Teen motherhood in cross-cultural perspective

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Abstract
Teen motherhood is the prevalent childbearing pattern in most traditional populations. Yet early
motherhood is associated with negative biological and social outcomes in the developed world. We
review the teen pregnancy literature in light of this discrepancy, emphasizing two core debates. The
first debate centers on whether teens have poor pregnancy outcomes compared to older women, and
whether negative outcomes are biologically based. Second, we consider the debate over the con-
founding effects of socio-economic conditions associated with being young. When teens are considered
as a group, results are inconsistent across studies. When teens are disaggregated by age, the strongest
finding across studies is that biological risk is concentrated in only the youngest of mothers. Negative
consequences are associated with teen motherhood not because of chronological age per se, but because
of relative developmental maturity and the availability of non-maternal support. In most traditional
societies as well as in some sectors of developed societies, teen motherhood occurs within the context of
extended kin networks and is subsidized through reliable economic and childcare assistance. Child-
rearing practices, rather than pregnancy per se, may explain much of the discrepancy in the prevalence,
success and attitudes toward teen motherhood in traditional and developed societies.

Keywords: Teen pregnancy, teen motherhood, fertility, natural fertility populations, growth, plasticity

Introduction
Teen motherhood is a topic that generates considerable interest in the developed world. Reflecting this, the medical, public health and sociological literature on teen pregnancy is
extensive. Poor pregnancy outcomes and negative social consequences are commonly
associated with young mothers. While teen motherhood is discouraged, debated as a public
health issue and considered a societal problem in developed populations, it is the pervasive
childbearing pattern in most traditional societies. In a broad sample of forager, horticultural
and agricultural populations, average age at first birth varies between 15.5 and 20.5 (Figure 1). In contrast, average age at first birth in developed nations has a low of 25.1 in the USA and a high of 29.9 in Canada (United Nations Economic Commission for Europe 2007, data for 2002). The teen birth rate is rarely reported for small-scale societies, but from available data it is strikingly higher in traditional compared to developed populations. Teen birth rates vary between 135 and 279 per 1000 women ages 15–19 among foragers and horticulturalists. This compares to a high of 43.0 per 1000 in the USA and a low of 5.0 in Switzerland (World Health Organization 2008). In the absence of fertility control, young women in the past most likely gave birth shortly following the establishment of fecundity. While the fossil and archaeological records leave scant evidence about age at first birth, comparative primate life history, demographic and dental clues suggest that early sexual maturity was the ancestral hominin condition (Dean 2006). From an evolutionary perspective, we would expect that if teen pregnancy poses a significant morbidity and mortality risk to mothers and infants, selection would have been strong against teen childbearing. In fact, evidence suggests that selective pressure has been strong for young women to complete skeletal growth and store energy before fecundity is established (Lancaster 1986; Ellison 2001). This draws attention to whether and why negative outcomes are associated with teen motherhood. If mothers routinely give birth in their teens in modern traditional societies and most likely did in the past, is this childbearing pattern maladaptive? Are risks diminished if mothers delay childbearing until their 20s? Or are teens in developed nations encouraged to delay childbearing for other reasons?

