Public Health Nutrition: 12(12), 2317–2322 doi:10.1017/S1368980009005576

Pregnancy-related food habits among women of rural Sikkim, India

Susmita Mukhopadhyay[1,*] and Arpita Sarkar[2]
[1]Biological Anthropology Unit, Indian Statistical Institute, 203 Barrackpore Trunk Road, Kolkata 700108, India:
[2]Cultural Research Institute, P 1/4, C.I.T. Scheme VII M, VIP Road, Kankurgachi, Kolkata 700054, India

Submitted 16 April 2008: Accepted 11 February 2009: First published online 1 May 2009

Abstract

Objective: Every society follows its own traditional health-care beliefs and practices during and after pregnancy, which is intimately linked to its socio-cultural environment. The objective of the present study was to document pregnancy-related food practices and the social-cultural factors linked with them.
Design: The present study was a cross-sectional one conducted among a group of women residing in five villages in east Sikkim, India. Mothers who had given birth to a child one year before the survey participated in the study. The mothers answered a pre-tested questionnaire on food habits and practices followed antepartum and for 6 weeks postpartum.
Subjects: The study group consisted of 199 women of Nepali caste groups with variations in economic condition.
Results: More than 86% of mothers consumed special foods during the postpartum period. Taboos on different food categories during the postpartum were reported only by 65·3% of mothers. Factors found to be significantly associated with special food consumption were literacy status during the antepartum and parity during the postpartum.
Conclusions: The change in consumption patterns reflects the success of a safe motherhood campaign propagated by the government. Detailed investigation in this area, involving per capita daily consumption during pregnancy and the postpartum period, is needed.

Keywords
Antepartum
Postpartum
Special food
Food taboo
Socio-economic factors

For each person food is a vital component of life, as it contains the nutrients he/she needs for daily living and also plays an important role in social life. However, food in appropriate quantities is not always accessible to all people, for various political, economic and geographic reasons[1]. Mothers in developing countries, especially pregnant and lactating ones, are considered to be nutritionally vulnerable as they are often subjected to different degrees of nutritional stress. At the individual level, nutrition requirements change throughout the lifespan, from childhood and adolescence to pregnancy and breast-feeding and into old age.

Food choices are determined by multiple factors like social, cultural, economic and environmental influences, coupled with individual taste preferences. Individual characteristics such as income, education, cooking ability, age and ethnicity also affect food choice. It has been established that women from less privileged communities in India tend to suffer from malnutrition of different grades and their dietary energy intake is not always adequate to compensate for the heavy physical workload which they often have to undertake[2]. Mothers are also subject to nutritional stress owing the nursing process and their health risk is multiplied by frequent pregnancies, coupled with a lack of access to and control over income, inadequate education, excessive demands on their time, and so on[3]. The success of lactation and the health status of the infant depend entirely on the type of diet consumed by women during pregnancy and lactation[4].

It is widely accepted that cultural beliefs and practices play a role in the successful dissemination of nutrition messages to the community. Since maternal nutrition plays an important role in pregnancy outcomes, ignorance about its needs can cause permanent damage to the health of the newborn. Sood and Kapil[5] studied the nutritional status of pregnant mothers and reported that 64% of them believed that food restriction in general for the first six months of pregnancy results in a smaller baby, making delivery easier. While reviewing major problems and key issues in maternal health in Nepal, Simakhada *et al.*[6] reported poor knowledge of the mothers about diet and nutrition. Nutritional anaemia was detected as one of the prime causes of high maternal mortality in Nepal. Frequent pregnancy associated with poor nourishment put these mothers at high risk during delivery[7].

