Has normal donor semen quality changed in the People's Republic of China?

Huang et al. (1), in "Decline in semen quality among 30,636 young Chinese men from 2001–2015," propose that sperm quality has been declining during a 15-year period in the Hunan Province of the People's Republic of China. This analysis is based on the evaluation of 30,636 men who responded to solicitation to be sperm donors and provided at least one semen specimen for study. The report that normal sperm morphology decreased threefold during this time frame is not surprising, as the World Health Organization evaluation of morphology and standards changed during this time. However, the change in sperm concentration and progressively motile sperm count is more surprising.

Changes in apparent male fertility potential, reflected by changes in semen parameters, can be evaluated in different ways, but each approach to study has limitations. The evaluation of semen parameters for fertile men often reflects female factors more than intrinsic male fertility potential. These studies often include men seeking vasectomy or recent fathers. Because this is not a population-based evaluation, it may reflect the semen parameters required for achieving a pregnancy. If, for example, the female age at conception was increasing during that time, then semen parameters may actually increase (measured for successful "fertile" couples). The optimal approach to evaluation of fertility potential in a population would involve a door-to-door evaluation of all men in a region. This is not a very feasible study approach. An alternative approach is to evaluate sperm donors, presuming that these men reflect the general population. However, once any selection of a population occurs (e.g., through the solicitation itself), this may alter the selection of subjects for study.

Semen parameters can change with time when the population studied is altered. This does not necessarily reflect a change in sperm production and/or quality, but a change in study population. Although Huang et al. (1) report that solicitation was done in a similar fashion throughout the 15-year study period, methods of communication have also changed during this time period, therefore different subjects could have been recruited. These changes could bias the study.

Because World Health Organization standards, especially for definition of normal sperm morphology, have changed during the 15-year study period of this study, and the World Health Organization standards were used to determine whether donors "qualified" as normal, it is not at all surprising that normal sperm morphology rates changed. The change in sperm concentration and progressive motility are not adequately explained in the World Health Organization standards.

Huang et al. (1) also focus too much on theories of environmental factors that may affect sperm production, quality, and fertility. The mention of purported causes of infertility without supporting data in the study population is potentially dangerous, as it may deter investigators away from the true causes of altered fertility, if real. It would be interesting to determine whether the purported changes in semen parameters have actually changed fertility, or at least fecundity—typically measured as time for a couple to achieve a pregnancy, in this same region of the People's Republic of China.

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