

Letter to the Editor

(Response to the Letter to the Editor by Sergei V. Jargin concerning “Atomic bomb testing and its effects on global male to female ratios at birth” by Victor Grech, The International Journal of Risk and Safety in Medicine 27 (2015), 35–44. DOI: 10.3233/JRS-150641)

Dear Editor,

The possible effect of the impact of radiation exposures from nuclear testing and Chernobyl fallout on the male to female ratio at birth (M/T) has been questioned in a letter to the editor [1, 2]. Social factors have been mooted as possible causes. The propensity for Asian societies to prefer males over females, and hence to opt for prenatal gender determination and termination of female fetuses is beyond dispute [3], an influence with which this author is fully cognizant [4]. This male preference with resultant female foeticide may well have played a role in the observed findings after antenatal gender identification became widely available.

However, due to historical timings of availabilities of technologies that permitted antenatal sexing, these factors cannot explain the statistically significant global changes in M/T (involving 94.5% of births studied) which included a uniform reduction in M/T between the early 1950s to the late 1960s, followed by an increase to the mid-1970s, with a subsequent decline [1]. The rise in M/T in the mid-1970s was thus transient and superimposed on an overall declining trend, and occurred shortly after an upsurge of nuclear bomb tests just before 1963, when the Partial Nuclear Test Ban Treaty was signed, prohibiting above-ground atomic bomb testing. The nuclear tests led to a global increase in radiation levels. The worldwide annual average population radiation exposure to natural sources is approximately 2.4 mSv [5]. The increase in background radiation due to atomic tests alone in 1962 and 1963 added approximately an additional 0.11 mSv of exposure per year worldwide (5% of the average background dose from all sources). After 1963, global background radiation levels fell progressively, down to 0.005 mSv per year by the year 2000 [5]. The rise and fall of M/T therefore occurred in temporal association with the spike in atomic bomb tests.

Antenatal fetal sexing cannot have been germane to the issue at hand as the first successful prenatal diagnostic use of chorionic villi biopsy was reported in 1975 [6], and ultrasonography for the determination of gender only became available in the early 1980s [7].

Furthermore, the letter to the editor implies that low doses of radiation are innocuous. This flies in the face of the linear no-threshold (LNT) hypothesis that states that at even at low doses, there is a linear relationship between dose and risk, particularly *vis-à-vis* the probability of cancer induction, all the way down to zero exposure [8].

However, this author acknowledges that several factors may have played an interacting role in the observed trends, and not only radiation.

Victor Grech
Department of Paediatrics
Mater Dei Hospital
Malta
Tel.: +356 99495813
E-mail: victor.e.grech@gov.mt

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