.22)	309 (43.16)	526 (52.60)	356 (23.36)
Age 20–24	213 (33.49)	343 (33.30)	531 (36.05)	290 (40.50)	332 (33.20)	553 (36.29)
>Age 24	130 (20.44)	140 (13.59)	600 (40.73)	117 (16.34)	142 (14.20)	615 (40.35)
Family structure, n (%)						
Family intact	404 (63.52)	363 (35.24)	1050 (71.28)	438 (61.17)	347 (34.70)	1145 (75.13)
Family disruption	232 (36.48)	667 (64.18)	423 (28.72)	278 (38.83)	653 (65.30)	379 (24.87)

^aWithin sex, Hispanic > White, $p < 0.05$.^bWithin sex, black > white, $p < 0.05$.^cAcross race/ethnicity, male > female, $p < 0.05$.^dWithin race/ethnicity, male > female, $p < 0.05$.^eWithin sex, black > Hispanic, $p < 0.05$.^fWithin race/ethnicity, female > male, $p < 0.05$.

HS, high school.

height and/or weight were not directly assessed. Age- and sex-specific BMI percentiles were based on CDC 2000 growth charts.¹³ Consistent with CDC designation,¹⁴ three dummy variables were coded for children who were obese (whose BMI was at/above 95th percentile for age and sex), overweight (BMI at/above 85th and below 95th percentiles for age and sex) and underweight (BMI below the 5th percentile for age and sex), with children who were healthy weight (at/above 5th and below 85th percentiles for age and sex) comprising the reference group.

Control variables. Sociodemographic characteristics assessed at age 7 or 8 were modeled as control variables in covariate-adjusted analyses. Control variables were se-

lected for consistency with previous research, following review of the literature. Dummy variables for maternal age at first childbirth were coded, including childbirth before age 20 and after age 24, with mothers giving birth between ages 20 and 24 comprising the reference group. Dummy variables were also coded for maternal education, comparing mothers who did not graduate from high school and mothers completing any college, relative to mothers completing high school only. Because family disruption has been identified as a risk factor for both sexual initiation¹⁵ and childhood obesity,¹⁶ additional dummy variables were coded for offspring residing with one or neither biological parent at age 7/8 in reference to offspring residing with both parents.

Analytic Strategy

Survival models were estimated in STATA version 13.¹⁷ As is customary in survival analysis, noninitiators (virgins) were censored as of age at last assessment. As part of preliminary analyses, cumulative failure curves of timing of sexual initiation were estimated using the Kaplan–Meier survivor function,¹⁸ with log-rank tests of differences by sex and race/ethnicity. Multinomial logistic regression was used for tests of differences in weight status. To examine age at first sexual intercourse as a function of childhood weight status, Cox proportional hazards (PH) regression¹⁹ models were estimated first without and then with adjustment for sociodemographic characteristics. Cox models were initially estimated separately for Hispanic, black, and white females and males. To test if the association between weight status and timing of first sex differed by respondent sex and race/ethnicity, interactions between weight status and respondent sex and between weight status and race/ethnicity were modeled in subsidiary analyses. Three-way interactions were also modeled to test for differences as a function of both respondent sex and race/ethnicity. For tests of interactions, respondent sex was modeled as a dummy variable with males comprising the reference group. The Huber–White robust variance estimator was used to adjust for nonindependence of sibling data, with the Efron approximation applied for survival ties.²⁰ To examine potential violations of the PH assumption, the Grambsch and Therneau test of Schoenfeld residuals was used.²¹ PH violations indicate that the association between weight status and sexual onset

varies for different age or “risk periods.” To address PH violations, age-interactions were computed and modeled.²²

Results

Preliminary Analyses

Significant differences by respondent sex and racial/ethnic group in sexual onset and weight status at age 7/8 were observed. As presented in Table 1, relative to males, delayed sex was observed for females when pooling across racial/ethnic group and for both Hispanic females and black females when examined separately by race/ethnicity. Relative to white females, earlier sex was observed for Hispanic and black females. Relative to white males, earlier sex was observed for Hispanic and black males. In addition, among black youth, proportionally more females were obese at ages 7/8 compared with males, whereas proportionally more white males were obese at ages 7/8 relative to white females. Proportionally more black females were obese at ages 7/8 compared with both white and Hispanic females, and Hispanic females were more likely to be obese at ages 7/8 than white females. Proportionally more Hispanic males were obese at ages 7/8 compared with white males.

