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CHAPTER

28 Perinatal Experiences of Adolescent Mothers

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Abstract

The United States has one of the highest rates of teen pregnancy in the developed world. Pregnancy and parenting prior to age 20 are associated with compromised biopsychosocial outcomes for the mother, the fetus, and the future child—though the strong coupling of poverty and early pregnancy indicate that these outcomes may not be uniquely attributable to maternal age. This chapter reviews psychological as well as biological factors associated with risk for adolescent pregnancy, such as the potential correlation between conduct disorder and pregnancy, as well as data suggesting that environmental factors as varied as exposure to endocrine disruptors and psychosocial stress may contribute to the earlier onset of puberty, sexual activity, and, ultimately, conception. Pregnancy outcomes for both the mother and the child are reviewed, as well as what is known about mental health status in pregnant and parenting teenagers. This chapter covers the importance of social support for this population and the treatment of perinatal psychopathology in childbearing adolescents.

Keywords: [adolescents](#), [pregnancy](#), [parenting](#), [puberty](#), [maturation](#), [neonatal outcomes](#), [depression](#), [conduct disorder](#), [intervention](#)

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In the United States, about 500,000 adolescent girls (15–19 years of age) give birth each year—one of the highest rates in the developed world (Darroch, 2001; Hamilton, 2010). There may be adverse consequences of adolescent pregnancy for the adolescent mother, the baby, the family, and the community. Some of the adverse consequences stem from unique factors related to adolescent pregnancy and parenting, such as the competing biological demands of a maturing body and developing fetus and the tension between achieving the developmental tasks of pregnancy, mothering, and adolescence. Other consequences result from the context of the perinatal experience that is often beset by specific social conditions, such as poverty during pregnancy and higher rates of depression (Hobfoll, Ritter, Lavin, Hulsizer, & Cameron, 1995). Adolescent pregnancy and parenting are not randomly distributed; instead, they are variously associated with specific

demographic and psychosocial circumstances that may impact adolescent pregnancy outcomes and parenting more than the fact of adolescent pregnancy per se (Darroch, 2001; Felice et al., 1999).

In what follows, we characterize adolescents who become pregnant, describe risk factors for adolescent pregnancy and adverse birth outcomes associated with adolescent pregnancy, discuss conditions specific to adolescent mothers, and explain the importance of social support for this population. We give special attention to mental health issues in the maternal population, considered in the context of a developmental perspective and the special psychological demands of this adolescent period. The phenomenon and characteristics of adolescent pregnancy also are examined in light of recent biological models that help explain teenage pregnancy and its outcomes, such as the role of endocrine disruptors in early menarche and risk for early pregnancy, as well as the challenges of supporting a developing fetus in a maturing body. We conclude with a section on the assessment and treatment of perinatal psychopathology in childbearing adolescents, in particular describing CenteringPregnancy, which delivers obstetrical care to adolescents in a group format and shows significant improvements in maternal and child medical and mental health outcomes. We end the chapter with recommendations for further research.

Table 28.1 Birth and Abortion Rates by Race and Ethnicity and Age

Race/Ethnicity	Teen birth rate (per 1,000)	Teen abortion rate (per 1,000)	Live teen births (recent year)
Non-Hispanic White	32	15	204,056
Black	77	55	118,954
Hispanic	87	30	129,469
Age (race/ethnicity grouped together)			
14 and younger	3.6	3.9	
15–17	23.2	13.1	
18–19	72.8	34.8	

Source: U.S. teenage pregnancy statistics: National and state trends and trends by race and ethnicity, 2006

The Pregnant Adolescent

Pregnant adolescents, compared to non-childbearing adolescents, are more likely to be raised in poverty, to be members of a racial ethnic minority group (African American or Hispanic), to have had fewer educational resources in the home, and to live in an urban area with a female-headed household (Oxford, 2010; Wahn, Nissen, & Ahlberg, 2005). However, these adolescents are not a homogenous group but are diverse by age and ethnicity (Reis, 2001; see Table 28.1). Interestingly, it has been reported that 15% of all adolescent pregnancies are planned (Montgomery, Ehlin, & Sacker, 2006).

Predictors of Adolescent Pregnancy

In this section, we present a broad review of the separate literatures on psychosocial and biological predictors of adolescent pregnancy.

Psychosocial Predictors of Teenage Pregnancy

According to Bronfenbrenner's Ecological Systems Theory (Bronfenbrenner, 1979), behavior is reciprocally influenced by multiple domains, including individual, family, peer, school, and community (Zweig, Phillips, & Lindberg, 2002), and examining risk factors in isolation from one another can obscure understanding of the mechanisms that influence the outcome of interest, in this case teenage pregnancy. The vast literature on risk factors for teenage pregnancy in general supports an ecological approach (Kotchick, Shaffer, Forehand, & Miller, 2001; Luster & Small, 1994; Meade & Ickovics, 2005; Miller, Benson, & Galbraith, 2001). At the individual level, risk factors for teenage pregnancy include substance use, lack of knowledge about or resistance to contraceptive use, early pubertal maturation, low motivation for academic achievement, lower intelligence, and school dropout (e.g., Devine, Long, & Forehand, 1993; Hardy, Astone, Brooks-Gunn, Shapiro, & Miller, 1998; Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001; Manlove, 1997; Miller-Johnson et al., 1999).

In terms of mental health factors, sexual promiscuity and precocity have been associated particularly with conduct disorder (CD) and aggressive behavior in adolescent females (Kovacs, Krol, & Voti, 1994; Miller-Johnson et al., 1999). For example, in a clinic sample of 83 pre-adolescent females, Kovacs et al. (1994) reported that approximately 55% girls with CD became pregnant during adolescence, compared with only 12% of girls with other psychiatric diagnoses. Using prospectively gathered data from the Pittsburgh Girls Study (PGS) spanning ages 11–18 years, Hipwell (2011) demonstrated that younger age of adolescent pregnancy is predicted by severity of conduct problems during early adolescence. Thus, after controlling for the effects of race, poverty, and living in a single-parent household, the results of a Cox regression survival analysis revealed that CD severity predicted earlier time to pregnancy (adjusted odds ratio [OR] = 1.38; 95% confidence interval [CI] = 1.04–1.82, $\Delta\chi^2[1] = 4.79, p < .05$), with the peak “hazard” occurring at age 15 years.

In contrast to converging reports that CD predicts teenage pregnancy, evidence for depression as a risk factor for teenage pregnancy is equivocal. It has been postulated that depressed girls may engage in risky sexual behavior to seek intimacy or to fend off social isolation (Kovacs et al., 1994). Empirical support for this notion is mixed, with some research showing that psychological distress (DiClemente et al., 2001), low self-esteem (Spencer, Zimet, Aalsma, & Orr, 2002), and depressive symptoms (Whitbeck, Conger, Simons, & Kao, 1993) predict early sexual behaviors, and others reporting no relation between depressed mood and early-onset sexual intercourse (Whitbeck et al., 1993). Similarly, no prospective relation between the severity of depressed mood and the likelihood of teenage pregnancy was revealed using PGS data collected annually between ages 11 and 18 years (Hipwell, 2011). Again, after controlling for socioeconomic status, severity of depressed mood was not associated with time to teenage pregnancy in this urban population sample of African-American and European-American girls (adjusted OR = ns, $\Delta\chi^2[1] = 0.08, ns$).

Family factors, such as poor parent-child relationship quality, harsh/inconsistent disciplining, low intrafamilial support, sexual and physical abuse, and single-parent households, have also been shown to be consistent risk factors for pregnancy (Franklin, Corcoran, & Harris, 2004; Hardy et al., 1998; Jaffee et al., 2001; Manlove, 1997; Talashek, Alba, & Patel, 2006). In addition, research across different samples has consistently documented that being born to a teenage mother increases the likelihood of teenage parenthood in the offspring (Furstenberg, Levine, & Brooks-Gunn, 1990; Hardy et al., 1998; Jaffee et al., 2001). This intergenerational effect probably reflects greater risk factors for teenage childbearing among these offspring due to the consequences of teenage motherhood that affect both mother and child at the individual (e.g., poorer school performance, more problem behaviors), family (e.g., single-parent household, lower parental monitoring), and environmental (e.g., fewer economic resources, fewer enrichment opportunities) levels. Attitudes toward teenage pregnancy fostered explicitly or implicitly within the family are also likely to be important. For example, daughters of teenage mothers often perceive

a younger ideal age of parenthood, which is itself a predictor of early childbearing (Manlove, 1997; Zabin, Astone, & Emerson, 1993).

Biological Factors Leading to Teenage Pregnancy

Consideration of biological factors in relation to what causes teenage pregnancy means, of course, an examination of biological processes as mediators of the psychosocial factors described previously, as well as the inclusion of additional environmental factors, such as diet and related obesity, that may directly impact the rate of sexual maturation and the likelihood of earlier pregnancy.

First is consideration of the adolescent brain. Research from developmental neuroscience indicates that the typically developing adolescent brain is primed to behave impulsively and to have poor future planning skills associated with highly developed executive functioning. Moreover, adolescents from materially and emotionally impoverished homes, such as those of the majority of pregnant teenagers, likely are deprived of the social situations to facilitate optimal brain development associated with impulse control (Gianaros et al., 2011; Lupien, McEwen, Gunnar, & Heim, 2009). Such psychosocial contexts may contribute to the risk for teenage pregnancy via negative impact on brain development.

Adolescent brains are distinct, both anatomically and neurochemically, from brains of adults or those of children (Dahl, 2004; Spear, 2000; Steinberg et al., 2006). Physiological changes that occur in the brain at the time of adolescence appear to be fairly consistent across species (Giedd et al., 1999; Jernigan, Trauner, Hesselink, & Tallal, 1991; Sowell, Thompson, Holmes, Jernigan, & Toga, 1999; van Eden, Kros, & Uylings, 1991; Zecevic, Bourgeois, & Rakic, 1989). These changes may involve age-specific or puberty-specific changes in the dopamine axis (associated with reward circuitry) and the prefrontal cortex, as well as changes in mesolimbic brain regions (Spear, 2000) and an increase in white matter and a decrease in gray matter (Blakemore & Choudhury, 2006). Recent research shows that puberty-specific developmental changes occur with regard to several different domains, including romantic and sexual interest, emotional intensity, sensation- and reward-seeking behavior, increased appetite, changes in sleep and arousal regulation, and increased risk of affective disorders in females (Giedd et al., 1999; Sowell et al., 1999; Spear, 2000). Although more studies are needed in this area, research indicates that developmental changes in these specific affective domains are more strongly linked with the advent of puberty than with age (Dahl, 2004). Again, given that these specific changes in affect and regulation occur at a stage when brain-based processes of impulse control and future planning are not yet functioning at a fully mature level—perhaps more so for those raised in psychological and material poverty—it is possible to understand teenage sexual behavior and resulting pregnancy in this psychobiological context.

Casey, Jones, and Hare (2008) developed a model of adolescent neurobiological development that is informed by current animal models and recent imaging studies of adolescent brains (Ernst et al., 2005; Galvan et al., 2006) This model takes into account not only the protracted development of the prefrontal cortex, but also the maturation of the subcortical limbic regions that mediate risk-taking and impulsive behavior. They speculated that because the limbic system matures before the prefrontal region, its influence will take dominance over less developed systems (Galvan, Hare, Voss, Glover, & Casey, 2007). Similarly, Dahl frequently compares the adolescent brain to a car without a driver, or with a wildly inexperienced driver (Dahl, 2004), to illustrate that adolescence results in certain aspects of brain development that cause intense emotional experiences, impulses, and desires. At the same time, the self-regulatory processes required to exert self-control, inhibit, and modify behaviors depend on neurobehavioral systems that are among the last regions of the brain to fully develop (Blakemore & Choudhury, 2006).

The timing of sexual maturation impacts the brain, as indicated, and is associated with teen parenting: Earlier sexual maturation is a risk factor for earlier parenting. Thus, what influences the rate of maturation also impacts the likelihood of teenage pregnancy. Recent data indicate that menarche, the first menstrual

cycle in girls, occurs in the United States on average at the age of 12.34 years (Anderson & Must, 2005). Menarche is beginning earlier for the average girl, and frank sexual maturation now dramatically precedes psychosocial maturation for many young women. Research studies with large community samples have linked the following experiences to early menarche: parental separation due to war (Pesonen et al., 2008), periods in the national history with high rates of homicide (Villamor, Chavarro, & Caro, 2009), conflict-prone family environments (Jean et al., 2011), and physical and sexual abuse (Wise, Palmer, Rothman, & Rosenberg, 2009). Overall, multiple psychosocial and environmental factors are seen as contributing to changing biology and the onset of maturation, such as significant psychosocial stressors, exposure to endocrine disruptors, and nutrition (Gluckman & Hanson, 2006).

Some evidence suggests that young girls are beginning puberty at an earlier age, but that it then takes longer to reach full maturation (Nebesio & Pescovitz, 2005). Data for this slower progression include earlier breast development (thelarche), but an atypically late onset of menses (Parent et al., 2003a). Indeed, some argue that puberty is not actually beginning earlier, but instead that early thelarche can be linked to overexposure to environmental estrogenic pollutants or to a redistribution of body fat related to the childhood obesity epidemic (Nebesio & Pescovitz, 2005). The timing of menarche also is influenced by an individual's genetic makeup, which may be affected by inherited genes from the parents, environmentally based gene disruptors, or mutations (Towne et al., 2005). Body mass and birth-weight also appear to be significant physiological factors in determining this timing, as there is a strong link in epidemiological studies between low body mass or low birthweight as a predictor of early menarche (Adair, 2001; Ibanez, Ferrer, Marcos, Hierro, & de Zegher, 2000).

As illustrated earlier, maturation is a complex biological process that is influenced by a range of environmental and socioemotional factors (Quinlan, 2003). Interestingly, different forms of stress do not always result in the same outcomes, and there are competing explanations for whether stress accelerates or inhibits sexual maturation. Various studies have shown that stress related to malnutrition or disease results in the delay of puberty, whereas socioemotional stress accelerates a girl's maturation (Ellis & Garber, 2000; Quinlan, 2003). Evidence suggests that stress causes the body to focus on survival rather than reproduction. This adaptation results in a delay in puberty because the body is not well prepared for the stress of reproduction (Ellis & Garber, 2000). In contrast, there have been several studies linking childhood sexual abuse with changes in pubertal timing. Reports show that those who experience higher rates of sexual abuse are more likely to menstruate early compared to those who have not reported incidents of abuse. Interestingly, this association is not reported in those who have experienced physical abuse (Romans, Martin, Gendall, & Herbison, 2003; Wise et al., 2009).

p. 579 However, the direction of relation between sexual abuse and early menarche has long been debated. That is, researchers have questioned whether girls who develop early are more prone to abuse due to early manifestation of sexual characteristics or whether something about the abuse, such as stress, accelerates sexual development. In a study aimed at addressing this issue, Zabin, Emerson, and Rowland (2005) found a negative association between the age of sexual abuse and the age of menarche, regardless of when the abuse occurred relative to menarche, a finding that implicates a stress effect.

Current literature also has focused on the role of family relationships, divorce, and parental psychopathology on the timing of maturation. Stressful life events, including parental divorce, change in caretakers, and parental psychopathology, play a part in both physical growth and reproductive development (Hulanicka, 1999). A study by Ellis and Garber (2000) demonstrated significant associations between maternal psychopathology, exposure to stepfathers, greater family conflict, and early menses in girls. The scholars suggested that father absence and family conflict are distinct factors contributing to early menstruation. Specifically, there was a significant correlation between child's age when an unrelated father figure first came into the home and the timing of menstruation. However, there was no relation between the age when the biological father moved out and the time of puberty. In addition, these scholars

suggested that the timing of puberty may not necessarily be unidirectional because there were several cases in which maternal psychopathology occurred after the daughter turned 10 years old or paternal conflict/divorce occurred after puberty.

Research also has examined the role of father absence and the exposure to new unrelated men or stepparents on children's maturation. Several studies have shown that girls raised in homes where the biological father is not present reach menarche earlier than girls raised in homes of intact families (Ellis & Garber, 2000; Moffitt, Caspi, Belsky, & Silva, 1992; Quinlan, 2003; Wierson, Long, & Forehand, 1993). Quinlan (2003) found that the timing of parental separation and the number of changes in the caretaking environment predicted age of menarche, age at first voluntary sexual intercourse, and age at first pregnancy. This study demonstrated that girls whose parents separated when the girl was between 0 and 6 months old were twice as likely to have early menarche, two-and-half times more likely to experience early pregnancy, and four times more likely to experience early sexual intercourse compared to girls from intact families. Risk of accelerated development decreased as the number of environmental changes decreased. Parental separation during adolescence was the strongest predictor of the number of sex partners during the teen years.

It should be noted that there are mixed findings regarding the impact of these social factors on early menarche. This is partly due to methodological issues that limit the scope of some studies. For instance, there are many ways to examine reproductive development, including age of initiation of secondary sex characteristics, age at menarche, age at first voluntary sexual intercourse, and age at first pregnancy. Hulanicka (1999) pointed out that even though family stress and father absence impact development, there are other associated environmental influences such as poverty that contribute to family dysfunction and make it difficult to isolate these variables as causative. Moreover, it is unclear whether these psychosocial factors impact maturation similarly to hypothalamic-pituitary-adrenal (HPA) stressors, or if there are unique biological mechanisms associated with father absence/unrelated male presence that impact pubertal timing.

The Biology of Stress Effects on Maturation

The HPA axis is activated when events, such as stress, serve to disrupt homeostasis, and cortisol is a steroidal hormone that is released upon HPA activation. Although stress during development can increase basal levels of cortisol (Levine & Wiener, 1988), in cases of severe abuse or neglect, lower basal levels of cortisol have been found (Gunnar & Donzella, 2002). One possible underlying mechanism involves corticotropin releasing hormone (CRH), the hormone released by the hypothalamus that activates the anterior pituitary along the HPA axis. It is thought that severe stress during development may increase the release of CRH, which, in turn, may prompt the down-regulation of the anterior pituitary, resulting in lower cortisol levels (Fries, Hesse, Hellhammer, & Hellhammer, 2005). Other mechanisms at work may be hypersensitivity of target tissues to cortisol (Yehuda, Yang, Buchsbaum, & Golier, 2006) and regulation of the glucocorticoid receptor (McGowan et al., 2009).

p. 580 Although activation of the HPA axis overall has been linked to suppression of reproduction (Herman et al., 2003), how hypocortisolism during development may link to early menarche is not yet clear. Future research should address the timing of the stressful event relative to menarche. Indeed, in neuroimaging and animal studies, different brain regions appear to be more prone to stress than others, depending on the timing of development (Lupien et al., 2009; Tottenham et al., 2011).

