

Extended Abstract

Introduction

Consanguineous marriage is conventionally defined as a union between spouses related as second cousins or closer (Bittles, 1994, 2001). Since the mid-19th century there has been a steady decline in the prevalence of consanguineous marriage in Western countries, but in many other populations intra-familial unions remain strongly favoured (Bittles & Black, 2010a; Hamamy *et al.* 2010; Bittles, 2012; Small *et al.* 2017). A number of local and state-based studies have suggested that the prevalence of customary consanguineous marriage has recently declined in India, especially in the four southern states, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu, and in neighbouring Maharashtra. The primary aim of the present study was to empirically determine whether this change has indeed occurred in India during the last generation, at national, regional and sub-national levels. The paper also investigates whether trends in the prevalence of consanguineous unions differed in rural and urban communities. And if uniform changes in prevalence were observed across specific levels and types of consanguineous marriage, i.e. uncle-niece, first cousin, and second cousin, in which spouses share 1/4, 1/8 and 1/32 of their genes respectively.

Objectives

- (i) To establish if the prevalence of customary consanguineous marriages in India has declined at national, regional and state levels;
- (ii) To determine whether there has been a uniform decline in the prevalence of specific categories of consanguineous marriages: uncle-niece, first cousin, and second cousin;
- (iii) To identify factors responsible for changes in the rates of consanguineous marriage in populations where: a) consanguinity traditionally was preferential, and b) consanguinity customarily was avoided;
- (iv) To replicate the analyses outlined in items (ii) and (iii), separately for urban and rural areas; and
- (v) To conclude whether the long-predicted decline in consanguineous marriages in India has occurred within the last generation and, if so, its possible effects on population structure and health.

Data and Methods

To accomplish the above objectives, data were obtained from the National Fertility and Health Surveys, NFHS-1 (1992-93) and NFHS-4 (2016-16). Information on consanguineous marriages were first collected in India on a national basis in NFHS-1, but in NFHS-2 (1998-99) and NFHS-3 (2005-06) the questions on consanguinity were omitted. However, in recognition of the potential social and health importance of the topic, and following rigorous representations by researchers working in the areas of demography and community genetics, the Government of India kindly agreed to reinstate the questions on consanguinity in the NFHS-4 questionnaire.

A total of 89,668 ever-married female respondents were interviewed in NFHS-1 and 529,872 in NFHS-4. Bivariate and multivariate techniques were used to identify the factors responsible for a decrease or increase of consanguineous marriage. The variables tested

include 'residence', 'education of woman', 'age at marriage of woman', and 'religion', with the analyses carried out separately for rural and urban populations.

Results

At the national level the overall prevalence of consanguineous marriage declined from 16.2% in NFHS-1 to 14.3% in NFHS-4. However, the changes in the overall numbers of consanguineous unions were not consistent, with the largest reductions in the four southern states from 34.6% in NFHS-1 to 27.8% in NFHS-4, and in neighbouring states in Western India, e.g. Maharashtra, from 25.4% in NFHS-1 to 16.1% in NFHS-4. Conversely, in some states in Central, North and East India where consanguineous marriage had previously been culturally restricted, increased overall levels of consanguinity were observed. As in Madhya Pradesh, 4.9% in NFHS-1 and 7.4% in NFHS-4; Haryana, 1.8% in NFHS-1 and 4.3% in NFHS-4; and Odisha, 7.0% in NFHS-1 and 8.1% in NFHS-4. The apparent marked increase in consanguinity reported in Jammu & Kashmir, from 9.8% in NFHS-1 to 18.9% in NFHS-4, is at least in part a sampling artefact since the data collection conducted in 1992-93 was restricted to the Jammu region only.

Minor differences were observed with respect to the specific levels of consanguineous marriage contracted. Thus comparing NFHS-1 and NFHS-4, uncle-niece unions declined in prevalence from 0.9% to 0.6%, first cousins from 10.1% to 6.9%, and second cousins from 5.3% to 4.4%. Calculated as mean coefficients of inbreeding (α), this translates into a 30.7% decline in the overall extent of consanguinity from $\alpha = 0.0075$ in NFHS-1 to $\alpha = 0.0052$ in NFHS-4.

In terms of overall consanguinity, there were inverse relationships between the age of the respondent and age at marriage in both NFHS-1 and NFHS-4. Likewise, from a national perspective consanguinity was highest in the Muslim community in both NFHS-1 and NFHS-4. But this finding needs qualification as, following the *Manusmriti*, in North India a very large proportion of the majority Hindu population rigorously avoids intra-*gotra* marriage. By comparison, according to the *Dharmasutra*, in South and West India there has been a strong cultural tradition of consanguineous unions in Hindu society dating back some 2,000 years (Bittles *et al.* 1991; Bittles 2002, 2012).