In this overview of teen motherhood we start by reviewing factors that affect the pace of reproductive maturity and biological constraints on age at first birth. We then turn to
pregnancy. Much of what is known about the biology of teen pregnancy comes from studies in the developed world. In reviewing the medical, sociological and anthropological literature on teen motherhood, we highlight two unresolved debates: How young is too young to initiate reproduction and what role do social factors play? We organize our overview in light of these debates, with an interest in how they may inform our understanding of the prevalence of teen motherhood in traditional societies and in certain sectors of the developed world. For simplicity we define developed populations as those having low mortality and fertility rates, access to contraception, having passed through much if not all of the demographic transition, as well as cash-based economies and competitive labor markets (Kaplan et al. 2002). Traditional populations we define as having little or no access to biomedical health care, no access to contraception and pretransitional levels of fertility and mortality. These demographic parameters more closely reflect past conditions when teen motherhood in all likelihood was the norm for first birth and the parenting pattern to which humans are adapted. The recent and novel conditions of developed society present an interesting contrast for young women making decisions about or falling into parenthood. We recognize that population differences can be identified and defined in many ways, but focus on a demographic contrast as salient in comparing teen motherhood. Our goal is to review the current literature with an eye toward issues that remain unanswered and areas for future study. Notable in reviewing the teen pregnancy literature is that few trends persist across studies, and the magnitude and cause of poor outcomes remain unclear. The strongest finding across studies is that biological risk is concentrated only in the youngest of mothers, generally those under 15 years of age. Given our shared physiology, we expect this to cross-cut human populations. While much medical focus has been given to the biological risks of childbearing, inconsistent results may point toward non-biological reasons or biosocial interactions as the cause of poor outcomes. We suggest that child-rearing practices might better explain differences between developed and traditional populations in the prevalence of, and attitudes toward, teen motherhood.

**Biological constraints on age at first birth**

The biological capacity for a young woman to conceive and deliver is mediated by the pace of development, age at menarche and the duration of subfecundity. Since debate arose over the critical-weight hypothesis to explain the timing of menarche (Frisch and Revelle 1970), female physiological maturation has been linked to a number of energetic and biomechanical factors (Worthman 1993; Ellison 2001; Jasienska 2001). It is now evident that menarche is cued to skeletal maturity and occurs after girls have accomplished ~95% of their statural growth (Ellison 1981; Ellison 2001; Lancaster 1986). During the period of subfecundity following menarche, girls’ stature may continue to marginally increase, biliac breadth reaches adult dimensions, fat deposition accrues and girls transition from partial to full adult ovarian function (Ellison 1982). In one of the only longitudinal studies of its kind, US girls 2 years postmenarche had achieved 99% of their adult stature and 91–99% of their adult pelvic dimensions, depending on measurement (Moerman 1982, p. 529). Final remodeling of the pelvic basin and pelvic inlet (birth canal) occurred after the asymptote in stature. This study provided critical data about the late timing of pelvic maturity in the developmental sequence, and made an important point about obstetrical maturity rather than chronological age per se determining readiness to support pregnancy. In this study, adult proportions in all indicators of skeletal maturity were correlated with the chronological age 17. However, since taller girls in general take longer to achieve adult stature, duration to completion of obstetrical maturity is expected to vary to some extent with stature. The relationship...
between adult stature and age at which skeletal growth is complete, is confounded by factors such as prevalence of diet, disease and stress that can slow growth (Riley et al. 1989). The human growth pattern buffers females from conceiving until the near completion of growth. Gonadal estrogen, which is necessary to promote adult ovarian cycling and pregnancy, also is critical to the process of long bone mineralization, regulating fusion of epiphyseal growth plates (Nilsson et al. 1994; Schwartz et al. 1995). After the mechanical constraints of stature and pelvic size are solved, surplus energy is reallocated to weight gain, fat storage and fecundity (Ellison 2001). While this sequence of maturational events is canalized, its pace and timing vary widely at both the individual and population levels. Since obstetrical maturity is a critical factor in healthy pregnancy outcomes, factors that affect skeletal growth are of interest.