Cox Regression Analyses

Results of Cox analyses predicting age of first sex from childhood weight status are presented in Tables 2 and 3 for females and males, respectively, separately by race/

Table 2. Hazard Ratios (and 95% Confidence Intervals) from Models Predicting Age of Sexual Initiation from Childhood Weight Status among Females, Separately by Race/Ethnicity

Predictor (risk period)	Hispanic, n = 636		Black, n = 1030		White/other, n = 1473	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Weight status						
Obese	1.01 (0.81–1.26)	1.00 (0.80–1.26)	0.97 (0.83–1.13)	0.99 (0.85–1.16)	0.90 (0.74–1.09)	0.87 (0.71–1.07)
Overweight	1.40 (1.14–1.73)	1.34 (1.07–1.68)	1.08 (0.91–1.27)	1.09 (0.92–1.30)	0.98 (0.84–1.15)	0.96 (0.82–1.13)
Healthy	I	I	I	I	I	I
Underweight	0.95 (0.75–1.21)	0.95 (0.74–1.22)	1.12 (0.94–1.34)	1.11 (0.93–1.32)	0.97 (0.80–1.17)	0.96 (0.80–1.15)
Maternal education						
No HS diploma (<14)		⌈ 1.04 (0.83–1.29)		⌈ 1.11 (0.95–1.30)		1.93 (1.39–2.68)
No HS diploma (≥14)		⌊		⌊		0.90 (0.73–1.11)
Postsecondary		0.93 (0.75–1.15)		1.02 (0.88–1.19)		0.76 (0.66–0.87)
Maternal age at birth						
<Age 20 (<14)		2.11 (1.40–3.20)		⌈ 1.34 (1.16–1.54)		2.02 (1.46–2.79)
<Age 20 (≥14)		1.03 (0.84–1.28)		⌊		1.17 (0.98–1.39)
>Age 24		0.76 (0.62–0.94)		0.80 (0.65–0.98)		0.78 (0.67–0.90)
Family disruption		1.60 (1.35–1.89)		1.22 (1.07–1.39)		1.35 (1.18–1.55)

Where brackets are shown, reported risk is equivalent across risk periods (age in years).

HS, high school.

Table 3. Hazard Ratios (and 95% Confidence Intervals) from Models Predicting Age of Sexual Initiation from Childhood Weight Status among Males, Separately by Race/Ethnicity

Predictor (risk period)	Hispanic, <i>n</i> = 716		Black, <i>n</i> = 1000		White/other, <i>n</i> = 1524	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Weight status						
Obese	0.92 (0.75–1.13)	0.92 (0.74–1.14)	0.85 (0.72–1.01)	0.85 (0.72–1.01)	0.84 (0.71–0.99)	0.79 (0.67–0.94)
Overweight	1.02 (0.81–1.29)	1.04 (0.82–1.32)	1.01 (0.85–1.19)	1.00 (0.83–1.20)	1.01 (0.86–1.19)	1.00 (0.85–1.17)
Healthy	I	I	I	I	I	I
Underweight (<13)	0.32 (0.12–0.85)	⊥	⊥	⊥	⊥	⊥
Underweight (≥13)	0.91 (0.74–1.12)	0.79 (0.64–0.87) ⊥	0.93 (0.78–1.10) ⊥	0.92 (0.77–1.10) ⊥	1.04 (0.88–1.23) ⊥	1.01 (0.85–1.19) ⊥
Maternal education						
No HS diploma (<13)		⊥ 1.04 (0.86–1.27)		1.45 (1.15–1.83)		1.72 (1.14–2.58)
No HS diploma (≥13)		⊥		0.93 (0.77–1.11)		1.09 (0.90–1.31)
Postsecondary		0.83 (0.68–1.01)		1.02 (0.88–1.18)		0.83 (0.72–0.95)
Maternal age at birth						
<Age 20 (<13)		⊥		⊥		1.93 (1.29–2.88)
<Age 20 (≥13)		1.15 (0.96–1.37) ⊥		1.22 (1.07–1.40) ⊥		1.28 (1.08–1.51)
>Age 24		0.88 (0.71–1.10)		0.68 (0.56–0.83)		0.79 (0.68–0.91)
Family disruption (<13)		⊥		⊥		2.57 (1.75–3.79)
Family disruption (≥13)		1.46 (1.25–1.71) ⊥		1.30 (1.13–1.48) ⊥		1.14 (0.99–1.32)

Where brackets are shown, reported risk is equivalent across risk periods (age in years).

