Global Health Matters

In this article, Sommer makes an important point that the age of menarche is overlooked as a key indicator in research and practice in low-income countries. As the author indicates, the absence of systematic national data collection is very much a missed occasion for trend analysis of the population, as well as a better appreciation of the inequities within the country. These data would also provide government officials, health-care providers, and researchers with valuable information on nutritional status and sexual and reproductive health.

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MENARCHE: A MISSING INDICATOR IN POPULATION HEALTH FROM LOW-INCOME COUNTRIES

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Evidence from high-income countries suggests that early onset of menarche (i.e., the first menstrual cycle) may be linked to early sexual initiation, the uptake of alcohol and other substances, and premature school dropout.[1,2] Such potential linkages have yet to be adequately explored in low-income countries but have implications for girls' health and population health outcomes. National country data, research studies, and large national surveys, including demographic and health surveys (DHSs) and multiple indicator cluster surveys (MICSs), have generally not included this important measure of a girl's nutritional status, developmental progress, and reproductive health. Given the public health importance of tracking the age of menarche within individual girls and across differing socioeconomic populations, the global health community is overdue to capture this important measure.

CURRENT LACK OF MENARCHE DATA

Across low-income regions of the world, there is almost no systematic effort to monitor the socio-epidemiology of menarche. This lack of monitoring represents a missed opportunity for shaping public health interventions targeting girls transitioning into young womanhood, and for deepening the understanding of the relationship between socioeconomic inequalities and adolescent girls' nutritional status, risk of unintended pregnancy, and risk of sexually transmitted infections (STIs).

The onset of menstruation is a key indicator in pubertal development, serving as a biological and social measure of a girl's healthy transition from childhood into adolescence or young adulthood. From a physiological perspective, the age of menarche serves as an important clinical indicator of a girl's physical maturation, nutritional status, and reproductive health. From a social perspective, particularly in many low-income countries, the onset of menses has traditionally served as a symbol of fertility, sexual readiness, and marriageability, depending on the local cultural context.

From a public health perspective, trends in population data on the average age of menarche can indicate nutritional status of the population, including improved nutrition, malnutrition, or anemia. Studies conducted in Sweden, the United States, Portugal, and other high-income countries have suggested that a higher gain in body mass index during childhood is related to an earlier onset of puberty.[3–5] In Bangladesh, childhood and adolescent stunting remains an important determinant of age of menarche.[6] In India, 60% of adolescent girls are reported to have nutritional anemia.[7] Differences in the average age of menarche within countries, including the rural vs. urban divide, can serve as an indicator of socioeconomic inequalities and their implications for adolescent health.[8] In a three-country study in Asia, researchers found that girls were reaching menarche earlier in more modern and urban settings, a transition that has been shown to correlate with earlier initiation of sexual activity.[9]

Despite the numerous important functions served locally and globally by capturing menarche data at a national or large-scale level, the measurement of menarche has been overlooked in almost all of the significant surveys conducted in low-income countries, including the DHS (with a few exceptions), the MICS conducted by the United Nations Children's Fund, and smaller-scale surveys relating to research on family planning, sexual and reproductive health, and human

immunodeficiency virus (HIV) and acquired immunodeficiency syndrome.

PUBLIC HEALTH IMPLICATIONS OF EARLY MENARCHE

The importance of collecting data on the average age of menarche is supported by patterns in risky social behavior and vulnerability that have been empirically documented in high-income countries. There is increasing evidence that the early onset of menses is linked to risky behaviors, such as early initiation of (unsafe) sexual relations; uptake of drugs, tobacco, and alcohol; and premature school dropout.[1,2] Whether similar patterns exist across low-income countries has not yet been widely explored. A recent study in northern Malawi found that earlier age of menarche was strongly associated with earlier sexual debut, marriage, and lower schooling levels. The latter has important implications given the strong correlation between girls' education and population health. In Malawai, the proportion of adolescent girls who completed primary school differed by age of menarche: 46% of those who reached menarche before age 14 years completed primary school, while 70% of the girls who reached menarche after 16 years of age completed primary school.[10] The difference was only partially explained by the age of sexual debut. The authors argue that age of menarche may be a major overlooked factor influencing both sexual debut and schooling, with implications pertaining to risk of infection with HIV. There is also growing evidence that the onset of menses may impact girls' schooling due to challenges concerning menstrual hygiene management, with limited water and sanitation facilities in schools.[11–13]