Increased Adiposity and Early Maturation

A vast body of literature has examined the relation between increased childhood and adolescent weight gain and early age of menarche. In recent years, the prevalence of obesity in American youth has been on the rise. During the 6-year period from 1999–2004, the rate of overweight female children and adolescents increased from 13.8% to 16% in the United States (Ogden et al., 2006). Obesity increased from 8.9% to 14.5% among non-Hispanic White girls, from 16.3% to 29.2% among non-Hispanic Black girls, and from 13.4% to 17.4% among Mexican-American girls, from the years 1988–1994 to 2007–2008 (Ogden & Carroll, 2010). Poor nutrition is one contributing factor to the obesity epidemic. Very few American adolescents eat the recommended amounts of fruits and vegetables (Kimmons, Gillespie, Seymour, Serdula, & Blanck, 2009). American children and adolescents (ages 2–18) get most of their energy from grain desserts, pizza, and soda. Forty percent of the energy they consume comes from empty calories (generally defined as the sum of energy from solid fats and added sugars), which greatly exceeds the recommended amount (Reedy & Krebs-Smith, 2010).

Though some research identifies early menarche as predictive of excess weight gain in later adolescence (Bratberg, Nilsen, Holmen, & Vatten, 2007), most of the literature focuses on childhood and adolescent weight gain preceding early menarche. Briefly, because estrogen and progesterone molecules (both are involved in the hormonal cascade contributing to menarche) are derived from cholesterol, which tends to be positively related to weight and body mass index (BMI), higher weight and BMI are viewed as likely precipitants to early maturation. Menarche occurs earlier in adolescent girls with a higher BMI and adiposity (Rosenfield, Lipton, & Drum, 2009). Differences in both BMI and height between girls who subsequently had earlier or later menarche were found as early as 3–6 years old (Salsberry, Reagan, & Pajer, 2009). One study investigated whether increased insulin would lead to higher levels of estradiol, and thereby be predictive of earlier menarche in both African-American and European-American adolescents. Though no relation was found between either insulin or estradiol and early menarche, early menarche was associated with an acceleration of fat deposition in African-American adolescents (Casazza, Goran, & Gower, 2008).

Lower-quality diets have been found to predict earlier puberty in children, independently of body composition preceding puberty (Cheng et al., 2010), and body composition preceding menarche in German girls was related to the age of onset of pubertal stages (Buyken, Karaolis-Danckert, & Remer, 2009). Higher vegetable protein intake in childhood was associated with later menarche, whereas higher animal protein intake was associated with earlier menarche (Gunther, Karaolis-Danckert, Kroke, Remer, & Buyken, 2010). In adolescent girls, early menarche was related to unhealthy body composition; however, birth-weight seemed to be a primary determining factor (Labayen et al., 2009). For more comprehensive reviews, see Ahmed, Ong, and Dunger (2009), describing childhood obesity and its relation to earlier puberty, and Kaplowitz (2008), linking earlier menarche with increases in body fat over the last few decades. In particular, Kaplowitz suggested that a higher BMI preceding puberty predicts earlier menarche, with leptin, a protein hormone that regulates energy intake and expenditure, playing a role in initiating puberty.

African-American and Mexican-American girls are more likely to experience early puberty and menarche than White American girls after adjusting for other variables such as weight and socioeconomic status (Anderson, Dallal, & Must, 2003; Chumlea et al., 2003; Sun et al., 2002; Wu, Mendola, & Buck, 2002). Forty percent of Latina and African-American girls reached menarche before age 12, compared to only 26% of White girls. In a longitudinal study examining American children, childhood poverty was predictive of adolescent obesity, especially in girls. Socioeconomic factors, neighborhood, and parental education were also linked to adolescent obesity, with race being a significant confounder (Lee, Harris, & Gordon-Larsen, 2009). These data suggest that factors leading to early sexual maturity vary with race/ethnicity and socioeconomic status, which indicates that the racial/ethnic differences in teenage pregnancy rates may be

p. 581 influenced, in part, by socioeconomic factors that are quite distinct from the psychosocial ones most commonly believed to govern adolescent sexual activity and pregnancy.

Estrogen Disruptors and Early Maturation

Endocrine disrupting chemicals (EDCs) are environmental toxins that have a negative impact on endocrine systems in human beings and in wildlife (Colborn & Clement, 1992). Several studies have linked EDC exposure to estrogenic, androgenic, anti-androgenic, and antithyroid changes in vertebrates and invertebrates (Crain, Rooney, Orlando, & Guillette, 2000; Guillette & Gunderson, 2001; Gunderson, LeBlanc, & Guillette, 2001; Iguchi, Watanabe, & Katsu, 2001). Commonly implicated contaminants and their sources include hydroxylated polychlorinated biphenyls (Guillette, 2006), diethylstilbestrol (Herbst, Ulfelder, & Poskanzer, 1971), pesticides such as dichlorodiphenyltrichloroethane (Nebesio, & Pescovitz, 2005; Parent et al., 2003b), phytoestrogens found in soy-food products (Nebesio, & Pescovitz, 2005; Strom et al., 2001), and hormone-containing cosmetic products (Tiway, 1998).

Currently, there is little debate about whether endocrine disruption occurs in response to EDC exposure. In contrast, there has been a great deal of research regarding what mechanisms of action are involved in known disruptions, what concentrations of toxins are necessary to cause adverse effects for specific human populations, and when, during the course of development, such exposures are most critical (Guillette, 2006). One of the human health outcomes that has been most studied in relation to EDC exposure include changes in the timing of pubertal development (Krstevska-Konstantinova et al., 2001; Nebesio & Pescovitz, 2005; Parent et al., 2003b; Tiway, 1998), with some consensus indicating that there is a role for EDCs in the acceleration of puberty onset (Nebesio & Pescovitz, 2005). Thus, from the perspective of risk factors for adolescent pregnancy, it remains to be determined to what extent EDCs contribute to early maturation, and to what extent this risk is unevenly distributed in relation to race/ethnicity and socioeconomic-status variability in these environmental exposures.

Poor Perinatal Outcomes in Adolescent Pregnancy

Relative to adult mothers, adolescent mothers tend to have less prenatal care and to begin health care later in pregnancy, which can result in the birth of low-birthweight infants, inadequate nutrition, and an increased rate of cesarean sections for delivery (Beers & Hollo, 2009; Stevens, 2006). Adolescent pregnancies more often result in premature birth (defined as ≤ 37 weeks' gestation) and the incidence of low birthweight (below the average of 3,500 g) is more than twice that of adult pregnancies (Cunnington, 2001; Felice et al., 1999; Jolly, Sebire, Harris, Robinson, & Regan, 2000; Lee, Suhng, Lu, & Chou, 1998; Stevens-Simon, Beach, & McGregor, 2002; Stevens-Simon, Kaplan, & McAnarney, 1993). For example, girls under 16 are nearly twice as likely as 20- to 30-year-olds to have premature births and are susceptible to having very low-birthweight babies (Stevens-Simon, Beach, et al., 2002). Numerous studies conducted across physiological, sociological, and public health fields in both developed and developing countries report that teenage pregnancy is associated with a disproportionately increased risk of preterm delivery (DuPlessis, Bell, & Richards, 1997; Fraser, Brockert, & Ward, 1995; Gilbert, Jandial, Field, Bifelow, & Danielsen, 2004; Jolly et al., 2000; Stevens-Simon, Beach, et al., 2002; Stevens-Simon et al., 1993; Stevens-Simon & White, 1991). Moreover, although some studies attribute the increased rates of preterm birth, as well as those of low birthweight and neonatal death, to specific confounding factors such as low socioeconomic status (Rogers, Peoples-Sheps, & Suchindran, 1996), inadequate prenatal care (Mahfouz, el-Said, al-Erian, & Hamid, 1995), or subpar nutritional intake (King, 2003; see later), a growing body of research indicates that teenage pregnancy is itself an independent risk factor for adverse birth outcomes (Chen et al., 2007; Fraser et al., 1995).

One explanation for these perinatal outcomes unique to adolescent pregnancy rests on the observation of the simultaneously maturing teenager and her developing fetus. Still-growing, pregnant adolescents have been found to experience greater gestational weight gain and increased fat stores over pregnancy compared to older pregnant women (Hediger, Scholl, Ances, Belsky, & Salmon, 1990; Scholl & Hediger, 1995; Stevens-Simon, Beach, et al., 2002). These factors do not, however, appear to result in greater fetal growth or greater fetal size because young adolescents who are still growing tend to deliver babies with lower birthweights than those delivered by older adolescents or adults (Frisancho, 1997; Scholl & Hediger, 1995; Stevens-Simon & White, 1991). Indeed, pregnant adolescents give birth to smaller infants compared to pregnant adults, controlling for weight gain during pregnancy and prepregnancy weight (Casanueva, Rosello-Soberon, De-Regil, Arguelles Mdel, & Cespedes, 2006). Younger pregnant adolescents, compared to older pregnant adolescents and pregnant adults, tend to transfer a smaller percentage of weight gained during pregnancy to their fetuses (Frisancho, 1997; Kirchengast & Hartmann, 2003). However, the data are inconsistent. In adolescent girls in Bangladesh, pregnancy was associated with decreased growth and weight loss for the woman, especially in those who became pregnant earlier (Rah et al., 2008), yet in British pregnant teenagers, maternal growth was not found to be harmful to fetal growth (Jones et al., 2010). No differences in birth outcomes were found between Brazilian teenagers and adults, but the distribution of minerals in the fetal portion of the placenta varied between the groups, such that the levels were greater in the fetal portion of the placenta of adults compared to that of teenagers, whereas the levels in the maternal portions of the placentas were comparable for both groups. This suggests that micronutrient availability could be influenced by the stage of biological maturation of the mother, with implications for infant developmental trajectories (de Moraes et al., 2011).

Evidence from animal studies of still-growing pregnant sheep indicates that ongoing maternal growth is an independent risk factor for low birthweight (Wallace, Da Silva, Aitken, & Cruickshank, 1997). These studies attribute this risk to complex physiological factors resulting from ongoing maternal growth that restrict placental growth and thereby appear also to restrict fetal growth (Wallace et al., 1997). Other factors, including patterns of pubertal fat store development and its effect on insulin resistance, also may act to promote a metabolic environment that inhibits placental growth and thus restricts fetal growth as well (Stevens-Simon, Thureen, Barrett, & Stamm, 2002; Thame, Fletcher, Baker, & Jahoor, 2010).

Overall, these findings have been interpreted to support the hypothesis that in a competition for limited nutrients, the metabolic demands of the pregnant young adolescent tend to take precedence over the nutritional needs of the growing fetus (Scholl, Hediger, & Schall, 1997). However, because the degree of physical maternal growth that typically takes place in young adolescents over the course of a pregnancy is so small (Scholl & Hediger, 1995), its associated metabolic demand may not be great enough to deprive a growing fetus of the nutrients necessary to maintain normal growth and development (Stevens-Simon, Beach, et al., 2002). More research is needed to determine the influence of biological development (e.g., maternal growth, a factor unique to teenagers) versus lifestyle (e.g., diet, a factor that other groups of pregnant women can share) on compromised outcomes in teenage pregnancy.

An alternative explanation for poor perinatal outcomes in adolescent pregnancy, specifically earlier birth, is elevated life stress, a hypothesis not unique to this population. As previously discussed, numerous studies indicate that pregnant teenagers tend to be exposed to a remarkable combination of intense psychosocial stressors including poverty, sexual abuse, physical abuse, and other childhood trauma (Boyer & Fine, 1992; Corcoran, 2000; Darroch, 2001; Hillis et al., 2004; Klein, 2005). Research also indicates that pregnancy during adolescence generates its own stressful effects, including parental rejection, social upheaval, and conflict with the baby's father (Stevens-Simon Beach, et al., 2002; Szigethy & Ruiz, 2001). A number of studies have examined the relation between stress during teenage pregnancy and birth outcomes (McCool, Dorn, & Susman, 1994; Miller, 1987; Stevens-Simon, et al., 1993; Stevens-Simon & McAnarney, 1994). For example, abused adolescents, compared to nonabused adolescents, gave birth to lower-birthweight infants

(2,904 ± 676 vs. 3,198 ± 443; Stevens-Simon & McAnarney, 1994). Most of these studies report an association between higher stress reports and adverse birth outcomes (Miller, 1987; Stevens-Simon et al., 1993; Stevens-Simon & McAnarney, 1994) though one did not find any such association (Miller, 1987).

Interestingly, some research that focused on birth outcomes for African Americans supports the stress hypothesis, though it suggests that African-American teens fare better than mature African-American women. Known as the “weathering hypothesis” (a similar term will appear later in the chapter referring to somewhat different issues), this model, with supportive data, suggests that infants born to African-American adolescents actually experience a survival advantage compared to those born to older African-American women. Specifically, Geronimus (1992, 1996) found an increased risk of adverse outcomes with increasing age in this population and attributed this result to the gradually worsening health that African-American women experience over the course of their lifetime due to stress associated with socioeconomic hardship. ↵ These findings have been replicated by a number of other studies (Ekwo & Moawad, 2000; Holzman et al., 2009; Osypuk & Acevedo-Garcia, 2008) that also have established that the weathering phenomenon is modified substantially by socioeconomic status and may be eliminated completely in African-American women in affluent communities (Geronimus, 1996).

Some recent research, however, presents evidence contrary to this hypothesis. Ananth, Misra, Demissie, and Smulian (2001) found, in their two-decade analysis, that rates of preterm birth were higher at the extremes of maternal age for Black women and for White women. This same study also found that the relative risk for preterm delivery remained constant for Blacks compared to Whites across age. Love, David, Rankin, and Collins (2010) reported significant weathering effects in poor African-American women with regard to low birthweight and small for gestational age, but not for preterm birth. More research is needed to determine the effects on perinatal outcomes of stress associated with chronic hardship over a lifetime versus that associated with teenage pregnancy. However, in both psychosocial situations, the biological mechanisms thought to mediate the stress effects are similar. Activation of the HPA axis, and, in particular, early elevations in cortisol levels, thought to “prime the placental clock” (Sandman et al., 2006), have been linked to earlier birth, as have elevations in cytokines (Coussons-Read, Okun, & Nettles, 2007; Coussons-Read, Okun, Schmitt, & Giese, 2005). According to this model, stress-linked changes in HPA axis regulation and/or immune functioning contribute to earlier births. This approach has yet to be applied to perinatal outcomes in teen pregnancies, though this research is currently under way in one of our laboratories (Monk).

Adolescent Mothers

Adolescent mothers are less likely to perform well in school, resulting in few career options and higher rates of poverty, compared to women who delay childbearing until age 20 or 21 (Hoffman & Maynard, 2008). Becoming a mother as an adolescent also negatively impacts relationships with family, friends, and significant others, compared to nonparent teens (Herrman, 2008). For adolescent mothers having a second or more pregnancy, the economic burden is substantial, with lower numbers of adolescent mothers becoming well educated and achieving high-paying jobs compared to adolescent mothers with first births (Schwarz, 2007). Adolescent mothers are at high risk for sexually transmitted diseases compared to nonpregnant adolescents of similar backgrounds, and they are at higher risk for rapid repeat pregnancy compared to adult mothers (Meade & Ickovics, 2005). Repeat pregnancies are twice as common in adolescent mothers who are African American compared to adolescent mothers who are European American (Mims, 1998). Alcohol and drug use also are common in adolescent mothers, particularly in adolescent mothers with significant depressive symptoms (Barnet, Duggan, Wilson, & Joffe, 1995). Adolescent mothers are less likely to breastfeed their infants for 3 months (16.8%) compared to adult mothers (35%); this rate falls well short of Healthy People 2020 goals of 80% (Dyson, Green, Renfrew, McMillan, & Woolridge, 2010; <http://www.healthypeople.gov/2020/default.aspx>).

There is an increased risk for child abuse and ineffective mothering in adolescent mothers (De Paul & Domenech, 2000; Logsdon, Ziegler, Hertweck, & Pinto-Foltz, 2008; Long, 2009), leading to an interest among several researchers in methods to identify resources needed to enhance parenting skills (Clemmens, 2001; Lee, 2009) and to improve maternal sensitivity (Koniak-Griffin & Verzemnieks, 1991; SmithBattle, 2007; Stiles, 2010). Adolescent mothers exhibit more nurturing behavior toward their infants if they are receiving more social support (Uno, Florsheim, & Uchino, 1998). In terms of adaptation to the role of mother, adolescent mothers believe they are less competent than older mothers and experience less gratification in the role of mother after the infant is 8–12 months of age, the time in which the adolescent mother experiences a decline in support from her own mother (Mercer, Hackley, & Bostrom, 1984).

As is evident, much of the literature describes negative aspects of being an adolescent mother. However, Clemmens (2003) synthesized findings from 25 qualitative studies on adolescent mothers and found five overarching themes in the words of the adolescent mothers, some of which indicate the potential for positive outcomes:

1. *The reality of motherhood brings hardship.* Adolescent mothers spoke about their lack of knowledge of mothering, the unexpected responsibilities from which they could not escape, and the lack of time for themselves and their usual adolescent activities, such as time with friends.
2. *Straddling the two worlds of adolescence and motherhood.* Participants described the challenges of achieving excellence in school, having time for peers, and taking care of themselves, all of which helps them to accomplish the developmental tasks of adolescence. This was difficult to balance with the unrelenting demands of a newborn.
3. *Motherhood as positively transforming.* Many adolescent mothers stated that they thought of their lives differently since childbirth, with new identities and with new understandings of the importance of relationships with their families.
4. *The baby as a stabilizing influence.* For some adolescent mothers, the birth of the baby stimulated them to stop risky behaviors and to become more serious about completing high school.
5. *Positive influence of social support in reshaping the future.* Many participants described the role of positive relationships in facilitating their ability to demonstrate positive feelings toward their babies.