HS, high school.

ethnicity. (Results pooling across racial/ethnic group are shown in Supplementary Tables S1 and S2 for females and males, respectively; Supplementary Data are available online at www.liebertpub.com/chi). Results from Cox models are presented as hazard ratios (HR). Similar to an Odds Ratio, a HR greater than 1 indicates an increased likelihood of sex or *earlier* first sex associated with a given weight status relative to healthy weight peers, and HR less than 1 indicates a reduced likelihood of sex or *delayed* first sex. HR equal to 1 indicates no difference in rate or timing of first sex.

As presented in Table 2, among Hispanic females, overweight status was associated with a 40% increased likelihood of sexual initiation relative to healthy weight status. In analyses controlling for maternal age at first birth, maternal education, and family disruption, overweight status predicted a 34% increased likelihood of sexual initiation among Hispanic females, relative to healthy weight status. Associations between weight status and timing of first sex were nonsignificant among black and white females. As shown in Table 3, among Hispanic males, underweight status predicted a 68% decreased likelihood of sexual initiation through age 12, relative to healthy weight status; in adjusted analyses, underweight status was associated with a 21% decreased likelihood of sexual initiation

across risk period. Among white males, obesity status was associated with 16% and 21% decreased likelihood of sexual initiation in unadjusted and adjusted analyses, respectively. Weight status was not significantly predictive of timing of first sex among black males.

In subsidiary analyses, interactions between weight status and respondent sex were nonsignificant, with a single significant interaction between weight status and racial/ethnic group: compared with peers coded as having healthy weight, overweight status predicted earlier sexual initiation among Hispanic relative to white females in both unadjusted [HR = 1.42 (95%CI: 1.09–1.85)] and adjusted analyses [HR = 1.38 (95%CI: 1.05–1.80)]; this interaction was further moderated by respondent sex [unadjusted HR = 1.25 (95%CI: 1.02–1.53); adjusted analyses HR = 1.12 (95%CI: 1.01–1.26)].

Discussion

The primary aim of this study was to examine longitudinal associations between weight status during childhood and timing of first sex, while taking into consideration respondent sex and race/ethnicity. To ensure temporal primacy of weight status among respondents who experienced very early sex, we

predicted sexual onset from weight status during childhood as opposed to adolescence. To our knowledge, this is the first study to examine childhood weight status as a predictor of first sex, and the first to conduct formal tests of differences between females and males of different racial/ethnic groups within a survival-analytic framework.

Although associations between weight status during childhood and sexual onset were generally modest, differential patterns of risk emerged for Hispanic, black, and white females and males specific to certain weight statuses. Overweight (but not obese) status predicted earlier age at first sex among Hispanic females, whereas obese (but not overweight) status predicted delayed first sex among white males, both relative to peers of the same race/ethnicity with healthy weight. Underweight status, largely ignored in previous research, predicted delayed first sex among Hispanic males.

Our finding that Hispanic females who were overweight were at increased risk of earlier sexual onset is consistent with cross-sectional findings reported by Akers et al.⁵ However, findings contrast with previous longitudinal reports of delayed sexual initiation among adolescents who were obese or overweight,⁷ especially white females who were obese.⁸ There are a number of reasons why our results might differ from previously published analyses, notably, methodological differences. Again, we examined sexual onset as a function of childhood weight status to ensure that for the majority of respondents, weight status was assessed before sexual onset (c.f., Refs.^{5,6}), while retaining in our sample individuals reporting very early sexual initiation (c.f., Refs.^{7,8}). We also stratified analyses by *both* sex and race/ethnicity to examine subgroup variations, unlike previous studies.

Evidence of potential moderation by sex and race/ethnicity in the context of increased methodological precision underscores the need for future research to consider such differences and to avoid extrapolation across females and males from diverse racial/ethnic groups. For example, we found a significant interaction between overweight status and race/ethnicity among females, with a significant three-way interaction among overweight status, respondent sex, and race/ethnicity also observed, suggesting further increased risk of early sex among Hispanic females who were overweight relative to other groups, female and male.

Although underlying mechanisms are unknown, recent research suggests that children who are overweight or obese report increased levels of peer stigmatization^{23,24} and weight-based stigma has been linked to lowered self-esteem, especially among females.^{23,25} Thus, lowered self-esteem as a function of peer stigma may explain, at least in part, observed associations between weight status and timing of first sex. In addition, pubertal timing, which is associated with both weight status and sexual onset, may also play an important role in observed associations.²⁶ For instance, obesity in childhood has been linked to earlier pubertal onset among females,²⁷ and early puberty has been associated with increased sexual behavior.²⁸ The potential role of pubertal timing will be the focus of follow-up studies.