In countries where fertility pressure is high and pubertal development serves as a symbol of sexual readiness, understanding the potential linkages to age of menarche is critical for adolescent girls' sexual and reproductive health. A growing number of low-income countries, such as Ethiopia, Senegal, Ghana, Bangladesh, and Thailand, are starting to measure menarche, usually among small samples of the rural or urban population.[3,14–17] They have generally concluded that the average age of menarche is dropping; however, in some countries, the reported average age remains high, particularly in rural areas. Zegeye et al. found the average age of menarche for girls in rural Ethiopia was 15.8 years.[14] In contrast, Pawloski et al. found that peri-urban Thai girls had an average age of menarche of 11.7 years, the latter having implications about increasing nutrition and socioeconomic status.[15] There remain, however, no national-level or large survey data that can provide a truly valid reference measure for most low-income countries.

PUBLIC HEALTH CONSEQUENCES OF LATE MENARCHE

The significance of capturing data on the average age of menarche has both clinical and public health utility. From a clinical perspective, as emphasized in a recent report issued by the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists, the menstrual cycle should be viewed as a vital sign or "important assessment tool of normal development and the exclusion of pathological conditions" for growing girls.[18] The authors highlight the insufficient knowledge most parents, girls, adolescents, and clinicians have of normal bleeding among girls transitioning through adolescence, and the importance of providing guidance to families and pediatricians. In low-income countries, particularly in sub-Saharan Africa, where adolescent girls continue to be under tremendous pressure to demonstrate their fertility,[19] a delayed onset of menses may cause tremendous concern within the family. In contrast, an early onset of menarche has shown to result in a girl's punishment if her parents interpret it as a sign of promiscuity, or isolation and seclusion away from the family, as has been evidenced in both sub-Saharan Africa and Asia (Unpublished report for the Bill & Melinda Gates Foundation. Sommer M. Global review of menstrual beliefs and behaviors in low-income countries: implications for menstrual hygiene management. 2011).[20,21] Although many girls in low-income countries, particularly those in rural settings, do not have regular interaction with a clinician, increased awareness about normal (and abnormal) patterns of the menstrual cycle could diminish unnecessary anxiety among girls and families, while also capturing pathologies that arise.

From a public health perspective, data on the average age of menarche are essential for understanding the nutritional status of the population and the socioeconomic divide between rural and urban population health. As data from high-income countries and Malawi suggest, they also have implications for understanding patterns in sexual initiation, vulnerability to HIV and other STIs, and schooling outcomes. Such national-level menarche data could also contribute to a global understanding of trends in overweight and obesity, if the age of menarche is found to be dropping among certain country populations.

A CALL FOR MENARCHE DATA

This absence of systematic national data collection represents a missed opportunity. Knowing the average age of menarche within populations would allow for public health trend analysis, clinical application, and a deeper understanding of socioeconomic inequalities within country populations. Important examples come from the U.S. population, in which researchers use menarche data—perceived to be the least subjective of the pubertal indicators—from the National Health and Nutrition Examination Survey to understand pubertal trends in varying populations of girls.[22] There is a need for large research studies, or the large-scale national-level surveys such as the DHS and MICS, to begin including menarche as a key indicator within their questionnaires. Although recall bias can be a challenge, both surveys target members of the population who are not too far away from menarche (e.g., the DHS targets 15-year-olds), and such biases can be adjusted for in analysis. In addition, consideration should be given to local taboos around sharing the onset of menses amongst certain cultural and social contexts.

Acquiring national-level data on the average age of menarche would provide critical information for country-level nutritionists, sexual and reproductive health experts, and experts working on the continued gender gap in education. In addition, research is needed in low-income contexts to better understand the potential vulnerabilities—from sexual initiation to school interruption to the uptake of substances, as has been found in high-income countries—of girls who reach menarche early. Lastly, the global-level health and development community would greatly benefit from the increased availability of quality data on age of menarche given their efforts to track trends in socioeconomic and nutritional status in regions around the world.

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