

Response to knowledge about puberty

Elizabeth A. Guillette, Ph.D.

Department of Anthropology, University of Florida, Gainesville, Florida

The lack of sound, scientific research dealing with real-life situations continues to perpetuate questions about the changes being observed in regard to puberty. Breast development in girls is considered normal at ages 6 and 7, but the normal may not be reflective of normalcy. We must move beyond general observations of the breast to include the corresponding development of mammary tissue. Research in Mexico, using breast palpation, has demonstrated that pesticide exposure is associated with altered mammary gland development, with a tendency toward greater fat deposit (1). This finding raises questions regarding the impact of many external environmental factors on proper pubertal development, including questions about the adequate development and functioning of other internal reproductive organs.

The external environment can also contribute to delayed puberty. Poor diet and extreme exercise are considered the main contributors to delayed menarche. Minimal research has considered the role of various manufactured chemicals. The drinking of water with volatile chemical and heavy metal contamination in Bhopal delayed the average onset of menarche by a year. Male development was also significantly delayed. Further, exposure histories of parents are not usually included in pubertal research. Parental exposure to methyl isocyanate (MIC) during the Bhopal disaster also delayed menarche in the offspring by a year or more. Males with

parental exposure to MIC had their first ejaculation a year or more later than controls (E. Guillette, unpublished data).

Whether we examine early or late pubertal development, all possible factors must be considered, and environmental factors during early life must be included. Normal variations must also be included; as with the above cases in Bhopal, some children were developed at the expected age, whereas others exhibited maturation 2 to 4 years later than the norm. The role of epigenetics remains unknown, including if the observed traits of either the timing of puberty or altered mammary gland development will be passed to future generation. Animal research provides suggestions as to the mechanisms driving the pubertal process, and can help explain the observed alterations. We must use such research as a foundation to direct human studies involving various environmental situations. Children must also be followed to determine the relationship of the timing of puberty on future reproduction and lactation abilities.

REFERENCE

1. Guillette EA, Conrad C, Lares F, Aguilar M, McLachlan J, Guillette LJ Jr. Altered breast development in girls from an agricultural environment. *Environ Health Perspect* 2006;14(3):471-5.

Reprint requests: Elizabeth A. Guillette, Ph.D., Department of Anthropology, University of Florida, Gainesville, Florida 32611.