Male to female ratio in newborns of grand grand multiparous women

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The male to female ratio in newborns of grand grand multiparous women was evaluated in 569 Jewish Orthodox women and 28 Muslim women. A total of 882 babies was born on the ≥10th delivery; 460 (52.2%) were males and 422 (47.8%) were females (sex ratio = 1.06). Newborn sex ratio did not significantly change with respect to birth order or maternal age. It is suggested that parity and increasing maternal age do not affect the sex ratio of newborns and that ethnic and environmental variables may play a role in the deviations in offspring sex ratio observed among different populations.

Key words: birth order/maternal age/sex ratio

Introduction

A recent study on the gender of newborns of grand grand multiparous women in Finland has demonstrated a shift from male to female majority with increasing age of the mothers (Juntunen et al., 1997). These findings may indicate an increased predisposition for abortion of male fetuses in multiparous women with advanced age. Alternatively, female majority at birth may be associated with ethnic and environmental variables and not necessarily linked to greater vulnerability of male fetuses with increasing maternal age.

The aim of this study was to evaluate the gender ratio in newborns of grand grand multiparous women in Orthodox Jewish communities residing in Jerusalem.

Materials and methods

The study comprised 597 women who delivered their 10–18th child (12.5 ± 2.0; mean ± SD per woman) during 1993–97 in Bikur Cholim hospital. A total of 569 women (95%) were Jewish, members of ultra-Orthodox communities, and 28 (5%) were Muslim. All women were in their first marriage. The ages of the mothers ranged from 28 to 49 years. A total of 882 babies was born, including 16 twins. Because all twin pairs were of both sexes, they were included in the study.

The χ² test was applied for comparison of newborn male ratios with birth order (one to nine versus ≥10) and with maternal age, which was categorized in groups as <35, 35–39, 40–45, and ≥45 years. The association of male frequency with mothers’ age was also evaluated by the Jonkheere-Terpstra test (Hollander and Wolse, 1973).

Results

During 1993–97, 17 107 babies were born in Bikur Cholim hospital. The male to female sex ratio of the newborns was 1.06. This ratio increased to 1.09 among babies born to grand grand multiparous women but the increase was not statistically significant (Table I). The proportion of male to female offspring was analysed with regard to maternal age. In both the general population and the grand grand multiparous women, increasing maternal age was not associated with significant changes in male to female ratio (Table II).

Discussion

Our study shows that sex ratio in offspring of grand grand multiparous women is similar to that of the general population and is not affected by increasing age of the mothers (Tables I, II). We have been unable to compare sex ratios in birth orders one to nine versus ≥10 within the grand grand multiparous group because many of their first to ninth babies were born in other hospitals. It seems reasonable to assume that the sex ratio of these first to ninth babies is similar to that of newborns in the general Jewish Orthodox population treated in our hospital, because in birth order ≥10, offspring gender frequency is comparable to that of the entire study population (Table I).

Many studies have indicated that the human sex ratio at birth is affected by a large number of variables such as the length of the follicular phase (Weinberg et al., 1995), timing of ovulation and coitus (Harlap, 1979), interpregnancy intervals (Greenberg and White, 1967; Jongbloet et al., 1996), testosterone concentrations (James, 1996a), seasonality (James 1996b; Jongbloet et al., 1996), and environmental hazards (James, 1987). Obviously, it is difficult to analyse the relative contribution of each of these variables separately, and therefore the debate concerning their impact on human offspring sex ratio is yet unresolved (James, 1996b,c; Jongbloet et al., 1996; Mittwoch, 1996; James, 1998).

The present findings are consistent with previous large sample studies which demonstrated a mean of about 1.06 for the human male to female ratio at birth, and indicated that the overall sex ratio varies hardly at all by either the birth order or the relative ages of the parents (Chahnazarian, 1988; Arnold and Rutstein, 1997). Our results do not fully correspond to the...
variations in relation to maternal age.

populations there is no consistent pattern of newborn sex ratio. Thus, it seems that among different
environment may play a role as possible factors affecting
increased. These cumulative data also imply that ethnicity and
(Imaizumi and Murata, 1981) the rates of male births have
offspring, whereas in Italy (Ulizzi and Zonta, 1995) and Japan
et al., (Moller, 1996) and the Netherlands (van der Pal-de Bruin
(Feitosa and Krieger, 1992; Allan et al., 1997). In accordance with the report of Juntunen
It has been suggested that excess conception of males is
depleted by preferential attrition of male fetuses in the course of
gestation (Byne and Warburton, 1987), and that the predi-
position of male fetuses for abortion may increase with advanced maternal age (Hansen, 1986; Juntunen et al., 1997).
However, our data indicate that the relative fertility of the male fetus does not seem to increase with advanced maternal age.

The discrepancy between our results and those of Juntunen et al. (1997) may be explained by ethnic and environmental variables affecting deviations in newborn sex ratios. It is noteworthy that large population data sets from America (Feitosa and Krieger, 1992; Allan et al., 1997), Denmark (Moller, 1996) and the Netherlands (van der Pal-de Bruin et al., 1997) have indicated a decline in the excess of male offspring, whereas in Italy (Ulizzi and Zonta, 1995) and Japan (Imaizumi and Murata, 1981) the rates of male births have increased. These cumulative data also imply that ethnicity and environment may play a role as possible factors affecting the newborn sex ratio. Thus, it seems that among different populations there is no consistent pattern of newborn sex ratio variations in relation to maternal age.

Table I. Sex ratio of newborns in relation to birth order and maternal age

<table>
<thead>
<tr>
<th>Birth order</th>
<th>No. of males (%)</th>
<th>No. of females (%)</th>
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<tbody>
<tr>
<td>1st–9th</td>
<td>8362 (51.5)</td>
<td>7863 (48.5)</td>
</tr>
<tr>
<td>10th–18th</td>
<td>460 (52.2)</td>
<td>422 (47.8)</td>
</tr>
</tbody>
</table>

Table II. Sex ratio of newborns in relation to maternal age in grand grand multiparous women

<table>
<thead>
<tr>
<th>Maternal age (years)</th>
<th>No. of males (%)</th>
<th>No. of females (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;35</td>
<td>66 (53.7)</td>
<td>57 (46.3)</td>
</tr>
<tr>
<td>35–39</td>
<td>219 (50.1)</td>
<td>218 (49.9)</td>
</tr>
<tr>
<td>40–44</td>
<td>153 (53.1)</td>
<td>135 (46.9)</td>
</tr>
<tr>
<td>45–49</td>
<td>22 (64.7)</td>
<td>12 (35.3)</td>
</tr>
<tr>
<td>Total</td>
<td>460</td>
<td>422</td>
</tr>
</tbody>
</table>

recent findings in grand grand multiparous women from Finland, which have demonstrated that increasing maternal age but not parity are associated with a significant shift in the gender of newborns from a male to a female majority (Juntunen et al., 1997). In accordance with the report of Juntunen et al. (1997), we observed that birth order did not affect newborn sex gender ratio. However, in our study group, male majority at birth was sustained irrespective of maternal age (Table II).


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References
