ABSTRACT

This paper considers the most recent research that demonstrates the causes of precocious puberty to be closer to home than many might suspect. The implications of the early onset of puberty are substantial. They range from physical issues like cancer to psychological and sociological issues that hinder healthy identity development. Early sexual maturation leads to low self-esteem, eating disorders, depression, and early sexual experimentation among others. Biologically, children are physically developing at earlier ages without the requisite emotional ability to handle the strains of an early transition. With the bodies of an adult and the mind of a child, our children are facing enormous obstacles. Literature on the subject will be considered as well as implications for the home and church.
**Introduction**

On Friday, September 17, 2010 two articles were published at TIME.com:

*Another Cause of Early Puberty in Girls: Absent Dads* and *Moms: Guilty of Driving Their Daughters to Early Puberty*? Two different authors reporting on the same phenomenon – early puberty, but reporting research that suggested different causes. This was interesting in and of itself, but what was really intriguing was what was not said. Neither article suggested that the cause of the early onset of puberty was linked to BMI, obesity, or some environmental chemical – the most commonly assumed culprits. Rather, these articles cited research that linked early puberty to environmental stresses in the home.

In a review of literature back in 2006, Sandra Cesario and Lisa Hughes determined that in the years of 1997-2006, 947 articles explicitly examined precocious puberty and its causes! Cesario and Hughes narrowed their search down to eighty-two studies or case reports that captured six attributable causes of early sexual maturation: genetic, ethnic, pediatric obesity, environmental toxins, psychosocial stress, and early exposure to a sexualized society. As one might imagine, many studies have been commissioned since 2006 to determine the cause(s) behind the early onset of puberty.

The research has postulated better nutrition, obesity as it is linked to increased body mass

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3 Ibid.
index (BMI), hormone disrupters found in food and various products (also known as endocrine disrupting chemicals), better medical practices, and hyperinsulinaemia and insulin resistance. While the popular tendency is to jump on the BMI or hormone bandwagon, the most current research seems to be pointing in a different direction, specifically the influence of familial and ecological factors.

This paper will explore the recent research available on the early onset of puberty and will demonstrate that assumptions concerning popular notions of precocious puberty are all but inconclusive. Far more convincing are the numerous, but underreported studies that show environmental factors such as familial stress and absent fathers as more likely culprits of precocious puberty. There are many implications that practitioners must think through, however, this paper will address the implications for youth and children in the home and congregational setting.

**Extended Adolescence**

Massive cultural shifts in the last century, namely the loss of a shared metanarrative and the resultant rise of systemic abandonment, have given way to a new stage of development known as adolescence. As a stage of development, adolescence has been well studied and documented. As the 19th century gave way to the 20th, researchers began to notice that adolescence was lengthening. There were (and still are) many contributing factors, but what has separated kids from adults and caused adolescence to lengthen is not a reaction to any one influence. Rather, many factors have combined as visible symptoms of a deeper, even more insidious and destructive conspiracy of neglect.
Those who study adolescence began to notice that the traditional two-stage theory of adolescence: early and late was giving way to a 3rd stage – midadolescence. It has long been acknowledged that adolescence begins in puberty, implications of which will be discussed below, and ends when the individual has said to have settled on the three issues of individuation: identity, autonomy, and belonging. Much of the current research on adolescence has focused on late adolescence, that is, the years that most closely approximate transition into adulthood and why that transition is taking so long. Theories abound as to why this is happening, but the most consistent causes seem to be linked to the cultural factors that created midadolescence. This research is necessary for ministry particularly as it seeks to understand what happens to adolescent faith after graduation from High School. As important as that research is, very little has been written about the implications of our kids starting puberty at earlier and earlier ages. Many have considered the upper spectrum of extended adolescence, but few (if any) have considered the reality that adolescence may be extending in the other direction as well. The ramifications for public health not to mention the sociological and practical complications that precocious puberty poses simply have not been given ample thought, particularly as these concern ministries to children, youth, and families.