Thus, some adolescents see becoming a mother as positively transforming (Barratt, Roach, Morgan, & Colbert, 1996; Carey, Ratliff, & Lyle, 1998; Lesser, Koniak-Griffin, & Anderson, 1999).

Impact of Adolescent Birth on Children of Adolescent Mothers

The offspring of adolescent mothers also are at risk for neonatal death as well as developmental delays, poor educational attainment (Gueorguieva et al., 2001), and mental health problems (Felice et al., 1999; Fergusson & Woodward, 1999). They tend to have poorer performance on cognitive measures into school age relative to children born of adult mothers (Cornelius et al., 2009; Dahinten, Shapka, & Willms, 2007). However, life circumstances for the adolescent mother and her child are better when the adolescent mother is older (Cooley & Unger, 1991). For example, in a recent study of 103 women ages 18–40 from one of our laboratories, every year older the adolescent mother was, the less were her odds of having a 4-month-old infant judged by independent observers to be highly reactive in temperament (OR = 0.88; 95% CI = 0.79–0.99) (Werner et al., 2013).

Social Support: A Key Mediator of Outcomes

Receiving adequate and appropriate social support is key to moderating and mediating many of the risk factors that could predict adverse outcomes for the adolescent mother and her child (Sieger & Renk, 2007). In addition, the support received by an adolescent mother may also have a direct effect on her health. In a longitudinal study of adolescent mothers ($n = 128$), path analysis of 6-week postpartum data indicated that social support (as well as self-esteem) had a significant direct effect ($p < .001$) on postpartum depression (Logsdon, Birkimer, Simpson, & Looney, 2005).

However, many adolescent mothers do not receive the social support that they want and need. For example, in a pilot study of adolescents who attended a school for pregnant and adolescent mothers ($n = 26$), there was a discrepancy between support that was important and support that was received for 27 of 40 items on the Postpartum Support Questionnaire (Logsdon, Cross, Williams & Simpson, 2004). In other words, adolescent mothers did not receive support in most areas that were important to them. In a series of three focus groups with pregnant adolescents ($n = 30$), adolescents described inconsistent and unreliable patterns of support from their male partners, family, and friends, but most were able to “piece together” the support that they needed (Logsdon, Gagne, Hughes, Patterson & Rakestraw, 2005). Mercer et al. (1984) investigated the social support available to adolescent mothers over the first postpartum year and demonstrated strong positive associations between social support and maternal role attainment. However, compared to adults, on average, adolescent mothers received less emotional support from their parents and their baby’s father over the entire year. Physical and emotional support correlated positively with feelings of love for the infant, and informational and emotional support correlated positively with gratification in the role of mother.

In more recent studies, social support to adolescent mothers has been associated with diverse outcomes, such as higher maternal self-esteem and confidence with mothering (Cox et al., 2008; Oberlander, Black, & Starr, 2007), prosocial behaviors such as willingness to share in preschool children born to adolescent mothers (Ensor & Hughes, 2010), and decreased rates of depression (Panzarine, Slater, & Sharps, 1995). The inverse relation between social support and depressive symptoms extends across the first year postpartum (Brown, Harris, Woods, Buman, & Cox, 2012).

However, relationships with the two main support providers, the adolescent mother’s own mother and the baby’s father, are frequently complicated and multidimensional (Flaherty, 1988). The father of the adolescent mother’s baby is seldom able to offer the economic and emotional support needed by the adolescent mother. However, when the adolescent mother is able to maintain a quality relationship with

the baby's father, support for the adolescent mother and her child is improved (Gee, McNerney, Reiter, & Leaman, 2007). In general, emotionally and materially supportive parental relationships have been shown to be inversely associated with teenage mothers' reports of depressed mood in the postpartum period (Barnet, Joffe, Duggan, Wilson, & Repke, 1996; Caldwell & Antonucci, 1997). Validation from significant others, such as from her own mother and her partner, for her adult roles of mother and wife/partner is a powerful predictor of the adolescent mother's ability to mother her infant (Spieker & Bensley, 1994). On the other hand, higher levels of perceived family conflict are associated with higher levels of depressed mood among teenage mothers (Kalil, Spencer, Spieker, & Gilchrist, 1998). Logsdon, Birkimer, et al. (2005) have warned that the relation between social support and healthy adjustment in the postpartum period is not necessarily a linear one and that unwanted support may cause the mother to feel "incapable, incompetent, or inadequate" (p. 52).

Support from the adolescent mother's own mother can buffer the negative impact of the disappointment with the contributions from the baby's father (Apfel & Seitz, 1991; Gee & Rhodes, 2003). Interpersonal dynamics, such as the extent of conflict, reciprocity expected, and the role expectation of each member of the support network, can all impact the social system of support provided and satisfaction with that support (Henly, 1997). For example, it is common for adolescent mothers and their mothers to experience conflict related to the adolescent mother's childrearing decisions, time with friends, household chores, and the adolescent's choices and priorities (Kaplan, 1996; Sadler & Clemmens, 2004). The Personal Responsibility and Work Opportunity Reconciliation Act (1996) has stay-in-school and live-at-home provisions for pregnant and parenting adolescents, but variations in family structures makes this option unappealing in some circumstances (Logsdon & Koniak-Griffin, 2005). For example, co-residence has been found to benefit the educational and financial success of adolescent mothers, but not parenting skills (Eshbaugh, 2008) or maternal-infant interaction (Diehl, 1997).

Although peer relations and affirmation from peers are of utmost importance to adolescents, data related to the impact of support from friends is equivocal (Thompson & Peebles-Wilkins, 1992); Voight, Hans, & Bernstein, 1996). Poor peer relationships is a predictor of depression (Prodromidis, Abrams, Field, Scafidi, & Rahdert, 1994).

Psychopathology in Adolescent Mothers

Some evidence suggests that depressive symptoms are prevalent in adolescent mothers across the first postpartum year, with reports of small-scale studies ranging from 20% to 67% depending on the measures, the timing (relative to childbirth) and the impairment definitions used (Barnett et al., 1996; Colletta, 1983; Deal & Holt, 1998; Schmidt, Wiemann, Rickert, & Smith, 2006). In comparison, a meta-analysis of 59 studies of adult women estimated the mean prevalence of postpartum depression to be 13% (O'Hara & Swain, 1996). In addition to this apparent increased risk, research has shown that about one-fifth of adolescent mothers report moderate to severe depressive symptoms that last up to 4 years (Schmidt et al., 2006). Mild to moderate depressive symptoms are associated with negative feeding interactions with infants, less maternal confidence and gratification in the role of mother, less satisfaction with social support, repeat pregnancies, and more use of emotion-focused coping (Barnet, Liu, & Devoe, 2008; Cassidy, Zoccolillo & Hughes, 1996; Panzarine et al., 1995). Lifetime major depressive disorder in adolescent mothers is associated with increased infant cortisol reactivity (Azar, Paquette, Zoccolillo, Baltzer, & Tremblay, 2007). Low income status, inadequate social support, family conflict, low self-esteem, low self-efficacy, exposure to intimate-partner violence (Lindhorst & Oxford, 2008), and a poor body image have been found to be predictors of depressive symptoms in adolescent mothers (Birkeland, Thompson, & Phares, 2005; Gosdin, 2005; Leadbeater & Linares, 1992; Reid & Meadows-Oliver, 2007; Secco et al., 2007), but younger age is not a predictor of depression (Steer, Scholl, & Beck, 1990). The impact of child maltreatment on depressive symptoms in adolescent mothers is equivocal (Lesser & Koniak-Griffin, 2000). When symptoms of depression are associated with suicidal ideation, there is greater risk for delivering low-birthweight infants (Hodgkinson, Colantuoni, Roberts, Berg-Cross, & Belcher, 2010).

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The experience of depression by adolescent mothers has been termed “weathering the storm” in the descriptive, phenomenological study (Clemmens, 2002) previously described. Themes included feelings of depression and being unprepared associated with the suddenness of being a mother, being pulled between the worlds of adolescence and motherhood, feeling alone and betrayed by those you need to love you, feeling a heavy weight, but also regrouping to see a different future.

Measurement of Depression

Most studies of adolescent mothers have measured depression with depression screening tools as opposed to diagnostic assessments by a mental health expert. Using high cutoff scores on screening instruments to indicate the presence of depression, rates of depression in adolescent mothers have ranged from 25% to 67% in international samples (Chen, 1996; Figueiredo, Pacheco, & Costa, 2007; Hudson, Elek, & Campbell-Grossman, 2000; Yozwiak, 2010).

In a classic longitudinal study that used Research Diagnostic Criteria to measure depression, Troutman and Cutrona (1990) compared rates of depression in adolescent mothers ($n = 128$) and a matched control group of non-childbearing adolescents ($n = 114$) across the first postpartum year. Although relatively high rates of depression were found in the adolescent mother group (6% major depressive disorder and 20% for minor depression), no significant differences were found between the groups at 6 weeks postpartum or 1 year postpartum. Other investigators have also pointed out that some adolescent mothers do not experience mental health problems (Oxford, Gilchrist, Gillmore, & Lohr, 2006). Thus, clearly a better understanding of this heterogeneity is warranted.

The Pittsburgh Girls Study

Data gathered in an ongoing teen mother substudy of the prospective PGS may provide additional insights into whether the postpartum period is a time of increased risk for psychopathology by avoiding some of the pitfalls of sample bias and by assessing a broad range of mental health problems. The PGS is a multiple cohort, multi-informant, longitudinal study examining the developmental precursors and risk factors of conduct problems, depression, and substance use in an urban sample of 2,451 girls, aged 5–8 years in wave 1 (Hipwell et al., 2002; Keenan et al., 2010). The PGS sample was recruited from an enumeration of 103,238 Pittsburgh households, with an oversampling of the poorest city neighborhoods. The sample comprised 52% African American, 42% European American, and 6% of mixed or another ethnicity at the time of recruitment (Hipwell, Keenan, Loeber, & Battista, 2010). The 13th annual assessment of the PGS data was recently completed, when the participants were 17–20 years old, and more than 85% of the original sample was retained. At wave 11, 296 pregnancies had been reported by PGS participants. Girls reporting that they were intending to or had become new mothers have been recruited into a substudy (Hipwell, 2011; Hipwell et al., 2010) for laboratory-based assessments of postpartum psychopathology, parenting behaviors and attitudes, infant emotion regulation and development, and observations of mother–infant interaction at 4 and 12 months.

Cross-sectional analyses comparing the level of psychopathology of 93 teenage mothers assessed in the laboratory with 1,996 similar aged non-childbearing teenagers showed higher rates of CD (14.8% vs. 5.2% respectively, $\chi^2[1] = 14.50, p < .001$) and oppositional defiant disorder (ODD; 14.8% vs. 7.2%, $\chi^2[1] = 6.93, p < .01$) in the teen mother subgroup. In contrast, there were no group differences on rates of depression, anxiety, or alcohol abuse. Similar to previous research, the results also showed that teen mothers were more likely to be African American (90.3% vs. 57.5% non-childbearing group) and living in household poverty compared with their non-childbearing adolescent counterparts (77.3% and 36%, respectively). When African-American race and household poverty were controlled in logistic regression analyses, teen mothers were almost twice as likely to meet criteria for CD (OR = 1.96; 95% CI = 1.04–3.70) than non-childbearing teenagers.

Although these comparisons suggest that, as a group, teenage mothers have higher rates of CD and ODD than non-childbearing controls of similar age and background, these characteristics are likely correlates of teen pregnancy (Coley & Chase-Lansdale, 1998) and, therefore, may not have resulted from postpartum stress. To control for some of these preexisting differences, analyses were then run with teenage mothers matched pair-wise with non-childbearing PGS teenagers on demographic variables (age, race, household poverty, single-parent household) and preconception CD severity. The results showed that when preconception CD severity was controlled in pair-wise matching, the postpartum period did not emerge as a developmental period of heightened risk for any type of psychopathology in this adolescent sample (Hipwell et al., 2010). This preliminary finding is consistent with the notion that conduct problems and depressive symptomatology are often comorbid in adolescent girls (Hipwell, 2011), and that if this overlap in psychopathology is taken into account, then the apparent risk for postpartum depressed mood may be reduced. As a group, the teenage mothers also reported few DSM-IV symptoms of depression in the postpartum period, and the rate of probable “caseness” as estimated by a score of 13 or more on the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden & Sagovsky, 1987) was 8.8%. However, there was a significant negative correlation between EPDS score and maternal age ($r = -.29, p < .02$), with probable caseness of 22% among teenage mothers younger than 16 years. By way of comparison, the point prevalence rate for a postpartum EPDS score of 13 or more has been reported as 6.6%, although rates vary from 0% to 14.3% transculturally (Gorman et al., 2004).

Understanding the risk factors for perinatal mental health problems in the teenage mother is central to the development of tailored and effective prevention and intervention strategies. A great deal of research has focused on assessing predictors of postpartum and, to a lesser extent, prenatal depression in adult women.

In contrast, there has been a dearth of studies focusing on risk factors for mental health problems in childbearing teenagers. In fact, teenage mothers are frequently excluded from large-scale studies because they are believed to be a special group with distinct risk and protective factors. As noted previously, teenage pregnancy and childbearing are not randomly distributed events among the adolescent population, but may be variously associated with a range of demographic and psychosocial factors such as poverty and unstable close relationships. Therefore, assessment of risk for perinatal mental health problems in teenagers also needs to take into account risk and protective factors associated with teenage pregnancy itself.

Risk Factors for Perinatal Psychopathology in Adolescents: A Developmental Perspective

Adolescent mothers are first adolescents, with the need to accomplish the developmental tasks of establishing autonomy, friendship and family relationships, and occupational goals (Erikson, 1968). Added to this, the developmental tasks of becoming a new mother must also be accomplished (Flanagan, McGrath, Meyers, & Garcia Coll, 1995). Moreover, normal adolescence is a developmental period characterized by mood volatility (Arnett, 1999; Brent & Birmaher, 2002; Nolen-Hoeksema & Girgus, 1994) and vulnerability for onset of a wide range of emotional and behavioral problems, including depressive disorders (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993), delinquency, and substance abuse (Steinberg et al., 2006). This developmental volatility means that a life-course perspective must be taken to fully understand whether the perinatal period is a time of increased (or decreased) risk for psychopathology. In a similar way, risk factors need to be assessed within this broader contextual view, using prospectively followed population samples. However, for a host of practical reasons, most research to date has had to rely on proximally determined reports or the retrospective reports of selected samples of teenage mothers first interviewed during or after pregnancy.

Several meta-analyses have been conducted examining risk factors for postpartum depression in adult samples (Beck, 2001; O'Hara & Swain, 1996; Robertson, Grace, Wallington, & Stewart, 2004). The most consistent risk factors are exposure to negative life events, low social support, a history of depression, depression in pregnancy, and anxiety in pregnancy. These same factors may also be pertinent for the population of teenage mothers, but more research is needed (Robertson et al., 2004). Furthermore, risk-factor studies have typically had a limited socioeconomic status range, with low socioeconomic status groups being poorly represented, and, therefore, the effect sizes of sociodemographic characteristics in these analyses are likely to be greatly underestimated (O'Hara, 2011). Given that the majority of childbearing teenagers live in disadvantaged circumstances, the relative strength of these risk factors for perinatal psychopathology remains unclear.

Demographic Characteristics

Some studies of adolescent samples have demonstrated an inverse relation between maternal age and levels of prenatal and postpartum depressive symptoms (Hipwell, 2011; Kalil et al., 1998; O'Hara, 2011; Rich-Edwards et al., 2006), but, as indicated earlier, this has not been supported in other studies (Barnet et al., 1996; Caldwell & Antonucci, 1997). Typically, when other variables are included in the models, greater family discord, financial problems, unwanted pregnancy, and low levels of social support explain the effect of young age. However, although Barnet et al. (1996) reported that severity of depressive symptoms was unrelated to maternal age, they also found no association between depression severity and socioeconomic status, poor academic achievement, or school attendance in their sample of 125 teenage mothers.

Reports have been equivocal on differences in rates of depressive symptoms by ethnicity of adolescent mother (Eshbaugh, 2006; Rickert, Wiemann, & Berenson, 2000; Schmidt et al., 2006). It has been proposed that deviance from cultural standards related to pregnancy and marriage may account for depressive symptoms in some populations. ↵ For example, Eshbaugh (2006) reported that Latina adolescent mothers

who were partnered had less depressive symptoms than those who were not partnered, but this was not the case for African-American adolescent mothers. In fact, being married/cohabiting was associated with more depression for African-American adolescents, although the effect sizes were small. The authors suggested that this pattern may reflect cultural differences in attitudes toward partnerships: Latina gender roles emphasize the importance of having a partner (Shorris, 1992), whereas there is a greater acceptance of childbearing among single women in African-American culture (Pagnini & Morgan, 1996). Deviance from these cultural norms may increase vulnerability to depression.

Evidence is also mixed about whether rates of depression are higher among African-American than European-American teenagers. For example, national survey data have shown that 48% of African-American and 28% of European-American adolescents (15–17 years old) met study criteria for depression compared with 25% and 14% of the respective adult mothers (Deal & Holt, 1998). On the other hand, Schmidt et al. (2006) reported that, although African-American teenagers ($n = 213$) were less likely to report moderate to severe depression compared with Caucasian teenagers ($n = 182$) at 3 months postpartum, they were more likely to experience a recurrence of symptoms 4 years later. Finally, several investigators have reported no race or ethnic differences in self-reported depressive symptoms in the postpartum period (Birkeland et al., 2005; Caldwell & Antonucci, 1997). These equivocal findings highlight the need for further research to determine whether health disparities by race/ethnicity exist, and if present, the sociocultural factors that can account for such differences.

Exposure to Maltreatment and Violence

As in adult samples, a history of child abuse has been linked with higher rates of depression and anxiety among teenage parents (Esperat & Esparza, 1997; Lesser & Koniak-Griffin, 2000). For example, Gilson and Lancaster (2008) reported that teenage mothers who had experienced physical and/or sexual abuse had higher mean depression scores at 6 weeks postpartum than teenage mothers who had not experienced physical and/or sexual abuse. In addition, Milan et al. (2004) found that pregnant and/or parenting adolescents who reported chronically elevated levels of distress had experienced significantly more physical maltreatment during childhood than nulliparous adolescents showing the same adjustment pattern.