*Corresponding author: Email susmi@isical.ac.in, susmi.mukho@gmail.com

Every society has its own traditional beliefs and practices related to health care in general and regarding harmful as well as beneficial effects of foods for women during pregnancy. These beliefs may not always follow modern biomedical norms of maternal nutrition, fetal growth and safe delivery[8]. These beliefs and practices are linked to the existing cultural ethos and different components of the socio-cultural environment, including the educational attainment of the women. Of various factors that influence the nutritional status of women, dietary habits especially during the two crucial periods of life – pregnancy and lactation – are important. The woman herself or her family often feels the need to consume special foods to maintain good health during pregnancy[9]. Two studies, one in Hyderabad[10] and the other in Rajasthan[11], revealed that large numbers of women used special food during pregnancy and during lactation, which supports the suggestion that women attach much importance to it.

It is often reported that poverty, non-availability of certain food items, misbeliefs, and at times ignorance, force women to avoid certain foods during the postpartum period; hence that certain foods are considered taboo. These taboo items may include many nutritious foods which a mother badly needs. During pregnancy, such avoidances are observed in many instances, as well[8]. However, a study on maternal diet and infant feeding practices among the Ho tribe in Chotanagpur, erstwhile Bihar[12], showed no food restriction during pregnancy. Lactating mothers were given special food (cooked rice mixed with salt, turmeric soup, dried onion, papaya, some herbs, etc.) to increase milk production.

A joint survey[13] by the All India Institute of Hygiene and Public Health, Calcutta and the Department of Health and Family Welfare, Sikkim measured average daily consumption of different categories of foodstuff by women in general in Sikkim. The study revealed that they consumed staple foods such as rice and maize adequately, while a large number of families reported no intake of all other categories of foodstuff. Mothers reported to have consumed meat, egg, milk, dhal (pulses) and *chhang* (indigenous millet beer) for special inclusion as and when affordable. Some prominent food taboos included chilli and green leafy vegetables both antepartum and postpartum, and pork and mutton postpartum or during lactation.

A study in rural Tamil Nadu[14] revealed that women consumed more green leafy vegetables, fruits, animal protein and dairy products during pregnancy than their usual intake. A significant association was observed between intake of food items and socio-economic factors such as parity, education, family type, family income and visits to health-care services. In some parts of Tamil Nadu women also followed food restrictions on items such as papaya, fish, green dhal and pumpkin, and consumed certain home-made foods.

The food culture of the state of Sikkim, nestled in the Himalayas, is reflected in the pattern of food production[15]. Preparation of wild edible plants including bamboo shoots, ferns and their parts (seeds, fruits, roots, leaves, flowers) in the local diet form an important component of food culture. Although several studies have been conducted to investigate the food practices during different phases of pregnancy among Indian rural (including tribal) women in different states, there remains a dearth of information pertaining to the food practices during pregnancy of women residing in a rural mountainous setting like Sikkim.

The objectives of the present study were to document the food practices of a group of Nepalese women during the antepartum and postpartum, and to describe how factors such as social group, education, parity and socio-economic status (measured in terms of monthly expenditure) were related to food intakes during these periods.

Materials and methods

The population of Sikkim is 540 000 according to the 2001 Census[16] and is scattered over four districts and 452 villages. The population of Sikkim is mainly made up of the Lepehas, the Bhutias and their allied clans, and the Nepalese. The study was conducted in five villages of Singtham, in east Sikkim. Data presented in the current paper are part of a survey aimed at collecting data on reproductive morbidity among a group of 200 women residing in those villages. Only those women were included who had given birth to a child one year prior to the survey. One woman was dropped owing to her sudden illness during the survey. The study population thus consisted of 199 women of Nepali caste groups, both higher (n 142) and lower caste (n 57), inhabiting rural settlements with variation in economic condition. Principal agricultural crops of the state are maize, rice (staple food), large cardamom, wheat, finger millet, potato, buckwheat, barley, soyabeans, ginger and a variety of seasonal vegetables including cabbage, radish, aubergine, tomato, mustard leaves, cucumber, pumpkin, sponge gourd and *rai* (green leaves)[17]. Seasonal fruits such as orange, apple and banana are grown and eaten. Traditional fermented food has always been a rich ingredient to the Sikkimese culture. More than seventeen varieties of indigenous fermented foods are prepared and consumed by people of Sikkim. Preparation of fermented food using micro-organisms substantially enhances the nutritive value of foods. During the process locally available agricultural produce is converted biochemically into upgraded edible forms[18].