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5 In recent years the theory of emerging adulthood by JJ Arnett has taken center stage, almost uncritically so. My fear is that the media-hyped rise of this theory will draw needed attention and research away from the psychosocial phenomenon of midadolescence.
The Age of Puberty

Historically, the age of the onset of puberty has been used as a measure of health status of particular populations. Since the 1800s, data on the age of menarche has been collected and recorded in health records in the United States and Europe. “Declines in the age of menarche have been reported from the late 1800s to the mid-1900s. This downward trend continued until about the middle of the 20th century, when, it seemed to cease. For a few decades the onset of puberty seemed to be stable until studies began reporting early sexual maturation in American girls in two independent studies: the Pediatric research in Office Settings study and the population-based National health and Nutrition Examination survey published in 1997 and 2002. The 1997 study on 17,000 girls served notice that something drastic was happening. The study found that the initial signs of puberty were occurring much earlier than previously recorded. Further, the study found that 27 percent of African-American and almost 7 percent of Caucasian girls by age 7 had early onset of secondary sexual characteristics (breast or pubic hair development). More recent studies have only supported this downward trend, so that,


7 HP Bowditch, Eighth Annual Report. Boston, MA: Massachusetts State Board of Health


girls in the “United States appear to be maturing at an earlier age and documented incidence of precocious puberty is on the rise.”

Precocious puberty (also known as premature pubarche) is defined as the appearance of secondary sexual characteristics before age 8 or the onset of menarche before age 9. Contemporary and historical studies have focused on girls’ age at menarche, in part because it is easier to collect data either retrospectively or prospectively. Further, girls have a better marker of puberty, which lends itself to better overall data collection. Hypotheses to explain the downward trends in pubertal timing are controversial. That the average age of puberty is dropping is indisputable. Why it is dropping, however, is very much up for debate.

**Potential Biological Predictors**

Theories abound as to why puberty in girls continues to drop. One of the more popular theories and the most touted by the media is the obesity or BMI theory. Generally, this theory holds that there is a correlation between precocious puberty (PP) and weight. Since the chemical leptin is one of the components necessary for the progression of puberty and fat cells produce leptin, increased weight gain is a likely culprit. Between the late 1970s and 1990s, the percentage of overweight kids nearly doubled. Additionally, it is well known that overweight girls have more insulin

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13 Ibid., 264.


16 Ibid.
circulating in their blood and that higher levels of insulin appear to stimulate the production of sex hormones.\textsuperscript{17} Not as readily mentioned, however, are the studies that demonstrate the inconsistency of this hypothesis.\textsuperscript{18} There is evidence that early maturing girls are more likely to become obese in adolescence and adulthood. While early maturing white girls might be heavier at the onset of puberty, they are not necessarily overweight or obese.\textsuperscript{19} Further, an early relationship to BMI is not apparent in early maturing African-American girls\textsuperscript{20} and the association is negative in boys. In the 2009 Copenhagen Puberty Study the researchers found that the onset of puberty (as measured by breast development) dropped from a mean age of 10.9 in 1991 to 9.9 in 2006. This was not due to obesity because the BMI remained constant.\textsuperscript{21}

It has also been suggested, albeit the evidence at this time is scant, that it is not body fatness that induces early maturation, but hyperinsulinaemia and insulin resistance.\textsuperscript{22} The majority of the studies of this hypothesis were carried out in a single clinic in Europe. The extent that their observations reflect what is occurring in the United

\textsuperscript{17} Ibid.


\textsuperscript{19} Arnold Slyper, “The pubertal timing controversy in the USA, and a review of possible causative factors for the advance in timing of onset of puberty,” 5.


\textsuperscript{21} Lise Aksglaede et al., “Recent Decline in Age at Breast Development: The Copenhagen Puberty Study,” 935.

\textsuperscript{22} Arnold Slyper, “The pubertal timing controversy in the USA, and a review of possible causative factors for the advance in timing of onset of puberty,” 5.
States is unclear. Another prominent hypothesis getting some play is that “exposure to endocrine-disrupting chemicals (EDCs) cause an earlier age of puberty.” These chemicals are found in various foods, ingredients in personal care products, and environmental toxins. Studies conducted in Puerto Rico alerted health officials to this possibility. Puerto Rico has the highest known incidence of premature breast development. Girls as young as two years of age were developing breasts! They found that 68% of the precocious puberty girls had high levels of phthalates in their blood, which is a chemical plasticizer used in nearly everything. While this research is interesting, what subsequent research has failed to show is why this chemical, so prevalent in everyday materials, has not produced the same links in other populations with heavy exposure.

While predominant in mainstream consciousness, better nutrition, steroids, and improved medical practices, often cited as reasons for precocious puberty, have little to no basis in research. Obviously much more research needs to be conducted to test biological predictors to the physiological triggers of precocious puberty.

**Probable Ecological Predictors**

Interestingly, the ecological predictors of precocious puberty have not received near the play in the media that the biological ones have. This is even more intriguing when one realizes that there is a rapidly growing body of research linking the onset of precocious puberty to ecological and psychosocial stress. Numerous studies have

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23 Ibid.