Factors affecting the rate of sexual maturation

Energy availability is an underlying constraint to reproduction and an important mediator in the timing of sexual maturity (Ellison 1990; Rosetta 1990; Cumming et al. 1994; Ulijaszek 1995; Strassman 1996; Bentley 1999; Ellison 2001). A comparison of maturational trajectories between urban and rural Zambian girls shows that differences in the time to completion of sexual maturity are associated with nutritional condition during adolescence (Gillett Netting et al. 2004). Despite a later onset of puberty among rural girls, they pass through the pubertal sequence more quickly than do urban girls. Following menarche, rural girls are sequestered, their work effort is minimized and they are preferentially fed such that weight gain and fat accumulation occur rapidly among these young women. Research among Maya agriculturalists showed that following the introduction of a gas-powered water pump and corn grinder, young nulliparous women spent substantially less time and calories in energetically costly work. These savings were significant enough to have a positive effect on female energy balance, and are associated with women initiating childbearing at a significantly younger age (Kramer and McMillan 1998, 1999, 2006). Energetic balance and energy flux in particular have demonstrated affects on female fecundity (Ellison 2001, 2003; Jasienska and Ellison 2004) and are likely to affect aspects of growth as well (Steinberg et al. 2008).

Since the secular trend in age at menarche was first recognized, faster and earlier maturity has been associated with good and improved childhood nutrition and health, and slow, and delayed maturity with poor childhood conditions (Foster et al. 1986; Garn 1987; Eveleth and Tanner 1990; Riley et al. 1993; Ellis 2004). Although energetic condition is an underlying factor in maturational pace, recent research points to the interesting paradox that fast maturational tracts occur under both good and suboptimal conditions (Cooper et al. 1996; Ibáñez et al. 2000). Ellis and collaborators have recently presented a model for the impact of environmental stressors in terms of harshness (externally caused levels of morbidity–mortality) and unpredictability (spatial–temporal variation in harshness) on developmental and reproductive life history schedules. These influences depend on population densities and relative levels of within group competition and resource scarcity, on age schedules of mortality, on the sensitivity of morbidity–mortality to the individual’s resource allocation decisions, and on the extent to which environmental fluctuations affect individuals versus populations over short versus long timescales (Ellis et al. 2009).

Fast maturity under suboptimal conditions has been linked to two factors: High mortality and emotionally stressful childhoods. Although empirical studies emphasize different aspects of the mortality curve, it is generally agreed when life expectancy is low or survival variable reproductive maturity is early (Chisholm 1999; Hill and Kaplan 1999;
Lancaster et al. 2000; Walker et al. 2006b). The Pumé and Hiwi, two groups of foragers who live in a similar savanna environment in Venezuela and Columbia, have comparable high mortality rates, early age at menarche and fast growth trajectories (Kramer 2009; Walker et al. 2006, respectively). A within-group comparison of the Pumé shows that girls who grow up as foragers experience seasonal undernutrition, high disease loads, have no access to health care and give birth to their first child at a younger age than do their related neighbors who are horticulturalists, have greater food stability, and access to market foods and health care (Kramer and Greaves 2007). The association between high morbidity and mortality, and early reproduction also has been observed in developed populations (Geronimus 1992, 2003; Wilson and Daly 1997). In studies of interurban US black women, Geronimus demonstrates that under conditions where older women are more likely to be physically disadvantaged, in poor health or not survive, teen motherhood gives children the best chance of having multigenerational caretakers.

Social experiences also have been brought to the fore as causal factors shaping pubertal timing (Belsky et al. 1991; Kim et al. 1997; Ellis et al. 2003; Ellis 2004). Evidence suggests that psychosocial stressors also have both inhibiting and accelerating effects on developmental pace (Boyce and Ellis 2005). Several studies propose that an extended period of juvenility and delayed maturity are adaptive in high-quality social environments, whereas emotionally stressful childhoods and family dysfunction tend to predict earlier menarche (Coall and Chisholm 2003; Hulanicka et al. 2001; Chisholm et al. 2005). Father absence in particular has been identified as a stressor associated with early menarche, earlier ages of sexual activity and adolescent pregnancy (Ellis et al. 2003; Quinlan 2003; Bogaert 2005).

While strong empirical evidence links fast maturity with high mortality and exposure to stressful social conditions, the mechanisms that advance maturity are unclear, and raise interesting new questions.