A pre-tested questionnaire was administered to collect information on food practices during pregnancy and up to 6 weeks after childbirth from mothers. Information on food practices included household prescribed and prohibited

food items during pregnancy and postpartum. The survey was conducted from April to June 2004. Each mother was interviewed in the local language or Hindi by a trained investigator. Prior consent was obtained from each study participant before data collection.

Results and discussion

Table 1 shows the distribution of mothers according to social group, literacy status, parity and economic status measured in terms of monthly expenditure. The mean age at marriage was 18·7 (SD 3·10) years. The illiterate group of women were older on average (27·9 years) than the literate group (24·6 years). Mothers with high parity were married at a younger age on average than were mothers with low parity. Tables 2 and 3 show the types of foods these mothers consumed during two important phases of pregnancy. Special foods were taken by 61·3% of mothers during the antepartum and by 86·4% of mothers during the postpartum. Interestingly, more mothers with low parity consumed special food during the antepartum, while mothers who were pregnant for the third or fourth time consumed special foods less

Table 1 Distribution by social variables: Nepali mothers from five villages in east Sikkim, India, April to June 2004

	All mothers		Age (years)		Age at marriage (years)		Taking special food during antepartum		Taking special food during postpartum	
	n	%	Mean	SD	Mean	SD	*n*	%	*n*	%
All mothers	199	100·0	25·5	5·4	18·7	3·1	122	61·3	172	86·4
Social group										
Higher†	142	71·4	25·8	5·2	18·9	3·3	89	62·7	124	87·3
Lower‡	57	28·6	24·8	5·8	18·3	2·7	33	37·3	48	84·2
Literacy status										
Literate	147	73·9	24·6	4·7	18·5	2·8	96	65·3	127	86·4
Illiterate	52	26·1	27·9	6·5	19·4	3·9	26	50·0	26	50·0
Parity										
One	69	34·7	21·8	3·3	18·9	3·1	44	63·8	51	73·9
Two	59	29·6	24·9	4·4	19·1	3·9	41	69·5	56	94·9
Three	24	12·1	25·7	3·4	18·5	2·3	12	50·0	23	95·8
More than three	47	23·6	31·6	4·6	18·0	2·5	25	53·2	42	89·4
Economic status§										
High (>Rs 5000)	23	11·6	25·4	5·4	19·0	3·8	18	78·3	19	82·6
Medium (Rs 2000–5000)	35	17·6	24·6	4·6	18·6	2·8	18	51·4	32	91·4
Low (<Rs 2000)	140	70·4	25·7	5·6	18·7	3·1	85	60·7	121	86·4

†Higher in the social hierarchy.
‡Lower in the social hierarchy.
§Based on monthly expenditure.

Table 2 Distribution by types of special food taken during the antepartum: Nepali mothers from five villages in east Sikkim, India, April to June 2004

			Types of special food											
	Mothers taking special food		Milk		Animal protein		Pulses		Green vegetables		Fruits		Others	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
All mothers	122	61·3	103	84·4	93	76·2	84	68·8	90	73·7	77	63·1	35	28·7
Social group														
Higher†	89	62·7	77	86·5	72	80·9	64	71·9	70	78·6	56	62·9	21	23·7
Lower‡	33	57·9	26	78·8	21	63·6	20	71·9	20	60·6	21	63·6	14	42·4
Literacy status														
Literate	96	56·3	85	88·5	75	78·1	67	69·8	72	75·0	62	64·6	29	30·2
Illiterate	26	50·0	18	69·8	18	69·2	17	65·4	18	69·2	15	57·7	6	23·1
Parity														
One	44	63·8	40	90·9	36	81·8	34	77·3	36	81·8	30	68·2	13	29·5
Two	41	69·5	32	78·0	31	75·6	28	68·3	28	68·3	28	68·30	14	34·1
Three	12	50·0	10	83·3	9	75·0	5	41·7	9	75·0	5	41·7	3	25·0
More than three	25	53·2	21	84·0	17	68·0	17	68·0	17	68·0	14	56·0	5	20·0
Economic status§														
High (>Rs 5000)	18	78·3	18	100·0	14	77·8	15	83·3	15	83·3	15	83·3	7	38·9
Medium (Rs 2000–5000)	18	51·4	17	94·4	13	72·2	12	66·7	14	77·8	11	30·6	2	5·6
Low (<Rs 2000)	85	60·7	67	76·5	66	77·6	56	65·9	60	70·6	50	58·8	26	30·6