Mitchell et al. (2010) examined the effects of violence exposure on the mental health of young African-American mothers living in an inner city. A path analysis on cross-sectional data revealed significant direct effects of witnessed and experienced violence on mothers' depressive symptoms and levels of general aggression. Experiences of discrimination were also associated with increased depressive symptoms. Moreover, there were significant indirect effects of mothers' violence exposure on their disciplinary practices via depression and aggression.

Preexisting Mental Health Problems

The lack of prospective studies that span childhood and adolescence means that it is not known whether prepregnancy adolescent-onset mood disorders also heighten risk for postpartum depression among teenagers. The importance of understanding prepregnancy mental health risk for mood disorders following childbirth has been indicated from the retrospective reports of already pregnant adult women (Beck, 2001; Da Costa, Larouche, Dritsa, & Brender, 2000; Evans, Heron, Francomb, Oke, & Golding, 2001; Gorman et al., 2004; Gotlib, Whiffen, Wallace, & Mount, 1991; Hobfoll et al., 1995; Johanson, Chapman, Murray, Johnson, & Cox, 2000; Josefsson et al., 2002; Logsdon, McBride, & Birkimer, 1994; Marcus, Flynn, Blow, & Barry, 2003; O'Hara & Swain, 1996), suggesting that postpartum depression frequently represents a continuation or exacerbation of preexisting illness rather than a new onset associated with related changes of childbirth. This distinction may be clinically important, given some evidence that women who experience "postpartum relapse" are at higher risk for future nonpostpartum episodes of depressive disorder (Cooper & Murray, 1995).

Using latent class and growth mixture modeling on prospectively gathered data from the PGS, Hipwell (2011) examined preconception developmental trajectories of depressed mood between ages 5 and 14 years to postpartum depressed mood. Using data from annual assessments of depression collected in the full PGS sample ($n = 2,228$) beginning at ages 5–8 years, the results of the latent class growth models showed that a four-group quadratic growth solution fit the longitudinal depressive symptomatology data best. The groups were labeled descriptively, showing stable high levels of symptoms between 5 and 14 years (4% of the sample), stable low levels (68.1%), low but increasing levels (15.4%), and moderate but decreasing levels over time (12.6%). When the severity of postpartum depressed mood was then compared for adolescent mothers according to the "stable high" and "increasing" versus "stable low" and "decreasing" trajectory groups, however, no differences were revealed. These preliminary results suggested that high or increasing patterns of depressed mood developing across childhood and early adolescence were not associated with increased risk for depression occurring in the postpartum period.

Given the wealth of data supporting a relation between deviant or aggressive behavior and pregnancy risk, it is surprising that there has been little research focused on the impact of childbirth on continuities and discontinuities in CD and antisocial behavior in young mothers. In a community sample of 26 pregnant or recently delivered 13- to 17-year-olds, Zoccolillo, Meyers, and Assiter (1997) found that over a third met diagnostic criteria for CD. However, no prospective data were available about prior history and whether symptoms had increased, decreased, or been unaffected by childbirth. Serbin et al. (1998) suggested that rates of antisocial behavior may decrease following the transition to parenthood simply because the maternal role limits the opportunities to engage in delinquency outside the home. Indeed, Sapotichne, Klostermann, and Hipwell (2010) reported a significant reduction in overall CD symptom severity in the postpartum period relative to the year "preconception" in a sample of 30 teen mothers. An important avenue for future work will be to examine whether certain types of antisocial behavior, such as property crime, decrease, whereas other characteristics, such as interpersonal aggression, may become exacerbated by the demands of caring for a young infant.

Interventions

Most adolescent mothers lack knowledge of normal infant growth and development and appropriate ways to respond to infants of different temperaments. Thus, it is not surprising that lack of competence with infant care and challenges with difficult infant temperaments predict parenting stress in adolescent mothers (Secco & Moffatt, 2003). Assessments and interventions to address these issues with adolescent mothers are needed.

Interventions that consider the context of the lives of adolescent mothers are most effective in reducing adverse outcomes for the infant and mother (SmithBattle, 1995). Intensive, early public health nursing interventions to low-income adolescent mothers have been demonstrated to reduce the incidence of premature births (3.2% intervention group, 8.5% control group), decrease the total days of non-birth-related hospitalization ($\chi^2[1] = 32.48, p < .001$), decrease rates of repeat pregnancies (adjusted OR = 0.47; 95% CI = 0.22–0.97); improve maternal–infant interaction ($F[1, 15] = 5.76, p < .05$), as well as result in higher school completion rates ($\chi^2[1] = 6.76; p < .009$) (Barnet, Rapp, DeVoe, & Mullins, 2010; Koniak-Griffin, Anderson, Verzemnieks, & Brecht, 2000; Koniak-Griffin et al., 2003; Koniak-Griffin & Verzemnieks, 1991). Public health nursing interventions to adolescent mothers involving home visitation have also been demonstrated to decrease early and inappropriate introduction of solid foods to infants, with the intervention group being four times more likely to adhere to American Academy of Pediatrics infant-feeding guidelines (Black, Siegel, Abel, & Bentley, 2001). However, some adolescent mothers experience challenges in obtaining needed support from state agencies and programs (Brosh, Weigel, & Evans, 2007) and need professional counseling and advice related to establishing and maintaining healthy relationships in order to promote child development (Black et al., 2002). School-based interventions that include community outreach and case management have been shown to decrease school dropout in adolescent mothers ($n = 798$) as opposed to adolescent mothers who do not receive such services (Warrick, Christianson, Walruff, & Cook, 1993). Preparation for parenting (knowledge and attitude about child development) has been found to be the strongest predictor of child abuse potential ($\beta = 0.31, F[1, 61] = 6.48, p < .01, r^2 = .096$) in adolescent mothers (Dukewich, Borkowski, & Whitman, 1996). As another example, Censullo (1994) used interactive coaching to increase the level of responsiveness in adolescent mothers and their infants ($\chi^2[1] = 5.1, p < .05$).

A novel intervention is CenteringPregnancy, which is modeled on the idea that prenatal care is most effective in groups and can simultaneously provide medical care as well as social and educational support. CenteringPregnancy has opened more than 100 sites in the United States since 1995 (Massey, Rising, & Ickovics, 2006). Appointments last for two hours and include 10–12 patients with similar due dates. The first 30 minutes involve individual exams performed semiprivate and adolescents taking their own vitals. For 90 minutes, the care provider and other social-service professionals lead an educational group aimed at helping the participants gain new knowledge and skills and form supportive relationships.

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Although most efficacy studies have examined adult patients, there are reasons to believe that the approach is especially well suited to pregnant teenagers. Pregnant adolescents, in particular, may benefit from receiving prenatal care in a group setting from which they also can gain social support from those going through a similar experience. More specifically, CenteringPregnancy can provide an open forum for discussion and a safe environment where adolescents can share their concerns, learn from each other, and form new friendships during a period that can be very isolating and overwhelming. Teens can develop a sense of empowerment through trying on a new role in a supportive community and making healthy and effective decisions for their bodies and futures (Grady & Bloom, 2004). One study showed that pregnant adolescents attending a CenteringPregnancy program in St. Louis, MO reported better health care compliance, increased satisfaction with prenatal care, and decreased rates of preterm births and low-birthweight infants compared to adolescents in typical care and those receiving some additional prenatal support (Grady & Bloom, 2004).

Other studies with women over 18, which may have implications for pregnant adolescents, have found that, compared to receiving traditional prenatal care, women enrolled in group prenatal care were less likely to have preterm births, with effects being strongest in African-American women (Ickovics et al., 2007), and to have infants with higher birthweights, especially evident in infants who were born preterm (Ickovics et al., 2003). Though not statistically significant, there was a trend association for women in group care to be less likely to have low-birthweight infants, deliver prematurely, or experience neonatal loss relative to women

receiving traditional prenatal care (Ickovics et al., 2003). They were also more prepared for delivery, had increased prenatal knowledge (Baldwin, 2006; Ickovics et al., 2007), were at lower risk for receiving suboptimal prenatal care, were more satisfied with their care, and were more likely to breastfeed (Ickovics et al., 2007). Importantly, there was no difference in cost between group prenatal care and standard treatment (Ickovics et al., 2007).

However, there have also been some negative results. In a study examining Hispanic women who received CenteringPregnancy group care, no differences in health behaviors, pregnancy knowledge, or infant outcomes were found, relative to those receiving standard treatment; however, women who participated in CenteringPregnancy reported being very satisfied with their care (Robertson, Aycock, & Darnell, 2009). Another study found that women in CenteringPregnancy group care engaged in health-promoting behaviors to a lesser degree than those in traditional prenatal care and valued the prenatal care less. There were no differences between groups in smoking or weight gain (Shakespeare, Waite, & Gast, 2010). Thus, the extent to which CenteringPregnancy may be a medical/psychosocial intervention uniquely suited to pregnant teenagers has yet to be determined.

Interventions related to decreasing symptoms of depression and improving maternal and infant interactions were conducted by Field and her colleagues (Field, Grizzle, Scafidi, & Schanberg, 1996; Field et al., 2000). In the first study (Field et al., 1996), 32 depressed adolescents were randomly assigned to either massage or relaxation therapy conducted in 30-minute sessions over 5 weeks. The results at treatment completion showed that both groups reported a pre- to post-test reduction in anxiety, but that the group receiving massage therapy showed behavioral and hormonal changes indicative of reduced stress. Field et al. (2000) reported the results of a larger sample of adolescent mothers with depressive symptoms ($n = 160$) stratified on risk factors and then randomly allocated to an intervention or control group at 3 months postpartum. The intervention comprised free day care for the infants and a rehabilitation program plus relaxation therapy, music mood induction, massage therapy, and coaching on mother–infant interactions over a period from 3 to 6 months. For the intervention group, the results showed that the quality of mother–infant interactions improved and the mothers' vagal tone and biochemical values tended toward the norm, even though the level of depression symptoms did not show any significant reduction. The infants in the intervention groups were characterized by improvements in mood, cognition, and physical health relative to their counterparts in the control group.

Few adolescent mothers with depressive symptoms receive mental health diagnostic evaluations or treatment. Logsdon, Hines-Martin, and Rakestraw (2009) examined barriers to depression treatment in low-income, unmarried, adolescent mothers in a southern, urban area of the United States. Participants were enrolled in a teenage parent program, an option of the public school system. Results from the study indicated that the adolescent mothers had little knowledge of depression symptoms or treatment. In a second study, framed by the Theory of Reasoned Action (Ajzen, Albarracin, & Hornick, 2007), intention to seek depression treatment was predicted by subjective norms but not attitude (Logsdon et al., 2009). A pilot test of telephone-based depression care management for overcoming barriers to depression treatment in adolescent mothers demonstrated promising results (Logsdon, Foltz, Stein, Usui, & Josephson, 2010). The Phase 1 clinical trial combined qualitative and quantitative methods to modify a collaborative-care, telephone-based, depression-care-management intervention for adolescent mothers, and to determine the acceptability, feasibility, and initial efficacy of the intervention in a sample of adolescent mothers ($n = 97$) who were recruited from a teen-parent program. Outcomes included measures of depressive symptoms, functioning, and use of mental health services. Acceptability of the intervention was demonstrated, but feasibility of the intervention was diminished by the complex life challenges confronting the adolescent mother. Although only four adolescent mothers received mental health treatment, there was a trend for improved depressive symptoms over time.

Today's adolescents have a different skill set, including new ways of accessing information and communicating (Elkind, 2001). These characteristics, as well as the need to accomplish the developmental tasks of both adolescence and motherhood, need to be considered in planning interventions (Breheny & Stephens, 2007). For example, using a cross-sectional design, a convenience sample of adolescent mothers ($n = 100$) completed surveys at 1–3 days postpartum at a mother–baby unit of a university hospital. Questions were adapted from a national survey conducted by Pew Corporation. Fifty percent of the sample was African American, 33% Caucasian, 6% Hispanic, and 11% other. No other demographic information was collected. Data analysis consisted of descriptive data, and more than one response could be chosen. Adolescent mothers received the most health information from the following: parents (69%), doctors/nurses (69%), and the Internet (64%). The parents of friends were also sources of health information (42%), followed by text messages and Facebook (33%, and 28%, respectively). Preferences for sources of health information included family (58%), the Internet (61%), and health care professionals (92%); 25% of participants searched for health information on the Internet 1–2 days per week.

The adolescent mothers used media extensively for communication. Forty-two percent of the sample sent more than 100 text messages per day; 50% of the sample accessed a computer several times per day; and 44% participated in a social networking site. The Internet was most frequently accessed through computers at school (81%), the library (97%), and cell phones (72%). The use of social media by adolescent mothers is common. Clinicians should use the Internet, text messages, and MySpace to provide health information and expert advice to adolescent mothers and to persuade them to appropriately use health care services. Using images of parents and health care providers to relay the health information should be considered (Logsdon, Tomasulo, Eckert, & Myers, 2011).

Adolescent mothers need an opportunity to talk privately with a health care provider that they trust so that accurate assessments of risk factors and challenges can be determined (Ford, 2010). It is imperative that the health care provider listen closely to information about the context in which the adolescent mother lives (Mercer, 1983). The United States Preventive Services Task Force has recommended screening adolescents aged 12–18 years for major depressive disorder (United States Department of Health and Human Services Agency for Healthcare Research and Quality, 2011), and in no population is this more important than in adolescent mothers.

Conclusion and Future Directions

Although some progress has been achieved in meeting national health objectives of adolescents, the mental health of pregnant and parenting adolescents has not been specifically targeted. This is disturbing because the mental health of adolescent mothers has been clearly shown to impact the adolescent's health and functioning, as well as the health and development of her child.

On the basis of the findings from empirical research and clinical interventions (Fleming, Munton, Clarke, & Strauss, 1993; Long, 2009; Zuckerman, Amaro & Beardslee, 1987), adolescent-specific strategies may be needed to adequately evaluate the mental health needs of this population of young mothers. In particular, individualized assessments and listening are vitally important. Adolescent mothers are not homogenous. There may also be an increased need to obtain a differential diagnosis in order to separate depressive symptoms from a diagnosis of depression and a variety of other mental health disorders, including drug and alcohol use. A comprehensive assessment is also likely to demand a full understanding of environmental and social needs.

In a similar manner, interventions may need specific adaptations for adolescent mothers. For example, engagement with services is likely to be improved if the provider can partner with the adolescent mother to develop plans to address needs. Depending upon availability in the community, referrals may be indicated to

social-service agencies, child-care agencies, support groups, counseling, and parenting classes. In addition, Child Protective Services may be indicated in cases in which there is risk to the health of the mother or baby.

The current overview also highlights a number of important avenues for further research. First, it is evident that a wealth of information has accumulated on the risks for adolescent pregnancy, but far less is known about protective factors that operate in the contexts of risk. Such factors need to be incorporated into multidimensional, transactional, and developmentally sensitive models that promote understanding of the ways in which risk and protective factors interact differently for different subgroups of adolescents. Progress in this area would lead to great improvements in our understanding of the heterogeneity that exists among adolescent mothers. Specifically, why is it that some adolescents navigate the transition to motherhood better or worse than others?

Second, there is relatively little known about genetic influences on the timing of sexual maturation, the desire to have a child, teenage pregnancy, and psychosocial adjustment during pregnancy and the postpartum period. Filling these gaps in knowledge could facilitate the identification of young girls, even prepuberty, who are likely to face the great challenges of adolescent motherhood. This would be a first step to the development and implementation of early prevention and intervention strategies to improve the health outcomes of both the adolescent mothers and their offspring. Another important area for biomedical research is to improve understanding of the role of stress in adolescent pregnancy and parenthood. Thus, research needs to advance knowledge on biological markers, indices, and mechanisms (e.g., hypocortisolism, pheromones, endocrine disrupting chemicals, HPA regulation) related to pubertal timing, age at first voluntary sexual initiation, as well as the perinatal outcomes of adolescent mothers.

There also remain significant gaps in knowledge about the factors that exacerbate or ameliorate risk for mental health problems of adolescent mothers over and above the factors that predict adolescent pregnancy. In particular, more research is warranted into the role of peer support on parenting quality and adolescent well-being in the postpartum period, the putative moderating effects of race/ethnicity, and the extent of continuities and discontinuities in conduct problems and antisocial behavior across the transition to motherhood. Finally, there remains an urgent need to broaden the window of examination of predictors and mechanisms to extend beyond pregnancy and the postpartum period to include psychosocial and biological influences that occur preconception, during the early adolescent, childhood, preschool, and neonatal periods. Such information is essential for the development and implementation of effective prevention and early intervention efforts.