26 Ibid.
demonstrated this reality. The most popular and one of the earliest studies was conducted by Belsky, Steinberg, and Draper in 1991.27 Their conclusion was that environmental stress may trigger early menarche in children. The results in a 1993 study were congruent with the Besky et al. theory that stressors in the family environment predict earlier onset of menarche.28 In fact, this study found that divorced families and frequent marital conflict were predictive of early onset of menstruation.29 What is suggested by these two studies is that girls are sensing risk for themselves when their parents verbally or physically fight, unconsciously triggering reproductive ability.30

Kim and Smith, in their 1999 study came to similar conclusions. Their research demonstrated “earlier menarche in women associated with more parental marital conflict throughout childhood from birth to age 11…”31 An important study published in the journal of Child Psychology and Human Development in the Fall of 2005 adds weight to this argument. The authors of this study build on what is called the biosocial viewpoint of pubertal timing. It postulates, “that behaviors are determined by an interaction between biological and psychological factors and that the purpose of the development is to allow the individual to adapt to the environment.”32 This means that the environment


29 Ibid., 921.

30 Ibid.


and behaviors influence physiological functions, i.e., the timing of puberty. The question, then, is how? First, factors associated with early onset of puberty such as low socioeconomic status (SES), climate, food intake, and so forth are conceptualized as sources of stress because they act as stimuli exerting pressure on individuals. Living conditions (e.g., physical, geographical, or psychological) are understood to be ecological events that cause an adaptation reaction. Second, “physiological reactions to stress are chain reactions starting from the hypothalamus-pituitary glands and moving to the suprarenal glands that release cortisol and epinephrine stress hormones.” This is known as the HPA axis. Third,

HPA is also responsible for releasing androgens during the first stage of puberty. The assumption is that stress, by stimulating the HPA axis, will cause pubertal development to start because the release of androgens stimulates gonad and secondary-sexual-characteristic development. The gonad development will then accelerate the occurrence of the following stage of pubertal development, which is the activation of hypothalamic-pituitary-gonad axis (HPG) to produce first menses.

Thus, from the biosocial perspective, psychosocial factors accelerate or decelerate pubertal maturation depending on the types of stress they produce. So, for example, environmental stress (e.g., long lasting natural disasters causing food deprivation) decelerates pubertal maturation whereas psychological stress (e.g., family divorce, low SES) accelerates development.
Trimblay and Frigon’s research indicate that family conditions before pubertal development relate to the onset of puberty. They found that girls whose parents report higher levels of anxiety at 8 years old will experience their first menses at a younger age than their less-anxious peers. To predict puberty they measured chronic (low-intensity and long-lasting) and acute stress. They found that anxiety in children correlates with family adversity, which is the low long-lasting measure of stress.\textsuperscript{38} The stressful events (strong, average lasting sources) did not predict onset of puberty, therefore, it seems that children do not necessarily react physiologically to an event but its consequences (e.g., divorce as the event - loss of financial security or loss of father as consequence). They conclude that acute stress delays puberty, but chronic stress accelerates the effect.

Research conducted in 2000\textsuperscript{39}, 2003\textsuperscript{40}, 2005\textsuperscript{41}, and 2007\textsuperscript{42} all demonstrate significant correlations or predict that childhood stress or conflict in the familial environment is associated with pubertal timing. The 2000 study conducted by Ellis and Garber determined “two separate classes of psychosocial accelerators acting on female pubertal maturation: interpersonal family stressors and exposure to unrelated adult

\textsuperscript{38} Ibid.


\textsuperscript{40} Robert Quinlan, “Father Absence, Parental Care, and Female Reproductive Development,” \textit{Evolution and Human Behavior} 24 (2003), 376-390.

\textsuperscript{41} Line Tremblay & Jean-Yves Frigon, Precocious Puberty in Adolescent Girls: A Biomarker of Later Psychosocial Adjustment Problems,” 73-94.

males.\textsuperscript{43} In his 2003 study Quinlan, after controlling for variables, found that women whose parents separated in early childhood (birth to 6 years) “experienced nearly twice the risk of early menarche, were at more than four times greater risk of early sexual intercourse, and were at two and a half times greater risk for early pregnancy when compared with women from intact families.”\textsuperscript{44} In fact, the risk of early sexual development decreased the longer women lived with both parents.\textsuperscript{45} Utilizing psychosocial acceleration theory in their research, Ellis and Essex (2007) replicated and extended other longitudinal research, which indicated, “higher levels of positive investment and support in family relationships in preschool predict lower levels of pubertal maturation…”.\textsuperscript{46} Further, Ellis and Essex were able to demonstrate that lower levels of ecological stress\textsuperscript{47} in childhood “predicted later development of secondary sexual characteristics in daughters.”\textsuperscript{48}