One explanation is that early sexual maturity is achieved by completing growth at a younger age and smaller body size. This has been observed in animal and human populations under disadvantageous mortality conditions. The recent widespread development of a fatal cancer among adult Tasmanian devils, for example, has lead to a dramatic increase in the proportion of precocious maturing individuals (Jones et al. 2008). Among humans, the Batak and Aeta are Philippine pygmy populations who have an early age at first birth and an unusual arrested growth pattern (Migliano et al. 2007). While this is a compelling life-history pattern, cross-cultural comparisons suggest that early reproduction is accompanied by varied body size outcomes. The Pumé, South American foragers, Batak and Aeta share in common an early age at first birth and high mortality profiles. In contrast to the Batak and Aeta who terminate growth at a young age and have short adult stature, the Pumé reach the asymptote in body size in their mid-teens and are normal with respect to adult stature compared to other native South Americans (Kramer et al. 2009). Mechanisms beside stopping early have to be invoked to more broadly explain early human reproduction. The relationship between age at maturity and body size is determined by numerous genetic, developmental, environmental and behavioral factors. In addition to the biological influences of diet, disease and stress considered above, the pace of growth is sensitive to children’s energy balance and flux, which varies not only through food intake, but the extent to which children participate in work and are involved in calorically expensive activities (Bogin and Rios 2003; Kramer et al. 2009).

Nutrient diversity may be an important, but under-explored, influence on the pace of growth leading to sexual maturity. Adolescent linear growth may be dampened, delayed or protracted under poor conditions (Cameron 1991; Bogin et al. 1992; Cameron et al. 1994; Sellen 1999). Adverse environments and poor nutrition, however, vary in kind and...
may differentially affect maturational trajectories (Cameron 2007). For example, carbohydrate-dominated diets appear to have more profound effects on growth delays than do the macro and micronutrient diverse diets typical of hunter–gatherers. Iron and iodine, which are often lacking in carbohydrate-dominated diets, are critical to healthy growth (Ryan 1997). Although forager diets may be low in calories, they are rich in these key nutrients, which are found in fish and meat (Lancaster et al. 2000). The diets of girls growing up in developed nations, fall everywhere along the continuum between high carbohydrate to high protein diets.

Potential intergenerational mechanisms recently have come to the fore as the connection between environmental cues and pubertal timing. Prenatal conditions, birthweight and early childhood conditions have been tied to reproductive development (Adair 2001; Karlberg 2002; Koziel and Jankowska 2002; Lienhardt et al. 2002). A study among Polish women found that early menarche was more common among girls who were born small for their gestational age (Koziel and Jankowska 2002). Other studies have found that daughters born to teen mothers are significantly more likely to become teen mothers themselves (Meade et al. 2008). New research also points to epigenetic effects on growth rates (Kuzawa 2005, 2007; Kuzawa and Sweet 2009). Ecological and nutritional information are transferred prenatally such that growth rates are established based, not on short-term ecological fluctuations that may occur during gestation, but integrate information averaged over the last few generations in the maternal line. Continued intergenerational research is likely to reveal new mechanisms that shape maturational pace. Current research illuminates that body size, growth rates, age at menarche and establishment of adult fecundity are related in complex and highly variable ways. This may suggest that selection for phenotypic plasticity in these traits has been strong as a response to the range of ecological and social settings in which humans grow up and begin to reproduce. Flexibility is advantageous in giving girls the best chance of success under variable energetic, epidemiological, mortality and social conditions (Gluckman and Hanson 2006b).

Teen pregnancy: How young is too young?

Although teenage pregnancy is commonly associated with increased maternal risks of low birth weight, obstetrical complications, fetal and neonatal mortality, the magnitude and cause of pregnancy complications among teens remains controversial. Among rural Indian women, mothers 19 and younger were found to more likely develop anemia, hypertension, and deliver low birth weight babies compared to mothers 19–35 (Mahavarkar et al. 2008). A large study of over 340,000 British mothers found that teens under the age of 18 were at greater risk of delivering preterm than women 18–35 (Jolly et al. 2000). Yet other studies find that teens are not at special risk of preterm delivery or low birth weight (Smith and Pell 2001). For other pregnancy outcome variables, teens seem to do better than older mothers.

