

HUMAN CONGENITAL ABNORMALITIES AND THEIR RELATIONSHIP TO NUTRITIONAL RELATED ENVIRONMENTAL FACTORS IN RURAL SOUTH AUSTRALIA

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The rural city of Mt. Gambier has an elevated perinatal mortality rate of congenital abnormalities in humans. Mt. Gambier is situated in a trace element deficient area, and also is supplied by drinking water with an increased level of nitrate. Animal experiments have shown that dietary trace element deficiencies in the pregnant mother result in offspring with congenital abnormalities (Underwood, 1977), while nitrates are readily converted to nitrosamines, which are carcinogenic and teratogenic. A study was undertaken to investigate the human perinatal mortality from congenital abnormalities in Eyre Peninsula and the South East of South Australia, as both these areas are deficient in trace elements and contain communities drinking water with high nitrate levels.

Using data supplied by the Australian Bureau of Statistics (A.B.S.), the perinatal deaths for the years 1968-76 were classified according to cause of death, and by local government area (L.G.A.) of mother's usual residence. Information from the A.B.S. on live births by mother's usual L.G.A. was used to calculate rates. A non-metropolitan area north of Adelaide, not trace element deficient and with no sources of drinking water with high nitrate levels, was used as the control area.

The perinatal mortality rate from all congenital abnormalities in the control area is 4.02 (per 1,000 births). In Mt. Gambier, which occurs in the South East, the mortality rate is 6.25, while in the remainder of the South East the rate is 2.79. In Eyre Peninsula, the rate is 4.69. The abnormalities responsible for the increase in Mt. Gambier and Eyre Peninsula are anencephalus, and abnormalities affecting multiple systems (Table 1).

Table 1. Perinatal mortality rate (per 1,000 births) for anencephalus and abnormalities affecting multiple systems (combined)
(Foetal + neonatal = Perinatal) () = number of deaths

	Foetal	Neonatal	Perinatal
Mt. Gambier	3.60 (15)	0.97 (4)	4.56 (19)
Remainder of South East	0.56 (4)	0.42 (3)	0.98 (7)
Eyre Peninsula	1.56 (10)	0.63 (4)	2.18 (14)
Control area	0.67 (15)	0.77 (17)	1.43 (32)
South Australia	0.89 (172)	0.73 (138)	1.61 (310)

Table 1 shows that the increases in Mt. Gambier and Eyre Peninsula occur mainly in foetal deaths, while neonatal deaths are less affected.

Arguments will be presented relating the increase in abnormalities to environmental factors occurring in Mt. Gambier and Eyre Peninsula, with particular reference to soil trace element deficiencies and high drinking water nitrate levels.

REFERENCE

UNDERWOOD, E.J. Trace Elements in Human and Animal Nutrition: Academic Press 1977

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