The most recent research published in 2011 has continued to demonstrate the negative effects of chronic stress. In a study published in the \textit{Journal of Adolescent Health}, Deardoff et al. demonstrated that father absence predicted earlier onset of breast development in higher-income families and onset of pubic hair development in high-

\textsuperscript{43} Bruce Ellis and Judy Garber, “Psychosocial Antecedents of Variation in Girls’ Pubertal Timing: Maternal Depression, Stepfather Presence, and Marital and Family Stress,” 497.

\textsuperscript{44} Robert Quinlan, “Father Absence, Parental Care, and Female Reproductive Development,” 382.

\textsuperscript{45} Ibid.


\textsuperscript{47} Like scarcity or instability of resources

\textsuperscript{48} Bruce Ellis and Marilyn Essex, “Family Environments, Adrenarche, and Sexual Maturation: A Longitudinal Test of a Life History Model,” 1812.
income African American families.\textsuperscript{49} This research was the first of its kind to prospectively examine the effects of father absence on breast and pubic hair development while taking into account BMI, ethnicity, and income.\textsuperscript{50} They conclude that factors present in the familial and social environment of young girls may explain the relationship between father absence and onset of puberty. By controlling ethnicity and income, they were able to uncover a complex pattern of relationships that warrants further investigation, such that, “family conditions and child characteristics across the life course should be considered to explain in detail, the relationship between father absence and pubertal timing within varying contexts.”\textsuperscript{51} Ellis at al (2011) extended the findings of Ellis and Essex (2007). Of critical note, as predicted by the theory of BSC\textsuperscript{52}, their study showed that “higher levels of parental supportiveness predicted slower initial pubertal tempo and less advanced pubertal development by age 12.5”\textsuperscript{53} This study is significant because it was one of the first studies to “longitudinally assess pubertal maturation and analytically examine how pubertal processes unfold within individuals over adolescence.”\textsuperscript{54} The benefits of this approach cannot be understated. This analytic approach enables greater knowledge into the “causes and effects of puberty in relation to


\textsuperscript{50} Ibid.

\textsuperscript{51} Ibid.

\textsuperscript{52} Biobehavioral susceptibility to environmental influences


\textsuperscript{54} Ibid.

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a broad range of physical, psychological, biological, and social developmental processes."\(^{55}\)

The research explored above collectively demonstrates that precocious puberty cannot simply be linked to biological predictors alone. Pediatricians, educators, ministers, in short, anyone who has worked with children, has long known that a healthy home environment is key to healthy and positive outcomes in the lives of youth. While we do not want to rule out the biological contributors to precocious puberty, we do not want to dismiss prematurely the ecological and familial stressors that have been shown to predict the onset of puberty. Psychosocial scientists have demonstrated for some time the associations of home life and behavior in children. Now, the most current research demonstrates that chronically stressful familial environments are predictors of the early onset of puberty.

**Health Concerns**

Puberty is a complex developmental process that encompasses a rapid and substantial period of change. Puberty is characterized by the “maturation of the hypothalmic-pituitary-gonadal axis, the appearance of secondary sexual characteristics, acceleration of growth, and ultimately the capacity for fertility.”\(^{56}\) That these rapid and serious physiological changes are increasingly occurring in young children is shocking. The extensive body of research in the West unanimously indicates that early pubertal maturation in girls is associated with a variety of negative health and psychosocial outcomes. Some of these concerns range from mood disorders and substance abuse to

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\(^{55}\) Ibid.

adolescent pregnancy and a variety of cancers of the reproductive system. Five years ago, precocious puberty had a prevalence of 1 in 5,000 children and occurs in girls more than boys by a ratio of 10:1. Early menarche has been linked to greater risk of breast cancer as an adult and since those who experience premature puberty grow faster than peers, they fail to reach normal adult height. Of all the research considered above, the negative health and psychosocial outcomes are the most consistent findings to emerge in the literature.

The research conclusions are grave – adult society has created a cultural milieu where its young are increasingly experiencing the harrowing journey of adolescence on their own. Not only is adolescence extending further and further into adulthood, now it is scooping deeper and deeper into childhood thrusting our young into adult physiological realities without the requisite emotional development to cope. The transition in and through puberty has never been easy, now experienced at increasingly younger ages, the necessary social hurdles and psychological adjustments are much more complicated. We now turn to the implications.