For example, Caesarian section occurs significantly less often in teens than older women (Brown et al. 1991; Lao and Ho 1997). A summary of study results for the most commonly reported consequences of teen pregnancy are given in Table I. Results are notably inconsistent across studies. How do we resolve what are often contrary results?

A closer look at this research reveals that teens are not all the same. Conception within 2 years of menarche undoubtedly raises the risk of poor pregnancy outcomes (Stevens-Simon et al. 2002). Beyond this threshold, how young is biologically too young to avoid the negative effects of childbearing is less clear. Uncertainty in the magnitude of age-related effects that are independent of socio-economic factors in part may reflect that older and younger teens are at very different points in their skeletal and hormonal development.
Young adolescents grow more rapidly, while growth rates drop precipitously during later adolescence as teens approach adult stature. In clinical studies, however, females 15–19 years old often are treated as one age-group. Because growth patterns change dramatically across the teens, age lumping teens may obscure a more detailed understanding of the biological costs of teen pregnancy.

Studies that do distinguish reproductive outcomes in early versus later adolescence find that adverse outcomes are far more pronounced for very young mothers (Lancaster and Hamburg 1986, 2008; Forrest 1993; Satin et al. 1994; Fraser et al. 1995; Olausson et al. 1999) and very early maturers (Scholl et al. 1989). Rates of infant mortality, very low birth weight and preterm delivery are significantly greater among mothers 15 and younger compared to older teens. A study among primiparous Cameroon teens, for example, found that mothers 15 years old or less were at greater risk of low birth weight and early neonatal death (Nkwabong and Fomulu 2009). Risks plateau among older teens, and more closely resemble those of adults (Phipps et al. 2002; Phipps and Sowers 2002). A study among Pumé foragers found that first time mothers under the age of 14 were four times more likely to lose their first born, than girls 17 and older. However, infant mortality was not significantly greater for 14–16-year-olds compared to older girls (Kramer 2008). Very early maturers, defined as girls who reach menarche before age 11, are at increased risk of ectopic pregnancy (Sandler et al. 1984), intrauterine fetal growth retardation (Scholl et al. 1989) and miscarriage (Martin et al. 1983). However, because these negative outcomes also may occur among late maturers, it is unclear whether risk is concentrated among young maturers rather than young teenagers.
because of their developmental immaturity or because of underlying hormonal profiles that can cross-cut age.

For young teens still growing, biological immaturity is often cited as the lead cause of poor birth outcomes. If a girl becomes pregnant during her final growth stage, clinical studies show that nutrient partitioning has its greatest effect on compromising fetal rather than maternal growth (Frisancho 1981; Naeye 1981; Scholl et al. 1990; Scholl et al. 1994; King 2003). In well-fed US populations, pregnancy among young girls leads to an energetic impasse such that growing teens have significantly lower infant birth weights than fully grown adolescents and mature women (Scholl et al. 1994). Recent research suggests that maternal/fetal competition results in reduced placental mass, restricted uterine and umbilical blood delivery, limited placental nutrient transfer and smaller offspring (Wallace et al. 2004). Why growing mothers and fetuses compete for intrauterine resources even when metabolic constraints are relaxed is not fully understood, but suggests that natural selection has acted strongly against fecundity among skeletally immature girls. This reifies the point that negative outcomes of early reproduction do not reflect chronological maternal age per se, but relative developmental immaturity.

One curious consistency across studies is that the incidence of Cesarean delivery and other delivery complications are lower among teens compared to older women (see Table I). Interpretation, however, is less clear. Positive delivery outcomes may suggest that pelvic structure is sufficiently developed in younger mothers. Alternatively, younger mothers may be in better muscular shape, or are more often encouraged to vaginally deliver.