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References

- Adair, L.S. (2001). Size at birth predicts age at menarche. *Pediatrics*, *107*(4), E59.
[Google Scholar](#) [WorldCat](#)
- Ahmed, M. L., Ong, K. K., & Dunger, D. B. (2009). Childhood obesity and the timing of puberty. *Trends in Endocrinology and Metabolism*, *20*(5), 237–242.
[Google Scholar](#) [WorldCat](#)
- Ajzen, I., Albarracin, D., & Hornick, R. (2007). *Prediction and change of health behavior: Applying the reasoned action approach*. Mahwah, NJ: Erlbaum.
[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)
- Ananth, C. V., Misra, D. P., Demissie, K., & Smulian, J. C. (2001). Rates of preterm delivery among Black women and White women in the United States over two decades: An age-period-cohort analysis. *American Journal of Epidemiology*, *154*(7), 657–665.
[Google Scholar](#) [WorldCat](#)
- Anderson, S. E., Dallal, G. E., & Must, A. (2003). Relative weight and race influence average age at menarche: results from two nationally representative surveys of US girls studied 25 years apart. *Pediatrics*, *111*(4 Pt 1), 844–850.
[Google Scholar](#) [WorldCat](#)
- p. 593 Anderson, S. E., & Must, A. (2005). Interpreting the continued decline in the average age at menarche: results from two nationally representative surveys of U.S. girls studied 10 years apart. *Journal of Pediatrics*, *147*(6), 753–760.
[Google Scholar](#) [WorldCat](#)
- Apfel, N., & Seitz, V. (1991). Four models of adolescent mother-grandmother relationships in black inner-city families. *Family Relations*, *40*, 421–429.
[Google Scholar](#) [WorldCat](#)
- Arnett, J. J. (1999). Adolescent storm and stress, reconsidered. *The American Psychologist*, *54*(5), 317–326.
[Google Scholar](#) [WorldCat](#)
- Azar, R., Paquette, D., Zoccolillo, M., Baltzer, F., & Tremblay, R. E. (2007). The association of major depression, conduct disorder, and maternal overcontrol with a failure to show a cortisol buffered response in 4-month-old infants of teenage mothers. *Biological Psychiatry*, *62*(6), 573–579.
[Google Scholar](#) [WorldCat](#)
- Baldwin, K. A. (2006). Comparison of selected outcomes of CenteringPregnancy versus traditional prenatal care. *Journal of Midwifery and Women's Health*, *51*(4), 266–272.
[Google Scholar](#) [WorldCat](#)
- Barnet, B., Duggan, A. K., Wilson, M. D., & Joffe, A. (1995). Association between postpartum substance use and depressive symptoms, stress, and social support in adolescent mothers. *Pediatrics*, *96*(4), 659–666.
[Google Scholar](#) [WorldCat](#)
- Barnet, B., Joffe, A., Duggan, A. K., Wilson, M. D., & Repke, J. T. (1996). Depressive symptoms, stress, and social support in pregnant and postpartum adolescents. *Archives of Pediatric and Adolescent Medicine*, *150*(1), 64–69.
[Google Scholar](#) [WorldCat](#)
- Barnet, B., Liu, J., & Devoe, M. (2008). Double jeopardy: depressive symptoms and rapid subsequent pregnancy in adolescent mothers. *Archives of Pediatrics and Adolescent Medicine*, *162*(3), 246–252.
[Google Scholar](#) [WorldCat](#)
- Barnet, B., Rapp, T., DeVoe, M., & Mullins, C. D. (2010). Cost-effectiveness of a motivational intervention to reduce rapid repeated

childbearing in high-risk adolescent mothers: a rebirth of economic and policy considerations. *Archives of Pediatric and Adolescent Medicine*, 164(4), 370–376.

[Google Scholar](#) [WorldCat](#)

Barratt, M. S., Roach, M. A., Morgan, K. M., & Colbert, K. K. (1996). Adjustment to motherhood by single adolescents. *Family Relations*, 45, 209–215.

[Google Scholar](#) [WorldCat](#)

Beck, C. T. (2001). Predictors of postpartum depression: an update. *Nursing Research*, 50(5), 275–285.

[Google Scholar](#) [WorldCat](#)

Beers, L., & Hollo, R. (2009). Approaching the adolescent-headed family: A review of teen parenting. *Current Problems in Pediatric and Adolescent Health Care*, 39, 216–233.

[Google Scholar](#) [WorldCat](#)

Birkeland, R., Thompson, J. K., & Phares, V. (2005). Adolescent motherhood and postpartum depression. *Journal of Clinical Child and Adolescent Psychology*, 34(2), 292–300.

[Google Scholar](#) [WorldCat](#)

Black, M. M., Papas, M. A., Hussey, J. M., Dubowitz, H., Kotch, J. B., & Starr, R. H., Jr. (2002). Behavior problems among preschool children born to adolescent mothers: Effects of maternal depression and perceptions of partner relationships. *Journal of Clinical Child and Adolescent Psychology*, 31(1), 16–26.

[Google Scholar](#) [WorldCat](#)

Black, M. M., Siegel, E. H., Abel, Y., & Bentley, M. E. (2001). Home and videotape intervention delays early complementary feeding among adolescent mothers. *Pediatrics*, 107(5), E67.

[Google Scholar](#) [WorldCat](#)

Blakemore, S. J., & Choudhury, S. (2006). Development of the adolescent brain: implications for executive function and social cognition. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 47(3–4), 296–312.

[Google Scholar](#) [WorldCat](#)

Boyer, D., & Fine, D. (1992). Sexual abuse as a factor in adolescent pregnancy and child maltreatment. *Family Planning Perspectives*, 24(1), 4–11, 19.

[Google Scholar](#) [WorldCat](#)

Bratberg, G. H., Nilsen, T. I., Holmen, T. L., & Vatten, L. J. (2007). Early sexual maturation, central adiposity and subsequent overweight in late adolescence. A four-year follow-up of 1605 adolescent Norwegian boys and girls: the Young HUNT study. *BMC Public Health*, 7, 54.

[Google Scholar](#) [WorldCat](#)

Breheny, M., & Stephens, C. (2007). Irreconcilable differences: health professionals' constructions of adolescence and motherhood. *Social Science and Medicine*, 64(1), 112–124.

[Google Scholar](#) [WorldCat](#)

Brent, D. A., & Birmaher, B. (2002). Clinical practice. Adolescent depression. *New England Journal of Medicine*, 347(9), 667–671.

[Google Scholar](#) [WorldCat](#)

Bronfenbrenner, U. (1979). Contexts of child rearing: Problems and prospects. *American Psychologist*, 34(10), 844–850.

[Google Scholar](#) [WorldCat](#)

Brosh, J., Weigel, D., & Evans, W. (2007). Pregnant and parenting adolescents' perception of sources and supports in relation to educational goals. *Child and Adolescent Social Work Journal*, 24, 565–578.

[Google Scholar](#) [WorldCat](#)

Brown, J. D., Harris, S. K., Woods, E. R., Buman, M. P., & Cox, J. E. (2012). Longitudinal study of depressive symptoms and social support in adolescent mothers. *Maternal and Child Health Journal*, *16*, 894–901.

[Google Scholar](#) [WorldCat](#)

Buyken, A. E., Karaolis-Danckert, N., & Remer, T. (2009). Association of prepubertal body composition in healthy girls and boys with the timing of early and late pubertal markers. *American Journal of Clinical Nutrition*, *89*(1), 221–230.

[Google Scholar](#) [WorldCat](#)

Caldwell, C. H., & Antonucci, T. C. (1997). Childbearing during adolescence: Mental health risks and opportunities. In J. E. Schulenberg, J. Maggs, & K. Hurrelmann (Eds.), *Health risks and developmental transitions during adolescence* (pp. 220–245). New York: Cambridge University Press.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

Carey, G., Ratliff, D., & Lyle, R. R. (1998). Resilient adolescent mothers: ethnographic interviews. *Families, Systems, and Health*, *16*(4), 347–364.

[Google Scholar](#) [WorldCat](#)

Casanueva, E., Rosello-Soberon, M. E., De-Regil, L. M., Arguelles Mdel, C., & Cespedes, M. I. (2006). Adolescents with adequate birth weight newborns diminish energy expenditure and cease growth. *Journal of Nutrition*, *136*(10), 2498–2501.

[Google Scholar](#) [WorldCat](#)

Casazza, K., Goran, M. I., & Gower, B. A. (2008). Associations among insulin, estrogen, and fat mass gain over the pubertal transition in African-American and European-American girls. *Journal of Clinical Endocrinology and Metabolism*, *93*(7), 2610–2615.

[Google Scholar](#) [WorldCat](#)

Casey, B. J., Jones, R. M., & Hare, T. A. (2008). The adolescent brain. *Annals of the New York Academy of Sciences*, *1124*, 111–126.

[Google Scholar](#) [WorldCat](#)

Cassidy, B., Zoccolillo, M., & Hughes, S. (1996). Psychopathology in adolescent mothers and its effects on mother-infant interactions: A pilot study. *Canadian Journal of Psychiatry*, *41*(6), 379–384.

[Google Scholar](#) [WorldCat](#)

Censullo, M. (1994). Strategy for promoting greater responsiveness in adolescent parent/infant relationships: report of a pilot study. *Journal of Pediatric Nursing*, *9*(5), 326–332.

[Google Scholar](#) [WorldCat](#)

Chen, C. H. (1996). Postpartum depression among adolescent mothers and adult mothers. *Kaohsiung Journal of Medical Sciences*, *12*(2), 104–113.

[Google Scholar](#) [WorldCat](#)

Chen, X. K., Wen, S. W., Fleming, N., Demissie, K., Rhoads, G. G., & Walker, M. (2007). Teenage pregnancy and adverse birth outcomes: a large population based retrospective cohort study. *International Journal of Epidemiology*, *36*(2), 368–373.

[Google Scholar](#) [WorldCat](#)

p. 594 Cheng, G., Gerlach, S., Libuda, L., Kranz, S., Gunther, A. L., Karaolis-Danckert, N., Kroke, A., & Buyken, A. (2010). Diet quality in childhood is prospectively associated with the timing of puberty but not with body composition at puberty onset. *Journal of Nutrition*, *140*(1), 95–102.

Chumlea, W. C., Schubert, C. M., Roche, A. F., Kulin, H. E., Lee, P. A., Himes, J. H., & Sun, S. (2003). Age at menarche and racial comparisons in US girls. *Pediatrics*, *111*(1), 110–113.

[Google Scholar](#) [WorldCat](#)

Clemmens, D. (2001). The relationship between social support and adolescent mothers' interactions with their infants: a meta-analysis. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *30*(4), 410–420.

[Google Scholar](#) [WorldCat](#)

Clemmens, D. (2002). Adolescent mothers' depression after the birth of their babies: weathering the storm. *Adolescence*, 37(147), 551–565.

[Google Scholar](#) [WorldCat](#)

Clemmens, D. (2003). Adolescent motherhood: A meta-synthesis of qualitative studies. *American Journal of Maternal Child Nursing*, 28(2), 93–99.

[Google Scholar](#) [WorldCat](#)

Colborn, T., & Clement, C. (1992). *Chemically-induced alterations in sexual and functional development: The wildlife/human connection*. Princeton, NJ: Princeton Scientific Publishing.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

Coley, R. L., & Chase-Lansdale, P. L. (1998). Adolescent pregnancy and parenthood. Recent evidence and future directions. *American Psychologist*, 53(2), 152–166.

[Google Scholar](#) [WorldCat](#)

Colletta, N. D. (1983). At risk for depression: A study of young mothers. *Journal of Genetic Psychology*, 142(2d Half), 301–10.

[Google Scholar](#) [WorldCat](#)

Cooley, M. L., & Unger, D.G. (1991). The role of family support in determining developmental outcomes in children of teen mothers. *Child Psychiatry and Human Development* 21(3), 217–234.

[Google Scholar](#) [WorldCat](#)

Cooper, P. J., & Murray, L. (1995). Course and recurrence of postnatal depression. Evidence for the specificity of the diagnostic concept. *British Journal of Psychiatry*, 166(2), 191–195.

[Google Scholar](#) [WorldCat](#)

Corcoran, J. (2000). Ecological factors associated with adolescent sexual activity. *Social Work in Health Care*, 30(4), 93–111.

[Google Scholar](#) [WorldCat](#)

Cornelius, M. D., Coldschmidt, L., Willford, J. A., Leech, S. L., Larkby, C., & Day, N. L. (2009). Body size and intelligence in 6-year-olds: are offspring of teenage mothers at risk? *Maternal and Child Health Journal*, 13, 847–856.

[Google Scholar](#) [WorldCat](#)

Coussons-Read, M. E., Okun, M. L., & Nettles, C. D. (2007). Psychosocial stress increases inflammatory markers and alters cytokine production across pregnancy. *Brain, Behavior, and Immunity*, 21(3), 343–350.

[Google Scholar](#) [WorldCat](#)

Coussons-Read, M. E., Okun, M. L., Schmitt, M. P., & Giese, S. (2005). Prenatal stress alters cytokine levels in a manner that may endanger human pregnancy. *Psychosomatic Medicine*, 67(4), 625–631.

[Google Scholar](#) [WorldCat](#)

Cox, J. E., Buman, M., Valenzuela, J., Joseph, N. P., Mitchell, A., & Woods, E. R. (2008). Depression, parenting attributes, and social support among adolescent mothers attending a teen tot program. *Journal of Pediatric and Adolescent Gynecology*, 21(5), 275–281.

[Google Scholar](#) [WorldCat](#)

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150, 782–786.

[Google Scholar](#) [WorldCat](#)

Crain, D. A., Rooney, A. A., Orlando, E. F., & Guillette, L. J., Jr. (2000). Endocrine-disrupting contaminants and hormone dynamics: Lessons from wildlife. In L. J. Guillette & D. A. Crain (Eds.), *Environmental endocrine disruptors: An evolutionary perspective* (pp. 1–

21). Philadelphia: Taylor & Francis.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

Cunnington, A. J. (2001). What's so bad about teenage pregnancy? *Journal of Family Planning and Reproductive Health Care*, 27(1), 36–41.

[Google Scholar](#) [WorldCat](#)

Da Costa, D., Larouche, J., Dritsa, M., & Brender, W. (2000). Psychosocial correlates of prepartum and postpartum depressed mood. *Journal of Affective Disorders*, 59, 31–40.

[Google Scholar](#) [WorldCat](#)

Dahinten, V., Shapka, J., & Willms, J. (2007). Adolescent children of adolescent mothers: The impact of family functioning on trajectories of development. *Journal of Youth and Adolescence*, 36(2), 195–212.

[Google Scholar](#) [WorldCat](#)

Dahl, R. E. (2004). Adolescent development and the regulation of behavior and emotion: introduction to part VIII. *Annals of the New York Academy of Sciences*, 1021, 294–295.

[Google Scholar](#) [WorldCat](#)

Darroch, J. E. (2001). Adolescent pregnancy trends and demographics. *Current Women's Health Reports*, 1(2), 102–110.

[Google Scholar](#) [WorldCat](#)

de Moraes, M. L., de Faria Barbosa, R., Santo, R. E., et al. (2011). Distribution of calcium, iron, copper, and zinc in two portions of placenta of teenager and adult women. *Biological Trace Element Research*, 143, 1271–1281.

[Google Scholar](#) [WorldCat](#)

De Paul, J., & Domenech, L. (2000). Childhood history of abuse and child abuse potential in adolescent mothers: a longitudinal study. *Child Abuse and Neglect*, 24(5), 701–713.

[Google Scholar](#) [WorldCat](#)

Deal, L. W., & Holt, V. L. (1998). Young maternal age and depressive symptoms: Results from the 1988 National Maternal and Infant Health Survey. *American Journal of Public Health*, 88(2), 266–270.

[Google Scholar](#) [WorldCat](#)

Devine, D., Long, P., & Forehand, R. (1993). A prospective study of adolescent sexual activity: Description, correlates, and predictors. *Advances in Behaviour Research and Therapy*, 15(3), 185–209.

[Google Scholar](#) [WorldCat](#)

DiClemente, R. J., Wingood, G. M., Crosby, R. A., Sionean, C., Brown, L. K., Rothbaum, B., ... Davies, S. (2001). A prospective study of psychological distress and sexual risk behavior among black adolescent females. *Pediatrics*, 108(5), E85.

[Google Scholar](#) [WorldCat](#)

Diehl, K. (1997). Adolescent mothers: What produces positive mother-infant interaction?. *Maternity Child Nursing* 22, 89–95.

[Google Scholar](#) [WorldCat](#)

Dukewich, T. L., Borkowski, J. G., & Whitman, T. L. (1996). Adolescent mothers and child abuse potential: An evaluation of risk factors. *Child Abuse and Neglect*, 20(11), 1031–1047.

[Google Scholar](#) [WorldCat](#)

DuPlessis, H. M., Bell, R., & Richards, T. (1997). Adolescent pregnancy: Understanding the impact of age and race on outcomes. *Journal of Adolescent Health*, 20(3), 187–197.

[Google Scholar](#) [WorldCat](#)

Dyson, L., Green, J. M., Renfrew, M. J., McMillan, B., & Woolridge, M. (2010). Factors influencing the infant feeding decision for socioeconomically deprived pregnant teenagers: the moral dimension. *Birth*, 37(2), 141–149.

[Google Scholar](#) [WorldCat](#)

Ekwo, E. E., & Moawad, A. (2000). Maternal age and preterm births in a black population. *Paediatric and Perinatal Epidemiology*, *14*(2), 145–151.

[Google Scholar](#) [WorldCat](#)

Elkind, D. (2001). Why today's adolescents behave differently from those of earlier generations. *Pediatric Annals*, *30*(2), 97–102.

[Google Scholar](#) [WorldCat](#)

Ellis, B. J., & Garber, J. (2000). Psychosocial antecedents of variation in girls' pubertal timing: maternal depression, stepfather presence, and marital and family stress. *Child Development*, *71*(2), 485–501.

[Google Scholar](#) [WorldCat](#)

Ensor, R., & Hughes, C. (2010). With a little help from my friends: Maternal social support, via parenting, promotes willingness to share in preschoolers born to young mothers. *Infant and Child Development*, *19*(2), 127–141.

[Google Scholar](#) [WorldCat](#)

p. 595 Erikson, E. H. (1968). *Identity, youth, and crisis*. New York: Norton.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

Ernst, M., Nelson, E. E., Jazbec, S., McClure, E. B., Monk, C. S., Leibenluft, E., ... Pine, D. (2005). Amygdala and nucleus accumbens in responses to receipt and omission of gains in adults and adolescents. *Neuroimage*, *25*(4), 1279–1291.

[Google Scholar](#) [WorldCat](#)

Eshbaugh, E. M. (2006). Predictors of depressive symptomatology among low-income adolescent mothers. *Archives of Women's Mental Health*, *9*(6), 339–342.

[Google Scholar](#) [WorldCat](#)

Eshbaugh, E. M. (2008). Potential positive and negative consequences of coresidence for teen mothers and their children in adult-supervised households. *Journal of Child and Family Study*, *17*, 98–108.

[Google Scholar](#) [WorldCat](#)

Esperat, M. C., & Esparza, D. V. (1997). Minority adolescent mothers who reported childhood sexual abuse and those who did not: perceptions of themselves and their relationships. *Issues in Mental Health Nursing*, *18*(3), 229–246.

[Google Scholar](#) [WorldCat](#)

Evans, J., Heron, J., Francomb, H., Oke, S., & Golding, J. (2001). Cohort study of depressed mood during pregnancy and after childbirth. *British Medical Journal*, *323*(7307), 257–260.