**Implications**

*In The Home*

The early onset of puberty is associated with externalized forms of problem behavior. Children with precocious puberty are often rated as more aggressive, more disobedient, have more sleep problems and have difficulties relating with peers among children. 

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59 Ibid.
other issues. What has been clear from the research is that environmental factors in the home (chronic stressors) do contribute to precocious puberty, whereas, similarly aged children coming from stable two-parent homes do not have many of the negative familial influences triggering early onset of puberty. Collectively, the research demonstrates that girls are at greater risk when parents separate when their children are young. Parents need to understand that stressors such as divorce and exposure to high-risk fathers puts children at greater risk. The risk appears to increase when non-paternal males are in the picture. As a result, on average, puberty is sped up by a year or more.

Additionally, ecological stresses such as scarcity or instability of resources have been shown to contribute to early maturation. While socio-economic issues come into play here, kids at the margins are at greater risk. Do children and youth know what they are coming home to? Do our kids consider home to be a safe haven of security and rest? Research by Chap Clark (Hurt 2.0) and other researchers of youth culture and adolescent development have argued for some time that a stable and secure home life is necessary for positive and healthy outcomes. The external and internal cultural realities that have lead to a culture of abandonment are now contributing to physiological changes in our young. Put simply, our homes must be protected and resourced to prevent further downward growth.

In the Church

Puberty is difficult enough without it occurring in the elementary years. The physical issues have been mentioned above. The psychological and sociological issues, however, remain to be considered. Those who minister to children and early adolescents

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60 Line Tremblay & Jean-Yves Frigon, Precocious Puberty in Adolescent Girls: A Biomarker of Later Psychosocial Adjustment Problems,” 89.
will need to be prepared. Girls who start early are at greater risk of experiencing behavioral problems and are more likely to experience psychological stress. With the development of secondary sexual characteristics will come increased attention or outright rejection by peers. Such rejection often leads to relationships with older friends, unwanted sexual attention from boys with behavioral problems, and even attention from degenerate adult males.

The need for greater numbers of healthy adults in the midst of youth and children’s ministry cannot be overstated. How a ministry team, adult volunteers, and church leadership react to this growing trend could be the difference in a child’s life. Further, healthy adult involvement might just keep the window of discipleship opportunities open than might have been otherwise. Where homes fail, churches need to be ready to open their doors and hearts to hurting kids and provide them with a place of safety and security. A cadre of healthy, agenda-free, loving adults is needed to counteract and slow down the effects of abandonment.

Ministry programming will also need to take into account this cultural reality. It used to be that youth ministers needed to be prepared for girls who might “start” on a trip, thus, minimizing the trauma that might ensue if not handled appropriately. While this has not changed just yet, Children’s ministers will need to have trained personnel and “kits” at the ready when girls in their ministries suddenly start. As has been stated above, the premature start of puberty and menarche are traumatic. How a ministry prepares itself and addresses this need will be crucial in the coming years.

Another implication has to do with how churches minister and pay attention to families whose familial conditions are ripe for contributing to precocious puberty in their
children. Kids, especially those in the first five-six years whose parents demonstrate chronic issues in their marriage, need to be provided additional resources. Ministries for these parents must increase, as there is more at stake than ever before. Ignorant churches will only contribute to the problem; however, ministry staffs trained in this emerging reality can provide effective pastoral care and even refer parents to other professionals if necessary. Parents must be made aware of how their marital problems not only affect them but that research demonstrates that their chronic issues do have negative physiological and psychological affects on their kids – now leading to the early onset of puberty which could potentially lead to other negative outcomes. If this is true, then the reverse is also true – the church as the family of families needs to be more proactive in encouraging and offering support to healthy families in order to prevent precocious puberty and other disorders. It is when the church works together as an extended family that a form of “preventive maintenance” can be employed. Healthy families need as much nurture and encouragement as those who are struggling!

**Conclusion**

It has been said that our eyes are like windows to the soul. Looking into the eyes of our children can be a rewarding and trying experience. What do they reveal? Jesus teaches that we are not to hinder the little children. When we look into their eyes, what do we see? Do we see joy, hope, and glimmers of a future yet experienced or do we see pain, suffering, abandonment – young eyes struggling to deal with realities they cannot comprehend? Through our own selfishness, we have sought our own good over and at the expense of our kids. We have left them alone and caused them hurt. Their eyes tell a story of fragmentation and familial discord – they have seen, heard, and felt too much.
The cultural realities of precocious puberty and extended adolescence are evidence that we have hindered our kids from flourishing…*hindered our kids from knowing Christ.*