†Higher in the social hierarchy.
‡Lower in the social hierarchy.
§Based on monthly expenditure.

https://doi.org/10.1017/S1368980009005576 Published online by Cambridge University Press

during the postpartum. Consumption of fruits was not very common among these mothers whereas consumption of green leafy vegetables (*rai sag*) was very common as it grows abundantly in the area.

The mothers under study reported certain food items as taboo during the postpartum period only. As depicted in Table 4, up to week 6 postpartum, 65·3% of mothers observed taboos on certain categories of food such as milk, eggs, fish, meat, pulses, green vegetables and fruits, which are most perceivably hot and sour foods.

Statistically significant differences in fruit consumption during the antepartum were observed between mothers depending on parity and economic status (Table 5), while there were no differences in the consumption of different food types during the postpartum (Table 6).

Traditionally, mothers in Sikkim used to consume special foods preferably during the postpartum period with the intention of providing better nutrition to lactating mothers to help them regain energy and resume work easily. Local alcoholic beverages are commonly consumed

Table 3 Distribution by types of special food taken during the postpartum: Nepali mothers from five villages in east Sikkim, India, April to June 2004

			Types of special food										
	Mothers taking special food		Milk		Animal protein		Pulses		Green vegetables		Fruits		
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	Others
All mothers	172	86·4	132	76·7	165	95·9	70	40·7	69	40·1	51	29·6	None
Social group													
Higher†	124	72·1	96	77·4	118	95·2	49	39·5	47	37·9	34	27·4	None
Lower‡	48	27·9	36	29·0	47	37·9	21	16·9	22	17·7	17	13·7	None
Literacy status													
Literate	127	73·8	101	79·5	121	95·3	61	48·0	62	48·8	45	35·4	None
Illiterate	45	26·2	31	68·9	44	97·8	9	20·0	7	15·6	6	13·3	None
Parity													
One	51	29·7	37	72·5	48	94·1	23	45·1	23	45·1	19	37·2	None
Two	56	32·6	45	80·4	53	94·6	23	41·1	21	37·5	20	35·7	None
Three	23	18·6	22	95·6	22	95·6	9	39·1	10	43·4	7	30·4	None
More than three	42	24·4	28	66·7	42	100·0	15	35·7	15	35·7	5	11·9	None
Economic status§													
High (>Rs 5000)	19	11·0	16	84·2	18	94·7	11	57·9	7	36·8	7	36·8	None
Medium (Rs 2000–5000)	32	18·6	26	81·2	30	93·8	12	37·5	13	40·6	10	31·2	None
Low (<Rs 2000)	121	70·3	90	74·4	117	96·7	47	38·8	49	40·5	34	28·1	None

†Higher in the social hierarchy.
‡Lower in the social hierarchy.
§Based on monthly expenditure.