Findings collectively suggest that a biological constraint on pregnancy exists at younger ages. By the mid teens, however, risks are ambiguous or indistinguishable from older mothers. Age grouping teens, who potentially express vast differences in growth completion and time since menarche, is likely to dampen negative consequences to very young mothers and overstate apparent risks in older teens. Furthermore, age effects are related to gynecological and skeletal age than to chronological age per se. Two girls of the same gynecological age are more likely to be developmentally similar than two girls of the same actual age but different ages at menarche. Despite this being well established, very few studies are conducted or results reported in gynecological age. Longitudinal data sets that include both information on menarche and pregnancy outcomes are difficult to collect and rare. These data, however, no doubt would increase the robustness of cross-cultural comparisons, and aid in refining age-related risk thresholds.

Teen pregnancy: What role do social factors play?

Not only are age effects of poor pregnancy outcomes debated, so are their causes. Inconsistent results on biological basis of poor pregnancy outcomes may further be confounded because of social factors associated with being young (King 2003). Teen mothers in more recent decades in developed societies are less likely to seek prenatal care or be married, and more likely to be primiparous and socio-economically disadvantaged. These factors have negative maternal and child health consequences irrespective of maternal age. When these social factors are controlled for, research results are mixed. Some studies find that the adverse age effects of teen pregnancy are greatly diminished, and maternal age has little residual effect on labor and delivery outcomes (Makinson 1985; Geronimus 1987; Lee et al. 1988). Other studies come to the opposite conclusion, and teen pregnancy is found to increase the risk of negative outcomes independently of known confounders (Fraser et al. 1995; Olausson et al. 1999; Jolly et al. 2000; Phipps et al. 2002; Chen et al. 2007).
Low birth weight is a good example of the confounding effects that biological and social factors have on teen pregnancy outcomes. Low birth weight, due either to preterm birth or to intrauterine growth retardation, is a primary risk factor in infant morbidity and mortality (McCormick 1985). However, its cause is difficult to impute because multiple risk factors (cigarette, drug and alcohol use, inadequate diet, uterine infection and low pre-pregnancy weight) are often present, and because these factors may be present irrespective of maternal age. Consequently, it remains unclear whether young maternal age itself places mothers at a disadvantage and predisposes them to greater risk for low birth weight deliveries (Akinbami et al. 2000; Kramer et al. 2000).

One study among white females in Utah found that, after adjusting for sociodemographic variables, teens under the age of 17 are at the greatest risk and teens 18–19 were at an elevated risk of delivering low birth weight infants compared to mothers in their 20s (Fraser et al. 1995). Other studies find that the risk of low birth weight increases with maternal age among interurban US women. Among Michigan women, the increased odds of low birth weight in mothers over the age of 15 are associated with precipitously declining health profiles among urban poor black women during their late teens and young adulthood (Geronimus 1996). As a result, black teens in this population have more low birth weight infants compared to young-adult white women but higher birth weights than black women in their 20s. A study of Chicago women found that when socio-economics and other risk factors were adjusted for, the incidence of low birth weight increases with maternal age more rapidly among disadvantaged mothers irrespective of their racial affiliation (Rich-Edwards et al. 2003). In societies where teen pregnancy is encouraged and occurs within the context of marriage, teen mothers have different outcomes. Low birth weight among urban Saudi women, for example, is linked more closely to prenatal care than to mother’s age (Mahfouz et al. 1995). Although research is divided on this issue, disparate results may highlight that the relationship between young maternal age and pregnancy outcomes is sensitive to cultural and community-specific attitudes, socio-economics, and morbidity and mortality profiles.