[Google Scholar](#) [WorldCat](#)

Felice, M. E., Feinstein, R. A., Fisher, M. M., Kaplan, D. W., Olmedo, L. F., Rome, E. S., & Staggers, B. (1999). Adolescent pregnancy—current trends and issues: 1998 American Academy of Pediatrics Committee on Adolescence, 1998–1999. *Pediatrics*, *103*(2), 516–520.

Fergusson, D. M., & Woodward, L. J. (1999). Maternal age and educational and psychosocial outcomes in early adulthood. *Journal of Child Psychology and Psychiatry*, *40*(3), 479–489.

[Google Scholar](#) [WorldCat](#)

Field, T., Grizzle, N., Scafidi, F., & Schanberg, S. (1996). Massage and relaxation therapies' effects on depressed adolescent mothers. *Adolescence*, *31*(124), 903–911.

[Google Scholar](#) [WorldCat](#)

Field, T., Pickens, J., Prodromidis, M., Malphurs, J., Fox, N., Bendell, D., et al. (2000). Targeting adolescent mothers with depressive symptoms for early intervention. *Adolescence*, *35*(138), 381–414.

[Google Scholar](#) [WorldCat](#)

Figueiredo, B., Pacheco, A., & Costa, R. (2007). Depression during pregnancy and the postpartum period in adolescent and adult Portuguese mothers. *Archives of Women's Mental Health*, 10(3), 103–109.

[Google Scholar](#) [WorldCat](#)

Flaherty, M. J. (1988). Seven caring functions of black grandmothers in adolescent mothering. *Maternal-Child Nursing Journal*, 17(3), 191–207.

[Google Scholar](#) [WorldCat](#)

Flanagan, P. J., McGrath, M. M., Meyers, E. C., & Garcia Coll, C. T. (1995). Adolescent development and transitions to motherhood. *Pediatrics*, 96, 273–277.

[Google Scholar](#) [WorldCat](#)

Fleming, B. W., Munton, M. T., Clarke, B. A., & Strauss, S. S. (1993). Assessing and promoting positive parenting in adolescent mothers. *American Journal of Maternal and Child Nursing*, 18(1), 32–37

[Google Scholar](#) [WorldCat](#)

Ford, C. (2010). Which adolescents have opportunities to talk to doctors alone? *Journal of Adolescent Health* 46, 307–308.

[Google Scholar](#) [WorldCat](#)

Franklin, C., Corcoran, J., & Harris, M. (2004). Risk and protective factors for adolescent pregnancy. In M. W. Fraser (Ed.), *Risk and resilience in childhood: an ecological perspective* (2nd ed., pp. 281–313). Washington, DC: NASW Press.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

Fraser, A. M., Brockert, J. E., & Ward, R. H. (1995). Association of young maternal age with adverse reproductive outcomes. *New England Journal of Medicine*, 332(17), 1113–1117.

[Google Scholar](#) [WorldCat](#)

Fries, E., Hesse, J., Hellhammer, J., & Hellhammer, D. H. (2005). A new view on hypocortisolism. *Psychoneuroendocrinology*, 30(10), 1010–1016.

[Google Scholar](#) [WorldCat](#)

Frisancho, A. R. (1997). Reduction of birth weight among infants born to adolescents: Maternal–fetal growth competition. *Annals of the New York Academy of Sciences*, 817(1), 272–280.

[Google Scholar](#) [WorldCat](#)

Furstenberg, F. F., Jr., Levine, J. A., & Brooks-Gunn, J. (1990). The children of teenage mothers: patterns of early childbearing in two generations. *Family Planning Perspectives*, 22(2), 54–61.

[Google Scholar](#) [WorldCat](#)

Galvan, A., Hare, T., Voss, H., Glover, G., & Casey, B. J. (2007). Risk-taking and the adolescent brain: Who is at risk? *Developmental Science*, 10(2), F8–F14.

[Google Scholar](#) [WorldCat](#)

Galvan, A., Hare, T. A., Parra, C. E., Penn, J., Voss, H., Glover, G., et al. (2006). Earlier development of the accumbens relative to orbitofrontal cortex might underlie risk-taking behavior in adolescents. *Journal of Neuroscience*, 26(25), 6885–6892.

[Google Scholar](#) [WorldCat](#)

Gee, C., McNerney, C., Reiter, M., & Leaman, S. (2007). Adolescent and young adult mothers' relationship quality during the transition to parenthood: Associations with father involvement in Fragile Families. *Journal of Youth and Adolescence*, 36(2), 213–224.

[Google Scholar](#) [WorldCat](#)

Gee, C. B., & Rhodes, J. E. (2003). Adolescent mothers' relationship with their children's biological fathers: Social support, social

strain, and relationship continuity. *Journal of Family Psychology*, 17(3), 370–383.

[Google Scholar](#) [WorldCat](#)

Geronimus, A. T. (1992). The weathering hypothesis and the health of African-American women and infants: Evidence and speculations. *Ethnicity and Disease*, 2(3), 207–221.

[Google Scholar](#) [WorldCat](#)

Geronimus, A. T. (1996). Black/white differences in the relationship of maternal age to birthweight: A population-based test of the weathering hypothesis. *Social Science and Medicine*, 42(4), 589–597.

[Google Scholar](#) [WorldCat](#)

Gianaros, P. J., Manuck, S. B., Sheu, L. K., Kuan, D. C., Votruba-Drzal, E., Craig, A. E., & Hariri, A. (2011). Parental education predicts corticostriatal functionality in adulthood. *Cerebral Cortex*, 21(4), 896–910.

[Google Scholar](#) [WorldCat](#)

Giedd, J. N., Blumenthal, J., Jeffries, N. O., Castellanos, F. X., Liu, H., Zijdenbos, A., Paus, T., ... Rapoport, J. (1999). Brain development during childhood and adolescence: a longitudinal MRI study. *Nature Neuroscience*, 2(10), 861–863.

[Google Scholar](#) [WorldCat](#)

Gilbert, W. M., Jandial, D., Field, N. T., Bifelow, P., & Danielsen, B. (2004). Birth outcomes in teenage pregnancies. *Journal of Maternal-Fetal and Neonatal Medicine*, 16, 265–270.

[Google Scholar](#) [WorldCat](#)

Gilson, K. J., & Lancaster, S. (2008). Childhood sexual abuse in pregnant and parenting adolescents. *Child Abuse and Neglect*, 32(9), 869–877.

[Google Scholar](#) [WorldCat](#)

Gluckman, P. D., & Hanson, M. A. (2006). Evolution, development and timing of puberty. *Trends in Endocrinology and Metabolism*, 17(1), 7–12.

[Google Scholar](#) [WorldCat](#)

Gorman, L. L., O'Hara, M. W., Figueiredo, B., Hayes, S., Jacquemain, F., Kammerer, M. H., Klier, C., ... TCS-PND Group (2004). Adaptation of the structured clinical interview for DSM-IV disorders for assessing depression in women during pregnancy and post-partum across countries and cultures. *British Journal of Psychiatry (Supplement)*, 46, s17–23.

[Google Scholar](#) [WorldCat](#)

Gosdin, M. M. (2005). *Perceptions of postpartum depression among adolescent mothers and the social construction of related stigma*. Unpublished master's thesis, University of North Texas, Denton, TX.

p. 596 Gotlib, I. H., Whiffen, V. E., Wallace, P. M., & Mount, J. H. (1991). Prospective investigation of postpartum depression: Factors involved in onset and recovery. *Journal of Abnormal Psychology*, 100(2), 122–132.

Grady, M. A., & Bloom, K. C. (2004). Pregnancy outcomes of adolescents enrolled in a CenteringPregnancy program. *Journal of Midwifery & Women's Health*, 49(5), 412–420.

[Google Scholar](#) [WorldCat](#)

Gueorguieva, R. V., Carter, R. L., Ariet, M., Roth, J., Mahan, C. S., & Resnick, M. B. (2001). Effect of teenage pregnancy on educational disabilities in kindergarten. *American Journal of Epidemiology*, 154(3), 212–220.

[Google Scholar](#) [WorldCat](#)

Guillette, L. J., Jr. (2006). Endocrine disrupting contaminants— beyond the dogma. *Environmental Health Perspectives*, 114 Suppl 1, 9–12.

Guillette, L. J., Jr., & Gunderson, M. P. (2001). Alterations in development of reproductive and endocrine systems of wildlife populations exposed to endocrine-disrupting contaminants. *Reproduction*, *122*(6), 857–864.

[Google Scholar](#) [WorldCat](#)

Gunderson, M. P., LeBlanc, G. A., & Guillette, L. J., Jr. (2001). Alterations in sexually dimorphic biotransformation of testosterone in juvenile American alligators (*alligator mississippiensis*) from contaminated lakes. *Environmental Health Perspectives*, *109*(12), 1257–1264.

[Google Scholar](#) [WorldCat](#)

Gunnar, M. R., & Donzella, B. (2002). Social regulation of the cortisol levels in early human development.

Psychoneuroendocrinology, *27*(1–2), 199–220.

[Google Scholar](#) [WorldCat](#)

Gunther, A. L., Karaolis-Danckert, N., Kroke, A., Remer, T., & Buyken, A. E. (2010). Dietary protein intake throughout childhood is associated with the timing of puberty. *Journal of Nutrition*, *140*(3), 565–571.

[Google Scholar](#) [WorldCat](#)

Hamilton, B. E. (2010). Births: Preliminary data for 2008. *National Vital Statistics Reports*, *58*(1–17).

[Google Scholar](#) [WorldCat](#)

Hardy, J. B., Astone, N. M., Brooks-Gunn, J., Shapiro, S., & Miller, T. L. (1998). Like mother, like child: Intergenerational patterns of age at first birth and associations with childhood and adolescent characteristics and adult outcomes in the second generation.

Developmental Psychology, *34*(6), 1220–1232.

[Google Scholar](#) [WorldCat](#)

Hediger, M. L., Scholl, T. O., Ances, I. G., Belsky, D. H., & Salmon, R. W. (1990). Rate and amount of weight gain during adolescent pregnancy: associations with maternal weight-for-height and birth weight. *American Journal of Clinical Nutrition*, *52*(5), 793–799.

[Google Scholar](#) [WorldCat](#)

Henly, J. R. (1997). The complexity of support: The impact of family structure and provisional support on African American and white adolescent mothers' well-being. *American Journal of Community Psychology*, *25*(5), 629–655.

[Google Scholar](#) [WorldCat](#)

Herbst, A. L., Ulfelder, H., & Poskanzer, D. C. (1971). Adenocarcinoma of the vagina. Association of maternal stilbestrol therapy with tumor appearance in young women. *New England Journal of Medicine*, *284*(15), 878–881.

[Google Scholar](#) [WorldCat](#)

Herman, J. P., Figueiredo, H., Mueller, N. K., Ulrich-Lai, Y., Ostrander, M. M., Choi, D. C., & Cullinan, W. (2003). Central mechanisms of stress integration: hierarchical circuitry controlling hypothalamo-pituitary-adrenocortical responsiveness. *Frontiers in Neuroendocrinology*, *24*(3), 151–180.

[Google Scholar](#) [WorldCat](#)

Herrman, J. W. (2008). Adolescent perceptions of teen births: a focus group study. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *37*, 42–50.

[Google Scholar](#) [WorldCat](#)

Hillis, S. D., Anda, R. F., Dube, S. R., Felitti, V. J., Marchbanks, P. A., & Marks, J. S. (2004). The association between adverse childhood experiences and adolescent pregnancy, long-term psychosocial consequences, and fetal death. *Pediatrics*, *113*(2), 320–327.

[Google Scholar](#) [WorldCat](#)

Hipwell, A. E. (2011, May). *What do pre-pregnancy characteristics tell us about the early caregiving among teenage mothers? Results from a 10-year prospective study*. Paper presented at the Conference on the Legacy of Channi Kumar: Perinatal psychiatry in the 21st century, Institute of Psychiatry, University of London, UK.

Hipwell, A. E., Keenan, K., Loeber, R., & Battista, D. (2010). Early predictors of sexually intimate behaviors in an urban sample of young girls. *Developmental Psychology*, 46(2), 366–378.

[Google Scholar](#) [WorldCat](#)

Hipwell, A. E., Loeber, R., Stouthamer-Loeber, M., Keenan, K., White, H. R., & Kroneman, L. (2002). Characteristics of girls with early onset disruptive and antisocial behaviour. *Criminal Behaviour and Mental Health* 12(1), 99–118.

[Google Scholar](#) [WorldCat](#)

Hobfoll, S. E., Ritter, C., Lavin, J., Hulsizer, M. R., & Cameron, R. P. (1995). Depression prevalence and incidence among inner-city pregnant and postpartum women. *Journal of Consulting and Clinical Psychology*, 63(3), 445–453.

[Google Scholar](#) [WorldCat](#)

Hodgkinson, S. C., Colantuoni, E., Roberts, D., Berg-Cross, L., & Belcher, H.M.E. (2010). Depressive symptoms and birth outcomes among pregnant teenagers. *Journal of Pediatric Adolescence and Gynecology*, 23, 16–22.

[Google Scholar](#) [WorldCat](#)

Hoffman, S., & Maynard, R. (2008). *Kids having kids: Economic and social consequences of teen pregnancy*. Washington, DC: Urban Institute.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

Holzman, C., Eyster, J., Kleyn, M., Messer, L. C., Kaufman, J. S., Laraia, B. A., ... Elo, I. T. (2009). Maternal weathering and risk of preterm delivery. *American Journal of Public Health*, 99(10), 1864–1871.

[Google Scholar](#) [WorldCat](#)

Hudson, D. B., Elek, S. M., & Campbell-Grossman, C. (2000). Depression, self-esteem, loneliness, and social support among adolescent mothers participating in the new parents project. *Adolescence*, 35(139), 445–453.

[Google Scholar](#) [WorldCat](#)

Hulanicka, B. (1999). Acceleration of menarcheal age of girls from dysfunctional families. *Journal of Reproductive & Infant Psychology*, 17(2), 119.

[Google Scholar](#) [WorldCat](#)

Ibanez, L., Ferrer, A., Marcos, M. V., Hierro, F. R., & de Zegher, F. (2000). Early puberty: Rapid progression and reduced final height in girls with low birth weight. *Pediatrics*, 106(5), E72.

[Google Scholar](#) [WorldCat](#)

Ickovics, J. R., Kershaw, T. S., Westdahl, C., Magriples, U., Massey, Z., Reynolds, H., & Rising, S. S. (2007). Group prenatal care and perinatal outcomes: a randomized controlled trial. *Obstetrics and Gynecology*, 110(2 Pt 1), 330–339.

[Google Scholar](#) [WorldCat](#)

Ickovics, J. R., Kershaw, T. S., Westdahl, C., Rising, S. S., Klima, C., Reynolds, H., & Magriples, U. (2003). Group prenatal care and preterm birth weight: results from a matched cohort study at public clinics. *Obstetrics and Gynecology*, 102(5 Pt 1), 1051–1057.

[Google Scholar](#) [WorldCat](#)

Iguchi, T., Watanabe, H., & Katsu, Y. (2001). Developmental effects of estrogenic agents on mice, fish, and frogs: a mini-review. *Hormones & Behavior*, 40(2), 248–251.

[Google Scholar](#) [WorldCat](#)

Jaffee, S., Caspi, A., Moffitt, T. E., Belsky, J., & Silva, P. (2001). Why are children born to teen mothers at risk for adverse outcomes in young adulthood? Results from a 20-year longitudinal study. *Development and Psychopathology*, 13(2), 377–397.

[Google Scholar](#) [WorldCat](#)

Jean, R. T., Wilkinson, A. V., Spitz, M. R., Prokhorov, A., Bondy, M., & Forman, M. R. (2011). Psychosocial risk and correlates of early menarche in Mexican-American girls. *American Journal of Epidemiology*, 173(10), 1203–1210.

[Google Scholar](#) [WorldCat](#)

Jernigan, T. L., Trauner, D. A., Hesselink, J. R., & Tallal, P. A. (1991). Maturation of human cerebrum observed in vivo during adolescence. *Brain*, *114*(Pt 5), 2037–2049.

[Google Scholar](#) [WorldCat](#)

p. 597 Johanson, R., Chapman, G., Murray, D., Johnson, I., & Cox, J. (2000). The North Staffordshire maternity hospital ↵ prospective study of pregnancy-associated depression. *Journal of Psychosomatic Obstetrics and Gynaecology*, *21*(2), 93–97.

Jolly, M. C., Sebire, N., Harris, J., Robinson, S., & Regan, L. (2000). Obstetric risks of pregnancy in women less than 18 years old. *Obstetrics and Gynecology*, *96*(6), 962–966.

[Google Scholar](#) [WorldCat](#)

Jones, R. L., Cederberg, H. M., Wheeler, S. J., Poston, L., Hutchinson, C. J., Seed, P. T., ... Baker, P. N. (2010). Relationship between maternal growth, infant birthweight and nutrient partitioning in teenage pregnancies. *British Journal of Obstetrics and Gynaecology*, *117*(2), 200–211.

[Google Scholar](#) [WorldCat](#)

Josefsson, A., Angelsioo, L., Berg, G., Ekstrom, C. M., Gunnervik, C., Nordin, C., & Sydsjö, G. (2002). Obstetric, somatic, and demographic risk factors for postpartum depressive symptoms. *Obstetrics and Gynecology*, *99*(2), 223–228.

[Google Scholar](#) [WorldCat](#)

Kalil, A., Spencer, M. S., Spieker, S. J., & Gilchrist, L. D. (1998). Effects of grandmother coresidence and quality of family relationships on depressive symptoms in adolescent mothers. *Family Relations*, *47*(4), 433–441.

[Google Scholar](#) [WorldCat](#)

Kaplan, E. B. (1996). Black teenage mothers and their mothers: the impact of adolescent childbearing on daughters' relations with mothers. *Social Problems*, *43*(4), 427–443.

[Google Scholar](#) [WorldCat](#)

Kaplowitz, P. B. (2008). Link between body fat and the timing of puberty. *Pediatrics*, *121* Suppl 3, S208–217.