Other factors that significantly influenced the prevalence and patterns of consanguineous marriage included rural/urban status, female education, family wealth, and Scheduled Caste and Tribe status. With regard to variables such as female education and wealth, it appeared that respondents in consanguineous unions largely occupied the centre ground, which differs from earlier studies that mainly correlated consanguinity with poor, ill-educated, rural communities. However, as with the question of religion, the national data and the results obtained from the surveys reported at state level were partially at variance, probably reflecting the major changes that have occurred during the past generation with respect to factors such as urbanization and female educational and employment opportunities.

Conclusion

With some exceptions at state and territory level, the comparative analysis of NFHS-1 and NFHS-4 strongly indicates that during the last 20+ years consanguineous marriage has indeed declined in prevalence in India. Besides the socio-demographic relevance of the findings, the study is important from a health perspective as consanguinity has been associated with adverse birth outcomes, and increased infant and child morbidity and mortality (Bittles &

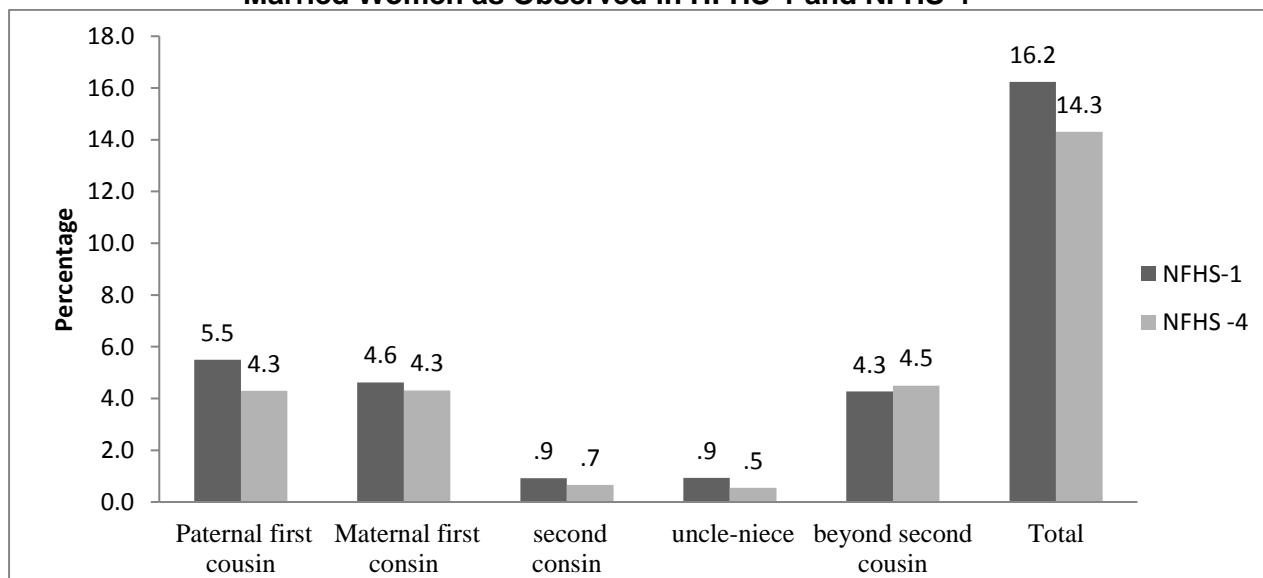
Black, 2010b; Shieh *et al.*, 2012; Bittles, 2013). Thus a decline in consanguineous marriage should result in lower rates of inherited non-communicable disorders.

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Tables:

Pattern of Relationship between Spouses before Marriage among Ever-Married Women as Observed in HFHS-1 and NFHS-4



Note: *Weighted by applying sample weights

Consanguineous relationships

Biological relationship	Genetic relationship	Coefficient of relationship (r)	Coefficient of inbreeding (F)
Incest Half-sib, double first cousin, uncle-niece	st 1 degree	0.5	0.25
	nd 2 degree	0.25	0.125

First cousin	3 rd degree	0.125	0.0625
First cousin once removed	4 th degree	0.0625	0.0313
Second cousin	5 th degree	0.0313	0.0156
Third cousin	7 th degree	0.0078	0.0039

Change in the prevalence of consanguineous marriage among Indian states from NFHS-1 and NFHS – 4