A number of cross-cultural studies find that girls who reach menarche early tend to marry and have their first born at a younger age (Urqu and Cliquet 1982; Sandler et al. 1984; Borgerhoff Mulder 1989; Wood 1994; Ellis et al. 2003). This trend appears to have both physiological and social explanations. Several studies indicate that girls who reach menarche early have a proportionally shorter duration of subfecundity and time to establishment of adult ovarian function. A comparison of Kikuyu (east African horticulturalists) and urban British girls found that earlier maturing girls progress more quickly through the pubertal sequence (Worthman 1987, 1993). Apter and Vihko (1983) find that girls who reach menarche at age 12.0–12.9 achieve 50% ovulatory cycles 3.0 years after menarche. In contrast, girls who are 13.0 and older at first menses, achieve the same level of ovulatory function 4.5 years after menarche (but see Foster et al. 1986).

While sexual maturity is a constraint on age at first birth, first birth also is mediated through cultural norms that restrict exposure to conception. In natural fertility populations, the lapse between menarche and exposure to conception is highly variable, and may last one to 2 years up to over a decade (Schlegel 1995; Whiting et al. 1986). No doubt some of the variation between age at menarche and first birth (Figure 1) can be attributed to differences in timing of sexual activity and marriage. The Pumé and Hiwi, two groups of foragers who live with 50 km of each other on the Venezuelan and Colombian border, are a case in point. Both Hiwi and Pumé girls reach menarche before age 13, but differ considerably in age at first birth. Average age at first birth among the Hiwi is 17.9–22.5, depending on estimate (Walker et al. 2006a, p. 308), compared to 15.5 among the Pumé (Kramer 2008). The
extent to which the later age at first birth among the Hiwi is due to a longer period of subfecundity or delayed exposure to conception is unknown. But, because they live within the same general savanna environment, traditionally had a similar subsistence base and experienced similar seasonal nutritional constraints, suggest a cultural rather than biological cause.

In the developed world, attention has been brought to the widening discrepancy between sexual and social maturity (Gluckman and Hanson 2006a). One impact of the secular trend toward earlier menarche and sexual maturation is that women are fecund at younger ages, yet they are socially less prepared to become competent caretakers and economic providers. Time to develop social, cognitive and occupational skills before a young woman assumes reproductive responsibilities is suggested to be a critical and increasingly important role of adolescence (Schlegel 1995). No doubt, the synchrony, or lack of, between biological and social development affects the age-patterning of successful reproductive outcomes (Altmann 1986) and cross-cultural attitudes toward teen motherhood.

In sum, very young teens are at much greater risk of poor pregnancy outcomes than older teens. The effect of very young gynecological age on pregnancy outcomes is expected to be a shared human trait. However, teens grow up and become mothers in very different cross-cultural social contexts. Teens in many traditional societies are not exposed to confounding lifestyle risks, nor is motherhood associated with social risks. We suggest that the cultural norms that influence a young girl’s sexual behavior and societal attitudes toward teen motherhood are related less to biological risk factors, except in the very youngest of mothers, than to factors that condition the extent to which child-rearing support is available to young mothers.

Teen motherhood and child-rearing environment

Successful motherhood in humans includes not only pregnancy and lactation, but also a prolonged period of postweaning support (Hrdy 1999). The ecologically diverse environments in which humans live affect their social environments and how they make their living. Reflecting these differences, children benefit from variable amounts of time spent in physical development, training, education and learning before they are competent to take on the responsibilities of parenthood (Kaplan et al. 2001; Lancaster and Kaplan 2009). A young woman maturing as a South American forager, a Maya agriculturalist or a 21st century American differs behaviorally and socially in ways that affect her success as a young mother. Is she economically able to support a child’s postnatal needs? If not can she count on assistance? Do young women live in extended families? To what extent can she depend on kin or other child-rearing support?