[Google Scholar](#) [WorldCat](#)

Keenan, K., Hipwell, A., Chung, T., Stepp, S., Stouthamer-Loeber, M., Loeber, R., & McTigue, K. (2010). The Pittsburgh girls study: Overview and initial findings. *Journal of Clinical Child and Adolescent Psychology* *39*(4), 506–521.

[Google Scholar](#) [WorldCat](#)

Kimmons, J., Gillespie, C., Seymour, J., Serdula, M., & Blanck, H. M. (2009). Fruit and vegetable intake among adolescents and adults in the United States: Percentage meeting individualized recommendations. *Medscape Journal of Medicine*, *11*(1), 26.

[Google Scholar](#) [WorldCat](#)

King, J. C. (2003). The risk of maternal nutritional depletion and poor outcomes increases in early or closely spaced pregnancies. *Journal of Nutrition*, *133*(5 Suppl 2), 1732S–1736S.

[Google Scholar](#) [WorldCat](#)

Kirchengast, S., & Hartmann, B. (2003). Impact of maternal age and maternal somatic characteristics on newborn size. *American Journal of Human Biology*, *15*(2), 220–228.

[Google Scholar](#) [WorldCat](#)

Klein, J. D. (2005). Adolescent pregnancy: current trends and issues. *Pediatrics*, *116*(1), 281–286.

[Google Scholar](#) [WorldCat](#)

Koniak-Griffin, D., Anderson, N. L., Verzemnieks, I., & Brecht, M. L. (2000). A public health nursing early intervention program for adolescent mothers: Outcomes from pregnancy through 6 weeks postpartum. *Nursing Research*, *49*(3), 130–138.

[Google Scholar](#) [WorldCat](#)

Koniak-Griffin, D., & Verzemnieks, I. (1991). Effects of nursing intervention on adolescents' maternal role attainment. *Issues in Comprehensive Pediatric Nursing, 14*(2), 121–138.

[Google Scholar](#) [WorldCat](#)

Koniak-Griffin, D., Verzemnieks, I. L., Anderson, N. L., Brecht, M. L., Lesser, J., Kim, S., & Turner-Pluta, C. (2003). Nurse visitation for adolescent mothers: Two-year infant health and maternal outcomes. *Nursing Research, 52*(2), 127–136.

[Google Scholar](#) [WorldCat](#)

Kotchick, B. A., Shaffer, A., Forehand, R., & Miller, K. S. (2001). Adolescent sexual risk behavior: a multi-system perspective. *Clinical Psychology Review, 21*(4), 493–519.

[Google Scholar](#) [WorldCat](#)

Kovacs, M., Krol, R. S., & Voti, L. (1994). Early onset psychopathology and the risk for teenage pregnancy among clinically referred girls. *Journal of the American Academy of Child and Adolescent Psychiatry, 33*(1), 106–113.

[Google Scholar](#) [WorldCat](#)

Krstevska-Konstantinova, M., Charlier, C., Craen, M., Du Caju, M., Heinrichs, C., de Beaufort, C., ... Bourguignon, J. P. (2001). Sexual precocity after immigration from developing countries to Belgium: Evidence of previous exposure to organochlorine pesticides. *Human Reproduction, 16*(5), 1020–1026.

[Google Scholar](#) [WorldCat](#)

Labayen, I., Ortega, F. B., Moreno, L. A., Redondo-Figuero, C., Bueno, G., Gomez-Martinez, S., & Bueno, M. (2009). The effect of early menarche on later body composition and fat distribution in female adolescents: Role of birth weight. *Annals of Nutrition and Metabolism, 54*(4), 313–320.

[Google Scholar](#) [WorldCat](#)

Leadbeater, B. J., & Linares, O. (1992). Depressive symptoms in black and Puerto Rican adolescent mothers in the first 3 years postpartum. *Development & Psychopathology, 4*(3), 451–468.

[Google Scholar](#) [WorldCat](#)

Lee, H., Harris, K. M., & Gordon-Larsen, P. (2009). Life course perspectives on the links between poverty and obesity during the transition to young adulthood. *Population Research and Policy Review, 28*(4), 505–532.

[Google Scholar](#) [WorldCat](#)

Lee, M. C., Suhng, L. A., Lu, T. H., & Chou, M. C. (1998). Association of parental characteristics with adverse outcomes of adolescent pregnancy. *Family Practice, 15*(4), 336–342.

[Google Scholar](#) [WorldCat](#)

Lee, Y. (2009). Early motherhood and harsh parenting: The role of human, social, and cultural capital. *Child Abuse and Neglect, 33*, 625–637.

[Google Scholar](#) [WorldCat](#)

Lesser, J., & Koniak-Griffin, D. (2000). The impact of physical or sexual abuse on chronic depression in adolescent mothers. *Journal of Pediatric Nursing, 15*(6), 378–387.

[Google Scholar](#) [WorldCat](#)

Lesser, J., Koniak-Griffin, D., & Anderson, N.L.R. (1999). Depressed adolescent mothers' preceptions of their own maternal role. *Issues in Mental Health Nursing, 20*, 131–149.

[Google Scholar](#) [WorldCat](#)

Levine, S., & Wiener, S. G. (1988). Psychoendocrine aspects of mother-infant relationships in nonhuman primates. *Psychoneuroendocrinology, 13*(1–2), 143–154.

[Google Scholar](#) [WorldCat](#)

Lewinsohn, P. M., Hops, H., Roberts, R. E., Seeley, J. R., & Andrews, J. A. (1993). Adolescent psychopathology: I. Prevalence and

incidence of depression and other DSM-III-R disorders in high school students. *Journal of Abnormal Psychology*, 102(1), 133–144.

[Google Scholar](#) [WorldCat](#)

Lindhorst, T., & Oxford, M. (2008). The long-term effects of intimate partner violence on adolescent mothers' depressive symptoms. *Social Science and Medicine*, 66, 1322–1333.

[Google Scholar](#) [WorldCat](#)

Logsdon, M. C., Birkimer, J. C., Simpson, T., & Looney, S. (2005). Postpartum depression and social support in adolescents. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 34(1), 46–54.

[Google Scholar](#) [WorldCat](#)

Logsdon, M. C., Cross, R., Williams, B., & Simpson, T. (2004). Prediction of postpartum social support and symptoms of depression in pregnant adolescents: a pilot study. *Journal of School Nursing*, 20(1), 36–42.

[Google Scholar](#) [WorldCat](#)

Logsdon, M. C., Foltz, M. P., Stein, B., Usui, W., & Josephson, A. (2010). Adapting and testing telephone-based depression care management intervention for adolescent mothers. *Archives of Women's Mental Health*, 13(4), 307–317.

[Google Scholar](#) [WorldCat](#)

Logsdon, M. C., Gagne, P., Hughes, T., Patterson, J., & Rakestraw, V. (2005). Social support during adolescent pregnancy: Piecing together a quilt. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 34(5), 606–614.

[Google Scholar](#) [WorldCat](#)

Logsdon, M. C., Hines-Martin, V., & Rakestraw, V. (2009). Barriers to depression treatment in low-income, unmarried, adolescent mothers in a southern, urban area of the United States. *Issues in Mental Health Nursing*, 30(7), 451–455.

[Google Scholar](#) [WorldCat](#)

p. 598 Logsdon, M. C., & Koniak-Griffin, D. (2005). Social support in postpartum adolescents: Guidelines for nursing assessments and interventions. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 34(6), 761–768.

Logsdon, M. C., McBride, A. B., & Birkimer, J. C. (1994). Social support and postpartum depression. *Research in Nursing and Health*, 17(6), 449–457.

[Google Scholar](#) [WorldCat](#)

Logsdon, M. C., Tomasulo, R., Eckert, D., & Myers, J. (2011, October). *Preferred health resources and use of social media to obtain health information by adolescent mothers*. NPWH Annual Conference, Austin, TX.

Logsdon, M. C., Ziegler, C., Hertweck, P., & Pinto-Foltz, M. (2008). Testing a bioecological model to examine social support in postpartum adolescents. *Journal of Nursing Scholarship*, 40(2), 116–123.

[Google Scholar](#) [WorldCat](#)

Long, M. S. (2009). Disorganized attachment relationships in infants of adolescent mothers factors that may augment positive outcomes. *Adolescence*, 44(175), 621–633.

[Google Scholar](#) [WorldCat](#)

Love, C., David, R. J., Rankin, K. M., & Collins, J. W., Jr. (2010). Exploring weathering: effects of lifelong economic environment and maternal age on low birth weight, small for gestational age, and preterm birth in African-American and white women. *American Journal of Epidemiology*, 172(2), 127–134.

[Google Scholar](#) [WorldCat](#)

Lupien, S. J., McEwen, B. S., Gunnar, M. R., & Heim, C. (2009). Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nature Reviews Neuroscience*, 10(6), 434–445.

[Google Scholar](#) [WorldCat](#)

Luster, T., & Small, S. A. (1994). Factors associated with sexual risk-taking behaviors among adolescents. *Journal of Marriage and Family*, 56(3), 622–632.

[Google Scholar](#) [WorldCat](#)

Mahfouz, A. A., el-Said, M. M., al-Erian, R. A., & Hamid, A. M. (1995). Teenage pregnancy: Are teenagers a high risk group? *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 59(1), 17–20.

[Google Scholar](#) [WorldCat](#)

Manlove, J. (1997). Early motherhood in an intergenerational perspective: The experiences of a British cohort. *Journal of Marriage and Family*, 59(2), 263–279.

[Google Scholar](#) [WorldCat](#)

Marcus, S. M., Flynn, H. A., Blow, F. C., & Barry, K. L. (2003). Depressive symptoms among pregnant women screened in obstetrics settings. *Journal of Women's Health (Larchmont)*, 12(4), 373–380.

[Google Scholar](#) [WorldCat](#)

Massey, Z., Rising, S. S., & Ickovics, J. (2006). Centering Pregnancy group prenatal care: Promoting relationship-centered care. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 35(2), 286–294.

McCool, W. F., Dorn, L. D., & Susman, E. J. (1994). The relation of cortisol reactivity and anxiety to perinatal outcome in primiparous adolescents. *Research in Nursing and Health*, 17, 411–420.

[Google Scholar](#) [WorldCat](#)

McGowan, P. O., Sasaki, A., D'Alessio, A. C., Dymov, S., Labonte, B., Szyf, M., ... Meaney, M. J. (2009). Epigenetic regulation of the glucocorticoid receptor in human brain associates with childhood abuse. *Nature Neuroscience*, 12(3), 342–348.

[Google Scholar](#) [WorldCat](#)

Meade, C. S., & Ickovics, J. R. (2005). Systematic review of sexual risk among pregnant and mothering teens in the USA: Pregnancy as an opportunity for integrated prevention of STD and repeat pregnancy. *Social Science and Medicine*, 60(4), 661–678.

[Google Scholar](#) [WorldCat](#)

Mercer, R. T. (1983). Assessing and counseling teenage mothers during the perinatal period. *Nursing Clinics of North America*, 18(2), 293–301.

[Google Scholar](#) [WorldCat](#)

Mercer, R. T., Hackley, K. C., & Bostrom, A. (1984). Social support of teenage mothers. *Birth Defects Original Article Series*, 20(5), 245–290.

[Google Scholar](#) [WorldCat](#)

Milan, S., Ickovics, J. R., Kershaw, T., Lewis, J., Meade, C., & Ethier, K. (2004). Prevalence, course, and predictors of emotional distress in pregnant and parenting adolescents. *Journal of Consulting and Clinical Psychology*, 72(2), 328–340.

[Google Scholar](#) [WorldCat](#)

Miller, B. C., Benson, B., & Galbraith, K. A. (2001). Adolescent pregnancy risk: A research synthesis. *Developmental Review*, 21(1), 1–38.

[Google Scholar](#) [WorldCat](#)

Miller, H. L. (1987). The effect of maternal stress on fetal birth weight. In J. H. Humphrey (Ed.), *Human Stress: Current Selected Research* (Vol. 2, pp. 103–119). New York: AMS Press.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

Miller-Johnson, S., Winn, D. M., Coie, J., Maumary-Gremaud, A., Hyman, C., Terry, R., & Lochman, J. (1999). Motherhood during the teen years: a developmental perspective on risk factors for childbearing. *Development and Psychopathology*, 11(1), 85–100.

[Google Scholar](#) [WorldCat](#)

Mims, B. L. (1998). Afrocentric perspective of adolescent pregnancy in African American families: a literature review. *Official journal of the Association of Black Nursing Faculty in Higher Education, Inc.*, 9(4), 80–88.

[Google Scholar](#) [WorldCat](#)

Mitchell, S. J., Lewin, A., Horn, I., Valentine, D., Sanders-Phillips, K., & Joseph, J. G. (2010). How does violence exposure affect the psychological health and parenting of young African-American mothers? *Social Science and Medicine* 70, 526–533.

[Google Scholar](#) [WorldCat](#)

Moffitt, T. E., Caspi, A., Belsky, J., & Silva, P. A. (1992). Childhood experience and the onset of menarche: A test of a sociobiological model. *Child Development*, 63(1), 47–58.

[Google Scholar](#) [WorldCat](#)

Montgomery, S. M., Ehlin, A., & Sacker, A. (2006). Breast feeding and resilience against psychosocial stress. *Archives of Disease in Childhood*, 91(12), 990–994.

[Google Scholar](#) [WorldCat](#)

Nebesio, T. D., & Pescovitz, O. H. (2005). Historical perspectives—Endocrine disruptors and the timing of puberty. *Endocrinologist*, 15(1), 44–48.

[Google Scholar](#) [WorldCat](#)

Nolen-Hoeksema, S., & Girgus, J. S. (1994). The emergence of gender differences in depression during adolescence. *Psychological Bulletin*, 115(3), 424–443.

[Google Scholar](#) [WorldCat](#)

O'Hara, M. (2011, May). *Perinatal mental illness across the world: Prevalence and risk factors*. Paper presented at the Conference on the Legacy of Channi Kumar: Perinatal psychiatry in the 21st century, Institute of Psychiatry, University of London, UK.

O'Hara, M. W., & Swain, A. M. (1996). Rates and risk of postpartum depression—a meta-analysis. *International Review of Psychiatry*, 8, 37–54.

[Google Scholar](#) [WorldCat](#)

Oberlander, S. E., Black, M. M., & Starr, R. H., Jr. (2007). African American adolescent mothers and grandmothers: A multigenerational approach to parenting. *American Journal of Community Psychology*, 39(1–2), 37–46.

[Google Scholar](#) [WorldCat](#)

Ogden, C., & Carroll, M. (2010). Prevalence of obesity among children and adolescents: United States, trends 1963–1965 through 2007–2008. *National Center for Health Statistics: Health E-Stat*, 1–5.

[Google Scholar](#) [WorldCat](#)

Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999–2004. *Journal of the American Medical Association*, 295(13), 1549–1555.

[Google Scholar](#) [WorldCat](#)

Osypuk, T. L., & Acevedo-Garcia, D. (2008). Are racial disparities in preterm birth larger in hypersegregated areas? *American Journal of Epidemiology*, 167(11), 1295–1304.

[Google Scholar](#) [WorldCat](#)

Oxford, M. L. (2010). Predicting markers of adulthood among adolescent mothers. *Social Work Research*, 34(1), 33.

[Google Scholar](#) [WorldCat](#)

p. 599 Oxford, M. L., Gilchrist, L. D., Gillmore, M. R., & Lohr, M. J. (2006). Predicting variation in the life course of adolescent mothers as they enter adulthood. *Journal of Adolescent Health* 39(1), 20–26.

[Google Scholar](#) [WorldCat](#)

Pagnini, D. L., & Morgan, S. P. (1996). Racial differences in marriage and childbearing: Oral history evidence from the south in the early twentieth century. *American Journal of Sociology*, *101*(6), 1694–1718.

[Google Scholar](#) [WorldCat](#)

Panzarine, S., Slater, E., & Sharps, P. (1995). Coping, social support, and depressive symptoms in adolescent mothers. *Journal of Adolescent Health*, *17*(2), 113–119.

[Google Scholar](#) [WorldCat](#)

Parent, A. S., Teilmann, G., Juul, A., Skakkebaek, N. E., Toppari, J., & Bourguignon, J. P. (2003a). The timing of normal puberty and the age limits of sexual precocity: Variations around the world, secular trends, and changes after migration. *Endocrine Reviews*, *24*(5), 668–693.

[Google Scholar](#) [WorldCat](#)

Parent, A. S., Teilmann, G., Juul, A., Skakkebaek, N. E., Toppari, J., & Bourguignon, J. P. (2003b). The timing of normal puberty and the age limits of sexual precocity: Variations around the world, secular trends, and changes after migration. *Endocrine Reviews*, *24*(5), 668–693.

[Google Scholar](#) [WorldCat](#)

Pesonen, A. K., Raikkonen, K., Heinonen, K., Kajantie, E., Forsen, T., & Eriksson, J. G. (2008). Reproductive traits following a parent-child separation trauma during childhood: A natural experiment during World War II. *American Journal of Human Biology*, *20*(3), 345–351.

[Google Scholar](#) [WorldCat](#)

Prodromidis, M., Abrams, S., Field, T., Scafidi, F., & Rahdert, E. (1994). Psychosocial stressors among depressed adolescent mothers. *Adolescence*, *29*(114), 331–343.

[Google Scholar](#) [WorldCat](#)

Quinlan, R. J. (2003). Father absence, parental care, and female reproductive development. *Evolution and Human Behavior*, *24*(6), 376–390.

[Google Scholar](#) [WorldCat](#)

Rah, J. H., Christian, P., Shamim, A. A., Arju, U. T., Labrique, A. B., & Rashid, M. (2008). Pregnancy and lactation hinder growth and nutritional status of adolescent girls in rural Bangladesh. *Journal of Nutrition*, *138*(8), 1505–1511.

[Google Scholar](#) [WorldCat](#)

Reedy, J., & Krebs-Smith, S. M. (2010). Dietary sources of energy, solid fats, and added sugars among children and adolescents in the United States. *Journal of the American Dietetic Association*, *110*(10), 1477–1484.

[Google Scholar](#) [WorldCat](#)

Reid, V., & Meadows-Oliver, M. (2007). Postpartum depression in adolescent mothers: An integrative review of the literature. *Journal of Pediatric Health Care*, *21*(5), 289–298.