Table 4 Distribution by types of food tabooed during the postpartum: Nepali mothers from five villages in east Sikkim, India, April to June 2004

			Types of tabooed food										
	Mothers following food taboo		Milk		Animal protein		Pulses		Green vegetables		Fruits		
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	Others
All mothers	130	65·3	1	0·8	30	23·1	99	76·2	100	76·9	90	69·2	–
Social group													
Higher†	94	72·3	1	1·06	20	21·3	73	77·6	73	77·6	65	69·1	–
Lower‡	36	27·7	–		10	27·8	26	72·2	27	75·0	25	69·4	–
Literacy status													
Literate	88	67·7	–		18	0·5	64	72·7	64	72·7	61	69·3	–
Illiterate	42	32·3	1	0·4	12	8·6	35	3·3	36	85·7	29	69·0	–
Parity													
One	43	33·1	–		12	27·9	36	83·7	36	83·7	28	65·1	–
Two	37	28·5	–		6	16·2	27	73·0	29	78·4	25	67·6	–
Three	16	12·3	–		5	31·2	12	75·0	10	62·5	11	68·7	–
More than three	34	26·2	1	2·9	7	20·6	24	70·6	25	73·5	26	76·5	–
Economic status§													
High (>Rs 5000)	15	11·5	–		3	20·0	10	66·7	13	86·7	9	60·0	–
Medium (Rs 2000–5000)	23	17·7	–		3	13·0	19	82·6	17	73·9	7	30·4	–
Low (<Rs 2000)	92	70·7	1	1·1	24	26·1	70	76·1	70	76·1	38	41·3	–

†Higher in the social hierarchy.
‡Lower in the social hierarchy.
§Based on monthly expenditure.

https://doi.org/10.1017/S1368980009005576 Published online by Cambridge University Press

Table 5 Test of significance (χ^2, df) for consumption of different food types in different socio-economic groups during the antepartum: Nepali mothers from five villages in east Sikkim, India, April to June 2004

	Overall consumption of special food	Milk	Animal protein	Pulses	Green vegetables	Fruits
Social group	$\chi^2 = 0{\cdot}216$, df = 1	$\chi^2 = 0{\cdot}888$, df = 1	$\chi^2 = 2{\cdot}608$, df = 1	$\chi^2 = 1{\cdot}278$, df = 1	$\chi^2 = 2{\cdot}766$, df = 1	$\chi^2 = 0{\cdot}032$, df = 1
Literacy status	$\chi^2 = 3{\cdot}176$, df = 1	$\chi^2 = 7{\cdot}382$, df = 1	$\chi^2 = 3{\cdot}520$, df = 1	$\chi^2 = 2{\cdot}113$, df = 1	$\chi^2 = 2{\cdot}646$, df = 1	$\chi^2 = 2{\cdot}343$, df = 1
Parity	$\chi^2 = 4{\cdot}441$, df = 3	$\chi^2 = 3{\cdot}134$, df = 3	$\chi^2 = 4{\cdot}549$, df = 3	$\chi^2 = 7{\cdot}227$, df = 3	$\chi^2 = 3{\cdot}597$, df = 3	$\chi^2 = 26{\cdot}18$*, df = 3
Economic status	$\chi^2 = 4{\cdot}236$, df = 2	$\chi^2 = 7{\cdot}317$*, df = 2	$\chi^2 = 2{\cdot}811$, df = 2	$\chi^2 = 5{\cdot}209$, df = 2	$\chi^2 = 2{\cdot}558$, df = 2	$\chi^2 = 10{\cdot}25$*, df = 2

*Statistically significant at 0·05 level.

Table 6 Test of significance (χ^2, df) for consumption of different food types in different socio-economic groups during the postpartum: Nepali mothers from five villages in east Sikkim, India, April to June 2004