While selection has been strong against fecundity among physiologically immature juveniles, humans can biologically reproduce well before they able to support children on their own. Young women in traditional populations commonly have their first born well before they are economically and socially mature, and childbearing is not expected to be associated with independence. Young mothers are less skillful as caretakers and less productive as food producers compared to older first-time mothers. However, the lower competence and productivity of young mothers is compensated through assistance in resource provisioning, childcare and social support. Cross culturally, children growing up in traditional societies receive about 50% of their childcare from non-maternal sources of allocare (Kramer 2005). In addition to childcare, mothers in traditional societies receive extensive help with food acquisition and production. Among several groups of foragers, children receive most of their calories (91%) and nearly all of their protein come from
non-maternal sources, especially from males (Kaplan et al. 2001). Among Maya agriculturalists, young mothers receive about 60% of the calories they need to support their children from others (Robinson Sullivan et al. 2008). This assistance allows mothers to reproduce before they have fully matured economically and socially. For Pumé South America foragers, young women, who give birth to their first child in their mid teens, are not yet competent as caretakers or efficient as foragers. The Pumé are matrilocal, share food extensively across matrilines, and rely on female kin for childcare. These factors help explain why Pumé women who initiate childbearing in their mid-teens do so at no greater cost to their children’s survival than women who delay childbearing until their late teens (Kramer 2008).

A similar relationship between social support, child-rearing assistance and age at childbearing has been noted in comparisons between US black and white girls. Paired age for age, black teens, who receive greater social and economic support from matrilineal kin, are healthier, have better birth outcomes and a greater likelihood of infant survival compared to white teens who do not count on this level of support. The mortality profile of black women during early adulthood has a two-pronged effect on the prevalence of early reproduction among black teens. Early childbearing mitigates the probability that a child will lose a parent, be orphaned or have a disabled parent. Teen mothers also are more likely to be healthy and have a surviving mother than women who delay childbearing until their 20s (Lancaster and Hamburg 1986, 2008; Geronimus et al. 1999; Geronimus 2003). In many other sectors of postindustrial societies, however, child-rearing support networks diminish or evaporate in the transition to modern labor markets. As generational time lengthens and families are more prone to geographic dispersion, kin networks shrink. In addition, the reduction of completed family size to around two children in most of the developed world means that in both the current and immediately previous generation, siblings, aunts and uncles are in short supply. Maternal work outside the home exacerbates the problem even further. These demographic effects associated with modernization leave teen mothers extremely vulnerable without the support of kin-based networks.

Conclusion

Very young maternal age (girls under the age of 14) is rare and associated with elevated risks. Mothers in their late teens who are within normal range with respect to age at menarche, and developmental maturity do not appear to experience disproportionately adverse effects compared to mothers who delay childbearing until their 20s. However, this distinction is not transparent when teens are considered as one age class. Importantly, negative consequences associated with teen pregnancy occur not because of chronological age per se, but because of relative developmental immaturity. In most traditional societies, as well as in sectors of developed societies, young mothers are subsidized through economic and childcare assistance and can rely on help to support early childbearing. For much of human history, first births were to teenage mothers and occurred in the context of extended families and under circumstances where maternal work and childcare were easily combined and shared among family and kin. Ironically, today such circumstances are found in developed societies only among the poor where the lack of resources and unemployment leads to the pooling of minimal resources. Teen mothers in developed societies more often are isolated and without the assistance of kin. Successful motherhood requires both bringing a fetus to term and providing postnatal resources for years past lactation. We suggest that child-rearing practices, rather than biological factors might better explain differences between developed and traditional populations in the prevalence of, and attitudes toward, teen motherhood.
Notes

1. Teen birth rates: Pumé foragers 195 per 1000 (Kramer 2008); Macajai Yanomama 266 per 1000 (Early and Peters 1990, p. 48); Xilixana Yanomami 279 per 1000 (Early and Peters 2000, p. 196); Ache (reservation) 253 per 1000 (Hill and Hurtado 1996, p. 262); Ache (forest) 151 per 1000 (Hill and Hurtado 1996, p. 261); !Kung 135 per 1000 (Howell 1979, 2000, p. 24).

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References

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