MMJ

Malta Medical Journal, 2025; 37(1)
http://mmsjournals.org/index.php/mmj/43

ORIGINAL ARTICLE

No birth sex ratio changes in the United States in 1977 following Elvis Presley's death

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Introduction

In humans, males are born slightly in excess of females such that male divided by total births (M/T) approximates 0.515. Many factors influence M/T, including acutely stressful events. This study was carried out to ascertain whether the death of Elvis Presley (1977) caused any perturbations in M/T in the following months in the United States.

Methods

Anonymous data (male and female births) was obtained from publicly available online datasets as white and non-white births.

Results

There were 3,235,291 (1658996 male and 1,576,295 female) births in 1977 with M/T=0.5128 (95% CI: 0.5122-0.5133). A seasonal pattern is evident in M/T for the United States for 1977. There were no obvious perturbations of this baseline after Presley's death including by race.

Discussion

Monthly cycles in M/T have been observed including in the United States. Acute stress has been shown to reduce M/T after the death of important and loved personages but this did not occur following the demise of Presley, possibly due to his slow career decline prior to his death.

In humans, males are born slightly in excess of females such that male live births divided by total live births (M/T) approximates 0.515.[1] Many factors influence M/T, including acutely stressful events.[2] This was observed for example after the September 11 attacks on the United States, where a sharp drop in male births was noted in the United States four months after this event,[3] and this correlated with a corresponding excess of male foetal loss in the same country in already pregnant women during that event.[4]

The demise of important personages has also been linked to similar dips in M/T, as evidenced after the demise of Lady Diana with a UK (only) dip in M/T 4-5 months later,[5] and the assassination of President John Kennedy with an M/T dip in the United States 4 months later.[6]

Elvis Presley was a popular musician, a loved figure and a loved icon whose death caused grief to many.[7,8] This study was carried out in order to ascertain whether the death of Elvis Presley (Born: January 8, 1935, Tupelo, Mississippi, United States - died: August 16, 1977, Graceland, Memphis, Tennessee, United States) caused any perturbations in M/T in the following months up to January of the following year (1978), five months later.

METHODS

Anonymous data (male and female live births) was obtained from the United States Office of Health Research via the publications vital statistics of the United States under Natality, and these are publicly available online.[9,10] Ethics approval and data protection were not applied for as these are inapplicable for the processing of datasets from such repositories. Data was available by state and by race (white and non-white). The degree of completeness was not specified. The equations of Fleiss were used to obtain confidence intervals for M/T (binomial).[11]

RESULTS

There were 3,497,642 (1,792,786 male and 1,704,856 female) births with M/T=0.5126 (0.5120-0.5131). A seasonal pattern is evident in M/T for the United States for 1977 (Figure 1). Visual inspection shows no obvious perturbations of this baseline. Breakdown by white and non-white populations also showed no baseline perturbations (Digital Supplementary File 1). Formal individual chi tests for November 1977, December 1977 and January 1978 versus the other months in the study confirmed the absence of significant fluctuations.

DISCUSSION

Monthly cycles in M/T are recognized and have been described for the United States in the same pattern as shown in this study.[12]

Acutely stressful events may precipitate spontaneous abortion in women who are pregnant with frail foetuses. Males are terminated in this way more than females in accordance with the Trivers-Willard hypothesis, which avers that nature has favoured parents who are able to influence offspring sex according to periconceptual and pregnancy conditions. This is because in polygynous species like humans wherein males have multiple mating

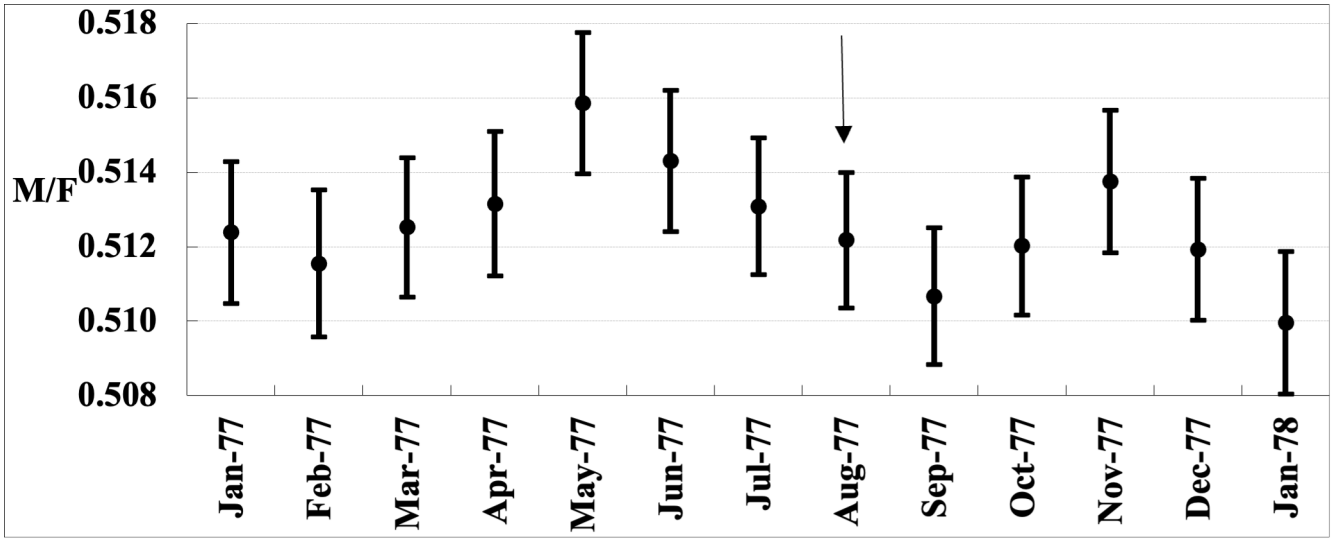

Figure 1 *Monthly M/T with 95% confidence intervals for the United States, January 1977 to January 1978 (White plus non-White). Arrow indicates month of Elvis Presley's death.*

opportunities, a strong male born in favourable conditions is likelier to pass on parental genes.[13] However, a frail male requires more resources to be gestated and in poor conditions, may not survive to term. Moreover, a frail male may not survive to adult life and in any case, would not be able to compete for mating privileges with stronger males. For this reason, in poor conditions, males are likelier to be culled in utero giving a potential mother an opportunity to retry pregnancy. If conditions remain poor and a female ensues, such a foetus requires less resources to be carried to term and in adult life will invariably be impregnated. On the other hand, if conditions improve and a male ensues, this further favours the parental passage of genes.[13]

Stress in its many forms has been shown to transiently reduce M/T and this was shown in a meta-analysis of terrorist events looking at population level M/T outcomes.[14] As already noted, the sudden death of a known and loved personage, whether accidental or by murder, resulted in a dip in M/T circa four months after the event, implying that already pregnant mothers miscarried disproportionately more male than female foetuses.[5,6] This was not witnessed after the death of Elvis Presley, as shown in this paper. Moreover, the assassination of President Kennedy had different effects on non-white vs. white populations,[15] and in this study, no such differences were noted.

It is possible that Presley's slow career decline may have attenuated the grief felt by his fans, who may also have become older and less likely to be of childbearing age and therefore also less likely to influence M/T despite outpourings of grief.[16]

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