Letters to the Editor

Influences of maternal weight on the secondary sex ratio of human offspring

Sir,

In their study on influences of maternal weight on the secondary sex ratio (SSR), Cagnacci et al. (2004) found lower SSRs in the lowest quartile of pre-pregnancy body weight (<54.6 kg) than in the other three quartiles: 99.4 versus 105 males for 100 females (P < 0.01). In the highest quartile of weight gain during pregnancy, the SSRs were lower than in the first three quartiles: 96.8 versus 103.2 males for 100 females (P = 0.054). Both low pre-pregnancy weight and greater weight gain during pregnancy being associated with reduced SSR were interpreted as greater attrition exerted on male than female offspring in female non-optimal reproductive/metabolic conditions.

This interpretation does not fit in with the secular increasing SSRs in the less affluent Southern non-metropolitan areas in Italy and among the Black population in the USA, in parallel with increasing socio-economic conditions (Marcus et al., 1998; Astolfi and Zonta, 1999). Also, and still more problematic, it militates against all existing knowledge about animal and human reproduction. In fact, amelioration of the optimal/metabolic conditions in general furthers an approach to gender equity (100 males for 100 females). This runs parallel with optimization of the ovulatory and conception pattern, as argued extensively elsewhere (Jongbloet, 2004a,b), e.g. in ameliorating socio-economic conditions, during prime reproductive age and prime ovulatory seasons, optimal restoration of the post-partum ovulatory pattern, etc. In contrast, male-biased conceptuses occur in the less optimal conditions, while SSR reduction occurs only in extremely unfavourable conditions, and only then as a consequence of inappropriate implantation and perishing male-biased pathological fetuses. This dose–response fallacy occurs particularly in the case of accumulation of ovulatory and conception pathology, as illustrated by a non-linear but, instead, sigmoidal increase of age-specific live birth prevalence of Down’s syndrome according to maternal age: at above age 45 years, there is no longer an increase, as previously assumed, but instead a decline (Morris et al., 2002), presumably as a consequence of a disproportional increased loss of aneuploid conceptuses.

Therefore, I can only partly agree with Cagnacci et al.’s interpretation of reduced SSRs in non-optimal reproductive/metabolic conditions. SSR reversal associated with increased pregnancy loss or reduction in fertility only occurs during the limited trajectories of reproductive life which are characterized by more extreme conditions, such as the first and fourth quartiles also addressed by the authors. Analogous SSR reversal associated with reduction in fertility is also elicited by other severe population stressors, such as a bombing attack in Croatia (Zorn et al., 2003), an earthquake in Kobe, Japan (Fukuda et al., 1998), the 1991 economy collapse in East Germany (Catalano et al., 2003), etc. As already mentioned earlier (Jongbloet, 2003), Cagnacci et al.’s interpretation threatens the obstruction and clarification of the many enigmas related to the primary sex ratio at conception and SSR at birth.

References


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Reply to ‘Influences of maternal weight on the secondary sex ratio of human offspring’

Sir,

Dr Jongbloet boldly maintains that our interpretation of present (Cagnacci et al., 2004) and past (Cagnacci et al., 2003) data ‘threatens the obstruction and clarification of the many enigmas related to the primary sex ratio at conception and secondary sex ratio at birth’. We have reported that offspring of lighter women show a reversed sex ratio. Our interpretation is that a reduced energy store influences the reproductive axis to favour female offspring. This interpretation is supported by the direct relationship between sex ratio and caloric availability in diets throughout the world (Williams and Gloster, 1992) and by studies (Singh and Zambarano, 1997), also including rural African regions