[Google Scholar](#) [WorldCat](#)

Reis, J. (2001). A comparison of young teenage, older teenage, and adult mothers on determinants of parenting. *The Journal of Psychology*, *123*(2), 141–151.

[Google Scholar](#) [WorldCat](#)

Rich-Edwards, J. W., Kleinman, K., Abrams, A., Harlow, B. L., McLaughlin, T. J., Joffe, H., & Gillman, M. W. (2006). Sociodemographic predictors of antenatal and postpartum depressive symptoms among women in a medical group practice. *Journal of Epidemiology and Community Health*, *60*(3), 221–227.

[Google Scholar](#) [WorldCat](#)

Rickert, V. I. P., Wiemann, C. M. P., & Berenson, A. B. M. (2000). Ethnic differences in depressive symptomatology among young women. *Obstetrics and Gynecology*, *95*(1), 55–60.

[Google Scholar](#) [WorldCat](#)

Robertson, B., Aycock, D. M., & Darnell, L. A. (2009). Comparison of centering pregnancy to traditional care in Hispanic mothers. *Maternal and Child Health Journal, 13*(3), 407–414.

[Google Scholar](#) [WorldCat](#)

Robertson, E., Grace, S., Wallington, T., & Stewart, D. E. (2004). Antenatal risk factors for postpartum depression: A synthesis of recent literature. *General Hospital Psychiatry, 26*(4), 289–295.

[Google Scholar](#) [WorldCat](#)

Rogers, M. M., Peoples-Sheps, M. D., & Suchindran, C. (1996). Impact of a social support program on teenage prenatal care use and pregnancy outcomes. *Journal of Adolescent Health, 19*(2), 132–140.

[Google Scholar](#) [WorldCat](#)

Romans, S. E., Martin, J. M., Gendall, K., & Herbison, G. P. (2003). Age of menarche: The role of some psychosocial factors. *Psychological Medicine, 33*(5), 933–939.

[Google Scholar](#) [WorldCat](#)

Rosenfield, R. L., Lipton, R. B., & Drum, M. L. (2009). Thelarche, pubarche, and menarche attainment in children with normal and elevated body mass index. *Pediatrics, 123*(1), 84–88.

[Google Scholar](#) [WorldCat](#)

Sadler, L. S., & Clemmens, D. A. (2004). Ambivalent grandmothers raising teen daughters and their babies. *Journal of Family Nursing, 10*(2), 211–231.

[Google Scholar](#) [WorldCat](#)

Salsberry, P. J., Reagan, P. B., & Pajer, K. (2009). Growth differences by age of menarche in African American and White girls. *Nursing Research, 58*(6), 382–390.

[Google Scholar](#) [WorldCat](#)

Sandman, C. A., Glynn, L., Schetter, C. D., Wadhwa, P., Garite, T., Chicx-Demet, A., & Hobel, C. (2006). Elevated maternal cortisol early in pregnancy predicts third trimester levels of placental corticotropin releasing hormone (CRH): Priming the placental clock. *Peptides, 27*(6), 1457–1463.

[Google Scholar](#) [WorldCat](#)

Sapotichne, B., Klostermann, S., & Hipwell, A. E. (2010, March). *The effects of young motherhood on conduct problems and substance abuse*. Poster presented at the Society of Research on Adolescence meeting, Philadelphia, PA.

Schmidt, R. M., Wiemann, C. M., Rickert, V. I., & Smith, E. O. (2006). Moderate to severe depressive symptoms among adolescent mothers followed four years postpartum. *Journal of Adolescent Health, 38*(6), 712–718.

[Google Scholar](#) [WorldCat](#)

Scholl, T. O., & Hediger, M. L. (1995). Weight gain, nutrition, and pregnancy outcome: Findings from the Camden study of teenage and minority gravidas. *Seminars in Perinatology, 19*(3), 171–181.

[Google Scholar](#) [WorldCat](#)

Scholl, T. O., Hediger, M. L., & Schall, J. I. (1997). Maternal growth and fetal growth: Pregnancy course and outcome in the Camden Study. *Annals of the New York Academy of Sciences, 817*, 292–301.

[Google Scholar](#) [WorldCat](#)

Schwarz, D. F. (2007). State of the art review: Intervening to improve outcomes for adolescent mothers and their children. *American Journal of Lifestyle Medicine, 1*(6), 482–489.

[Google Scholar](#) [WorldCat](#)

Secco, M. L., & Moffatt, M. E. (2003). Situational, maternal, and infant influences on parenting stress among adolescent mothers. *Issues in Comprehensive Pediatric Nursing, 26*, 103–122.

[Google Scholar](#) [WorldCat](#)

Secco, M. L., Profit, S., Kennedy, E., Walsh, A., Letourneau, N., & Stewart, M. (2007). Factors affecting postpartum depressive symptoms of adolescent mothers. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 36(1), 47–54.

[Google Scholar](#) [WorldCat](#)

Serbin, L. A., Cooperman, J. M., Peters, P. L., Lehoux, P. M., Stack, D. M., & Schwartzman, A. E. (1998). Intergenerational transfer of psychosocial risk in women with childhood histories of aggression, withdrawal, or aggression and withdrawal. *Developmental Psychology*, 34(6), 1246–1262.

[Google Scholar](#) [WorldCat](#)

Shakespeare, K., Waite, P. J., & Gast, J. (2010). A comparison of health behaviors of women in centering pregnancy and traditional prenatal care. *Maternal and Child Health Journal*, 14(2), 202–208.

[Google Scholar](#) [WorldCat](#)

Shorris, E. (1992). *Latinos: A biography of the people*. New York: Norton.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

p. 600 Sieger, K., & Renk, K. (2007). Pregnant and parenting adolescents: A study of ethnic identity, emotional and behavioral functioning, child characteristics, and social support. *Journal of Youth Adolescence*, 36, 567–581.

[Google Scholar](#) [WorldCat](#)

SmithBattle, L. (1995). Teenage mothers' narratives of self: An examination of risking the future. *Advances in Nursing Science*, 17(4), 22–36.

[Google Scholar](#) [WorldCat](#)

SmithBattle, L. (2007). Learning the baby: An interpretive study of teen mothers. *Journal of Pediatric Nursing*, 22(4), 261–271.

[Google Scholar](#) [WorldCat](#)

Sowell, E. R., Thompson, P. M., Holmes, C. J., Jernigan, T. L., & Toga, A. W. (1999). In vivo evidence for post-adolescent brain maturation in frontal and striatal regions. *Nature Neuroscience*, 2(10), 859–861.

[Google Scholar](#) [WorldCat](#)

Spear, L. P. (2000). The adolescent brain and age-related behavioral manifestations. *Neuroscience and Biobehavioral Reviews*, 24(4), 417–463.

[Google Scholar](#) [WorldCat](#)

Spencer, J. M., Zimet, G. D., Aalsma, M. C., & Orr, D. P. (2002). Self-esteem as a predictor of initiation of coitus in early adolescents. *Pediatrics*, 109(4), 581–584.

[Google Scholar](#) [WorldCat](#)

Spieker, S., & Bensley, L. (1994). Roles of living arrangements and grandmother social support in adolescent mothering and infant attachment. *Developmental Psychology*, 30(1), 102–111.

[Google Scholar](#) [WorldCat](#)

Steer, R. A., Scholl, T. O., & Beck, A. T. (1990). Revised Beck Depression Inventory scores of inner-city adolescents: Pre- and postpartum. *Psychological Reports*, 66(1), 315–320.

[Google Scholar](#) [WorldCat](#)

Steinberg, L., Dahl, R., Keating, D., Kupfer, D. J., Masten, A. S., & Pine, D. S. (2006). The study of developmental psychopathology in adolescence: Integrating affective neuroscience with the study of context. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology, Vol 2: Developmental neuroscience* (2nd ed., pp. 710–741). Hoboken, NJ: Wiley.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

Stevens, C. A. (2006). Being healthy: Voices of adolescent women who are parenting. *Journal for Specialists in Pediatric Nursing*, 11(1), 28–40.

[Google Scholar](#) [WorldCat](#)

Stevens-Simon, C., Beach, R. K., & McGregor, J. A. (2002). Does incomplete growth and development predispose teenagers to preterm delivery? A template for research. *Journal of Perinatology*, 22(4), 315–323.

[Google Scholar](#) [WorldCat](#)

Stevens-Simon, C., Kaplan, D. W., & McAnarney, E. R. (1993). Factors associated with preterm delivery among pregnant adolescents. *Journal of Adolescent Health*, 14(4), 340–342.

[Google Scholar](#) [WorldCat](#)

Stevens-Simon, C., & McAnarney, E. R. (1994). Childhood victimization: Relationship to adolescent pregnancy outcome. *Child Abuse and Neglect*, 18(7), 569–575.

[Google Scholar](#) [WorldCat](#)

Stevens-Simon, C., Thureen, P., Barrett, J., & Stamm, E. (2002). Regional body fat distribution and insulin resistance during adolescent pregnancy. *Journal of the American Dietetic Association*, 102(4), 563–565.

[Google Scholar](#) [WorldCat](#)

Stevens-Simon, C., & White, M. M. (1991). Adolescent pregnancy. *Pediatric Annals*, 20(6), 322–331.

[Google Scholar](#) [WorldCat](#)

Stiles, A. S. (2010). Case study of an intervention to enhance maternal sensitivity in adolescent mothers. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 39, 723–733.

[Google Scholar](#) [WorldCat](#)

Strom, B. L., Schinnar, R., Ziegler, E. E., Barnhart, K. T., Sammel, M. D., Macones, G. A., ... Hanson, S. A. (2001). Exposure to soy-based formula in infancy and endocrinological and reproductive outcomes in young adulthood. *Journal of the American Medical Association*, 286(7), 807–814.

[Google Scholar](#) [WorldCat](#)

Sun, S. S., Schubert, C. M., Chumlea, W. C., Roche, A. F., Kulin, H. E., Lee, P. A., ... Ryan, A. S. (2002). National estimates of the timing of sexual maturation and racial differences among US children. *Pediatrics*, 110(5), 911–919.

[Google Scholar](#) [WorldCat](#)

Szigethy, E. M., & Ruiz, P. (2001). Depression among pregnant adolescents: An integrated treatment approach. *American Journal of Psychiatry*, 158(1), 22–27.

[Google Scholar](#) [WorldCat](#)

Talashsek, M. L., Alba, M. L., & Patel, A. (2006). Untangling the health disparities of teen pregnancy. *Journal for Specialists in Pediatric Nursing* 11(1), 14–27.

[Google Scholar](#) [WorldCat](#)

Thame, M. M., Fletcher, H. M., Baker, T. M., & Jahoor, F. (2010). Comparing the glucose kinetics of adolescent girls and adult women during pregnancy. *American Journal of Clinical Nutrition*, 91(3), 604–609.

[Google Scholar](#) [WorldCat](#)

Thompson, M. S., Peebles-Wilkins, W. (1992). The impact of formal, informal, and societal support networks on the psychological well-being of black adolescent mothers. *Social Work*, 37(4), 322–328.

[Google Scholar](#) [WorldCat](#)

Tiwary, C. M. (1998). Premature sexual development in children following the use of estrogen- or placenta-containing hair products. *Clinical Pediatrics*, 37(12), 733–739.

[Google Scholar](#) [WorldCat](#)

Tottenham, N., Hare, T. A., Millner, A., Gilhooly, T., Zevin, J., & Casey, B. J. (2011). Elevated amygdala response to faces following early deprivation. *Developmental Science*, 14(2), 190–204.

[Google Scholar](#) [WorldCat](#)

Towne, B., Czerwinski, S. A., Demerath, E. W., Blangero, J., Roche, A. F., & Siervogel, R. M. (2005). Heritability of age at menarche in girls from the Fels Longitudinal Study. *American Journal of Physical Anthropology*, 128(1), 210–219.

[Google Scholar](#) [WorldCat](#)

Troutman, B. R., & Cutrona, C. E. (1990). Nonpsychotic postpartum depression among adolescent mothers. *Journal of Abnormal Psychology*, 99(1), 69–78.

[Google Scholar](#) [WorldCat](#)

U.S. teenage pregnancy statistics: National and state trends and trends by race and ethnicity. (2006). New York: Guttmacher Institute.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

United States Department of Health and Human Services Agency for Healthcare Research and Quality. (2011). US preventive task force-child and adolescent health recommendations. Retrieved from

<http://www.uspreventiveservicestaskforce.org/tfchildcat.htm>

[WorldCat](#)

United States Department of Health and Human Services, Healthy People 2020. Retrieved from

<http://www.healthypeople.gov/2020/default.aspx>

[WorldCat](#)

Uno, D., Florsheim, P., & Uchino, B.N. (1998). Psychosocial mechanisms underlying quality of parenting among Mexican-American and white adolescent mothers. *Journal of Youth Adolescence*, 27(5), 585–605.

[Google Scholar](#) [WorldCat](#)

van Eden, C. G., Kros, J. M., & Uylings, H. B. M. (1991). The development of the rat prefrontal cortex: Its size and development of connections with thalamus, spinal cord and other cortical areas. In H. B. M. Uylings, C. G. van Eden, J. P. C. De Bruin, M. A. Corner, & M. G. P. Feenstra (Eds.), *Progress in Brain Research: The prefrontal cortex: Its structure, function and pathology* (Vol. 85, pp. 169–183). Amsterdam: Elsevier.

[Google Scholar](#) [Google Preview](#) [WorldCat](#) [COPAC](#)

Villamor, E., Chavarro, J. E., & Caro, L. E. (2009). Growing up under generalized violence: An ecological study of homicide rates and secular trends in age at menarche in Colombia, 1940s–1980s. *Economics & Human Biology*, 7(2), 238–245.

[Google Scholar](#) [WorldCat](#)

Voight, J., Hans, S., & Bernstein, V. (1996). Support networks of adolescent mothers: Effects on parenting experience and behavior. *Infant Mental Health Journal* 17(1), 58–73.

[Google Scholar](#) [WorldCat](#)

Wahn, E. H., Nissen, E., & Ahlberg, B. M. (2005). Becoming and being a teenage mother: How teenage girls in South Western Sweden view their situation. *Health Care for Women International*, 26(7), 591–603.

[Google Scholar](#) [WorldCat](#)

p. 601 Wallace, J. M., Da Silva, P., Aitken, R. P., & Cruickshank, M. A. (1997). Maternal endocrine status in relation to pregnancy outcome in rapidly growing adolescent sheep. *Journal of Endocrinology*, 155(2), 359–368.

[Google Scholar](#) [WorldCat](#)

Warrick, L., Christianson, J. B., Walruff, J., & Cook, P. C. (1993). Educational outcomes in teenage pregnancy and parenting programs: Results from a demonstration. *Family Planning Perspectives*, 25, 148–155.

Werner, E., Zhao Y., Evans, L., Kinsella, M., Kurzius, L., Altincatal, A., ... Monk, C. (2013). Higher maternal prenatal cortisol and younger age predict greater infant reactivity to novelty at 4 months: An observation based study. *Developmental Psychobiology*, 55(7), 707–718.

[Google Scholar](#) [WorldCat](#)

Whitbeck, L. B., Conger, R. D., Simons, R. L., & Kao, M.-Y. (1993). Minor deviant behaviors and adolescent sexual activity. *Youth & Society, 25*(1), 24–37.

[Google Scholar](#) [WorldCat](#)

Wierson, M., Long, P. J., & Forehand, R. L. (1993). Toward a new understanding of early menarche: The role of environmental stress in pubertal timing. *Adolescence, 28*(112), 913–924.

Wise, L. A., Palmer, J. R., Rothman, E. F., & Rosenberg, L. (2009). Childhood abuse and early menarche: findings from the black women's health study. *American Journal of Public Health, 99 Suppl 2*, S460–466.

[Google Scholar](#) [WorldCat](#)

Wu, T., Mendola, P., & Buck, G. M. (2002). Ethnic differences in the presence of secondary sex characteristics and menarche among US girls: The Third National Health and Nutrition Examination Survey, 1988–1994. *Pediatrics, 110*(4), 752–757.

Yehuda, R., Yang, R. K., Buchsbaum, M. S., & Golier, J. A. (2006). Alterations in cortisol negative feedback inhibition as examined using the ACTH response to cortisol administration in PTSD. *Psychoneuroendocrinology, 31*(4), 447–451.

[Google Scholar](#) [WorldCat](#)

Yozwiak, J. A. (2010). Postpartum depression and adolescent mothers: A review of assessment and treatment approaches. *Journal of Pediatric Adolescence and Gynecology, 23*, 172–178.

[Google Scholar](#) [WorldCat](#)

Zabin, L. S., Astone, N. M., & Emerson, M. R. (1993). Do adolescents want babies? The relationship between attitudes and behavior. *Journal of Research on Adolescence 3*(1), 67–86.

[Google Scholar](#) [WorldCat](#)

Zabin, L. S., Emerson, M. R., & Rowland, D. L. (2005). Childhood sexual abuse and early menarche: The direction of their relationship and its implications. *Journal of Adolescent Health, 36*(5), 393–400.

[Google Scholar](#) [WorldCat](#)

Zecevic, N., Bourgeois, J. P., & Rakic, P. (1989). Changes in synaptic density in motor cortex of rhesus monkey during fetal and postnatal life. *Brain research. Developmental brain research, 50*(1), 11–32.

[Google Scholar](#) [WorldCat](#)

Zoccolillo, M., Meyers, J., & Assiter, S. (1997). Conduct disorder, substance dependence, and adolescent motherhood. *American Journal of Orthopsychiatry, 67*(1), 152–157.

[Google Scholar](#) [WorldCat](#)

Zuckerman, B. S., Amaro, H., & Beardslee, W. (1987). Mental health of adolescent mothers: The implications of depression and drug use. *Journal of Developmental and Behavioral Pediatrics 8*(2), 111–116.

[Google Scholar](#) [WorldCat](#)

Zweig, J. M., Phillips, S. D., & Lindberg, L. D. (2002). Predicting adolescent profiles of risk: Looking beyond demographics. *Journal of Adolescent Health 31*(4), 343–353.

[Google Scholar](#) [WorldCat](#)