It may also be that among Hispanic females especially, overweight status in childhood is related to a broad category

of risk behaviors that includes early sexual initiation, as previous work has also linked childhood overweight status among Hispanic females to earlier use of alcohol and marijuana.²⁹ Sociocultural attitudes regarding health behavior may help to explain why childhood overweight status among Hispanic females, but not other groups, potentially increases risk behaviors in adolescence. In the United States, levels of acculturation have been positively linked to childhood obesity and sexual initiation among Hispanic adolescents.^{30,31} Recent research suggests that relative to less assimilated peers, Hispanic females who are more assimilated to US culture are more likely to participate in risky sexual behaviors, including earlier sexual onset.^{30,32} Relative to males, the impact of acculturation may be more pronounced for Hispanic females for a host of risk behaviors, including teen pregnancy and adolescent substance use.³³

While the present study has several strengths and answers a call for increased replication of previously published findings,³⁴ there are important limitations which should be noted. Our measure of weight status was limited to a single assessment of height and weight. The literature on the relationship between weight status and sexual onset may be advanced by examining changes in weight status over the course of childhood and adolescence and their relationship to first sex. We also did not examine the role of self or parent perception of child's weight status nor potential stigma associated with being overweight or obese.³⁵ Unfortunately, these measures are not available in NLSY79 dataset. In addition, differences *within* racial/ethnic groups were not addressed. This is particularly important for Hispanic youth whose risk of obesity and of sexual onset may vary as a function of both nativity and acculturation.

In conclusion, our study contributes to a recent but growing literature documenting associations between weight status and sexual risk. Health educators are advised to consider both respondent sex and race/ethnicity when developing prevention and intervention strategies aimed at delaying sexual onset in the service of reducing early unintended pregnancy and STI. Although we are hesitant to draw broader implications for preventative efforts beyond those for Hispanic females, earlier sexual initiation among Hispanic females who were overweight as children is concerning as Hispanics represent the fastest growing minority group in the United States.³⁶ Hispanic females who were overweight as children may especially benefit from early screening and education with the goal of delaying sexual initiation.

Acknowledgments

All individuals who contributed significantly to the research reported in this publication are included as authors.

Author Disclosure Statement

No competing financial interests exist.

The content of this report is solely the responsibility of the authors.

