

What do data on child-woman ratios imply about the early demographic effects of colonisation on Māori?

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Introduction

The last fifty years has seen vigorous debate on the ‘fatal impact’ of European contact and conquest (Bushnell, 1993; Stannard, 1989; Thornton 1987), as well as the extent and causes of post-contact Indigenous depopulation (Cook, 1998; Crosby, 1976; Dobyns, 1981; Rallu, 1991; Smith et al., 2008), and its long-term consequences (Pool, 2015; Swanson, 2019). In Aotearoa New Zealand (Aotearoa), knowledge about past Māori populations is crucial to understanding the nation’s history of colonisation, particularly in the decades spanning the 1840 Tiriti o Waitangi (Treaty of Waitangi) to 1900. However, the fertility and mortality rates of Māori during colonisation are challenging to measure owing to the patchy quality of historical data sources. The first official attempt at a Māori was undertaken in 1858 – nearly two decades after the Tiriti (Fenton, 1859) – and it wasn’t until the mid-twentieth century that reliable data on Māori fertility and mortality became available. More importantly, colonial censuses were as much a tool of surveillance and dispossession as they were a method of data collection (Kukutai, 2012).

Much of the scholarship on nineteenth century Māori demography rests on analyses of child-woman ratios using adjusted data from colonial censuses. In a series of pathbreaking studies, the late demographer Ian Pool adapted methods originally developed for mid-twentieth century developing countries, to try to study demographic conditions in nineteenth century Aotearoa (Pool 1973, 1991, 2015). He relied particularly on methods first described by Coale and Demeny (UNDESA 1967) for inferring mortality and fertility from data on the ratio between the number of children in a population and the number of adult women. Child-woman ratios have been used in other demographic studies, typically as a measure of fertility. Ford & DeJong (1963), for example, used the child-woman ratio, along with other measures, to investigate fertility decline in the Southern Appalachian Mountain Region of the US. Easterlin (1971) used the child-woman ratio to study variation in White fertility in the US while Engerman (1978) used it to track changes in Black fertility between 1850 and 1960.

In this paper, we review the logic behind methods for inferring fertility and mortality rates from child-woman ratios, highlighting the important assumptions. We then apply the methods to data for nineteenth century Māori populations. Our motivation is to determine what these methods can tell us about the demographic conditions experienced by Māori in nineteenth century Aotearoa. We find that the ability to draw out the implications of data on child-woman ratios and growth rates reveals as much about the limits of the data as it does about fertility and mortality.

Inferring fertility and mortality from child-woman ratios

Following essentially the same logic as the early methods of Coale and Demeny, we show how the relationship between fertility, mortality, child-woman ratios, and population growth in stable populations can be used to make inferences about fertility and mortality rates. Whereas Coale and Demeny assume that census data on full age distribution can be obtained, however, we focus on the

case where only counts of children versus adults are available, which allows us to develop a more direct, graphical approach than their original methods.

If we know the levels of fertility and mortality in a population, and we know that fertility and mortality rates have been more or less constant over recent decades, then we can infer the age-structure and growth rate of that population. This logic can also be applied in reverse. If we have some indicator of the age structure of the population, and an estimate of its growth rate, then we can infer the levels of fertility and mortality. The analysis becomes more complicated when fertility rates have not been constant, but it can be shown that child-woman ratios and growth rates should provide an indication of demographic conditions a generation or so earlier.

Indicative results

In Aotearoa, one indicator of age structure that is available, at least of the second half of the nineteenth century, is counts of children and women from the population census (conducted in 1858/59, 1874, 1878, 1881, 1886, 1891, 1896). Comparing values from the population counts carried out during this time also gives some rough estimates of population growth rates. It should, in principle, be possible to use this data to estimate fertility and mortality rates.

We find that the methods lead to values for fertility in the middle of the century that are implausibly high (a TFR of 7-8 births per woman) combined with life expectancies that are implausibly low (around 10-15 years), though the values become more plausible by the end of the century, with a TFR of around 6 births, and a life expectancy in the low 20s.

The results for the middle of the century suggest that there are serious problems with the input data: that the estimates for child-woman ratios are wrong, the estimates of population growth rates are wrong, or both.

Implications

Our analysis suggests that the standard sources of quantitative data for nineteenth century Māori demography are not internally consistent, and need to be handled with extreme caution when trying to reconstruct the demographic history of the period.

To make progress, it will be necessary to try new strategies. One is to disaggregate the existing data sources, and to distinguish between localities where the data more reliable and localities where it is less reliable. Another is to bring in data sources that have not previously been used, such as Māori-language documents from the time, and oral histories.

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