References

- Kann L, McManus T, Harris W, et al. Youth risk behavior surveillance—United States, 2015. *MMWR Surveill Summ* 2016;65:1–174.
- Coker AL, Richter DL, Valois RF, et al. Correlates and consequences of early initiation of sexual intercourse. *J Sch Health* 1994;64:372.
- Sandfort TG, Orr M, Hirsch JS, et al. Long-term health correlates of timing of sexual debut: Results from a national US study. *Am J Public Health* 2008;98:155–161.
- Finer LB, Philbin JM. Sexual initiation, contraceptive use, and pregnancy among young adolescents. *Pediatrics* 2013;131:886–891.
- Akers AY, Lynch CP, Gold MA, et al. Exploring the relationship among weight, race, and sexual behaviors among girls. *Pediatrics* 2009;124:e913–e920.
- Sanderson JM, Desai MM, White MA. The influence of race in the association between weight status and risk behaviors among adolescents. *Am J Health Educ* 2015;46:255–265.
- Cheng YA, Landale NS. Teen overweight, weight stigma, and intimate relationship development from adolescence to young adulthood. Max Planck Institute for Demographic Research Working Paper 2010 (2010-008), Rostock, Germany.
- Cheng YA, Landale NS. Adolescent overweight, social relationships and the transition to first sex: Gender and racial variations. *Perspect Sex Reprod Health* 2011;43:6–15.
- Harris KM. The Add Health Study: Design and Accomplishments. Carolina Population Center, University of North Carolina at Chapel Hill: Chapel Hill, 2013.
- Cunningham SA, Kramer MR, Narayan KV. Incidence of childhood obesity in the United States. *N Engl J Med* 2014;370:403–411.
- Bureau of Labor Statistics, United States Department of Labor, Children of the National Longitudinal Survey of Youth 1979, 1979–2014 [computer file]. Center for Human Resource Research, The Ohio State University: Columbus, OH, 2014.
- Bureau of Labor Statistics, United States Department of Labor, National Longitudinal Survey of Youth 1979 cohort, 1979–2014 (rounds 1–25) [computer file]. Center for Human Resource Research, The Ohio State University: Columbus, OH, 2014.
- Kuczmarski RJ, Ogden CL, Guo SS, et al. 2000 CDC growth charts for the United States: Methods and development. *Vital Health Statistics* 2002;11:1–190.
- CDC. A SAS Program for the CDC Growth Charts. CDC: Atlanta, GA, 2002.
- Santelli JS, Lowry R, Brener ND, et al. The association of sexual behaviors with socioeconomic status, family structure, and race/ethnicity among US adolescents. *Am J Public Health* 2000;90:1582.
- Chen AY, Escarce JJ. Family structure and childhood obesity, early childhood longitudinal study—Kindergarten cohort. *Prev Chronic Dis* 2010;7:A50.
- StataCorp. Stata Statistical Software: Release 13. StataCorp LP: College Station, TX, 2013.
- Kaplan EL, Meier P. Nonparametric estimation from incomplete observations. *J Am Stat Assoc* 1958;53:457–481.
- Cox DR. Regression models and life-tables. *J R Stat Soc Series B Methodol* 1972;34:187–220.
- Efron B. The efficiency of Cox's likelihood function for censored data. *J Am Stat Assoc* 1977;72:557–565.
- Grambsch PM, Therneau TM. Proportional hazards tests and diagnostics based on weighted residuals. *Biometrika* 1994;81:515–526.
- Cleves M, Gould W, Gutierrez R., et al. *An Introduction to Survival Analysis Using Stata*. Stata Press: College Station, TX, 2008.
- Gray L, Leyland AH. Overweight status and psychological well-being in adolescent boys and girls: A multilevel analysis. *Eur J Public Health* 2008;18:616–621.
- Puhl R, Latner J. Stigma, obesity, and the health of the nation's children. *PsyB* 2007;133:557.
- Strauss RS. Childhood obesity and self-esteem. *Pediatrics* 2000;105:e15–e15.
- James J, Ellis BJ, Schlomer GL, et al. Sex-specific pathways to early puberty, sexual debut, and sexual risk taking: Tests of an integrated evolutionary–developmental model. *Dev Psychol* 2012;48:687.
- Ahmed ML, Ong KK, Dunger DB. Childhood obesity and the timing of puberty. *Trends Endocrinol Metab* 2009;20:237–242.
- Negriff S, Susman EJ, Trickett PK. The developmental pathway from pubertal timing to delinquency and sexual activity from early to late adolescence. *J Youth Adolesc* 2011;40:1343–1356.
- Duckworth JC, Doran KA, Waldron M. Childhood weight status and timing of first substance use in an ethnically diverse sample. *Drug Alcohol Depend* 2016;164:172–178.
- Afable-Munsuz A, Brindis CD. Acculturation and the sexual and reproductive health of Latino youth in the United States: A literature review. *Perspect Sex Reprod Health* 2006;38:208–219.
- Caprio S, Daniels SR, Drewnowski A, et al. Influence of race, ethnicity, and culture on childhood obesity: Implications for prevention and treatment a consensus statement of shaping America's health and the obesity society. *Diabetes Care* 2008;31:2211–2221.
- Schuster C. Latina adolescent health. Issues at a Glance. Washington, DC: Advocates for Youth. Retrieved June 2003, 21: p. 2009.
- Lara M, Gamboa C, Kahramanian MI, et al. Acculturation and Latino health in the United States: A review of the literature and its sociopolitical context. *Annu Rev Publ Health* 2005;26:367–397.
- Nosek BA, Spies JR, Motyl M. Scientific utopia II. Restructuring incentives and practices to promote truth over publishability. *Perspect Psychol Sci* 2012;7:615–631.
- Robinson E, Sutin AR. Parents' perceptions of their children as overweight and children's weight concerns and weight gain. *Psychol Sci* 2017;28:320–329.
- Ennis SR, Ríos-Vargas M, Albert NG. The Hispanic Population: 2010. US Department of Commerce, Economics and Statistics Administration, US Census Bureau, Washington, DC, 2011.

Address correspondence to:

Mary Waldron, PhD

Department of Counseling and Educational Psychology

Indiana University

201 N. Rose Avenue

Bloomington, IN 47405-1006

E-mail: mwaldron@indiana.edu