	Overall consumption of special food	Milk	Animal protein	Pulses	Green vegetables	Fruits
Social group	$\chi^2 = 0{\cdot}123$, df = 1	$\chi^2 = 0{\cdot}189$, df = 1	$\chi^2 = 0{\cdot}010$, df = 1	$\chi^2 = 0{\cdot}022$, df = 1	$\chi^2 = 0{\cdot}327$, df = 1	$\chi^2 = 0{\cdot}462$, df = 1
Literacy status	$\chi^2 = 0{\cdot}044$, df = 1	$\chi^2 = 1{\cdot}044$, df = 1	$\chi^2 = 0{\cdot}027$, df = 1	$\chi^2 = 8{\cdot}824$, df = 1	$\chi^2 = 12{\cdot}744$, df = 1	$\chi^2 = 3{\cdot}306$, df = 1
Parity	$\chi^2 = 8{\cdot}755$, df = 1	$\chi^2 = 6{\cdot}136$, df = 1	$\chi^2 = 6{\cdot}677$, df = 1	$\chi^2 = 0{\cdot}230$, df = 1	$\chi^2 = 0{\cdot}007$, df = 1	$\chi^2 = 0{\cdot}344$, df = 1
Economic status	$\chi^2 = 1{\cdot}028$, df = 2	$\chi^2 = 0{\cdot}503$, df = 2	$\chi^2 = 1{\cdot}268$, df = 2	$\chi^2 = 0{\cdot}035$, df = 2	$\chi^2 = 2{\cdot}558$, df = 2	$\chi^2 = 0{\cdot}274$, df = 2

among women during the postpartum, because high-energy food beverages have been proved as nutritionally rich[19]. Taboo on certain food items was observed during the postpartum also to keep young children away from the possible adverse outcomes of those foods taken by lactating mothers.

The present study revealed that just over 60 % of young literate mothers (with low parity) consumed special foods during the antepartum. These women could realize the need for taking personal care during pregnancy. This change in consumption pattern among the younger women reflects the success of the safe motherhood campaign recently promoted by the government health department on the one hand, and behaviour change through media exposure on the other.

Acknowledgements

The work was funded by a research grant from the Indian Statistical Institute. There are no conflicts of interest. S.M. contributed to data collection and writing of the manuscript; A.S. provided help in analysing the data. The authors are deeply indebted to the study participants of Sikkim for their untiring help at the time of data collection; Dr B.B. Rai of the Voluntary Health Association of Sikkim for his whole-hearted support and advice at different stages of data collection; and Dr Barun Mukhopadhyay for his unhesitating help in developing the manuscript.

References

1. World Health Organization (1990) *Diet, Nutrition and the Prevention of Chronic Disease. WHO Technical Report Series* no. 797. Geneva: WHO.
2. Chatterjee M & Lambert J (1990) *Women and Nutrition: Reflections from India and Pakistan. ACC/SCN Symposium Report.* Geneva: Administrative Committee on Coordination/Subcommittee on Nutrition.
3. Leslie J (1991) Women's nutrition: the key to improving family health in developing countries? *Health Policy Plan* **6**, 1–19.
4. Kwatra A & Sehgal S (1998) Nutrient intake of lactating mothers from rural and urban areas. *Indian J Soc Res* **39**, 91–99.
5. Sood AK & Kapil U (1984) Traditional advice not always good (letter). *World Health Forum* **5**, 149.
6. Simkhada B, van Teijlingen ER, Porter M & Simkhada P (2006) Major problems and key issues in maternal health in Nepal. *Kathmandu Univ Med J* **4**, 258–263.
7. Matsumura M & Gubhaju B (2001) Women's status household structure and the utilization of maternal health service in Nepal. *Asia Pac Popul J* **16**, 23–44.
8. Nag M (1994) Beliefs and practices about food during pregnancy. *Econ Polit Wkly* 10 Sept, 2427–2438.
9. Sai Leela M & Busi BR (1995) The effect of physiological state on the nutritional status of women. *Man India* **75**, 221–229.
10. Surekha R (1994) Assessment of infant feeding practices, cost and attitude of the mothers towards infant feeding in Hyderabad city. MSc Dissertation, Andhra Pradesh Agricultural University.
11. Pendse V & Giri I (1989) Pregnancy care practices in rural Rajasthan. *J Fam Welf* **35**, 53–57.
12. Sinha A & Pandey H (1998) Maternal and infant feeding practices of 'Ho' tribe women in Bihar. *Indian J Nutr Diet* **35**, 325–328.
13. All India Institute of Hygiene and Public Health & Department of Health and Family Welfare (1994) *A Survey Report on the Nutritional Status in the State of Sikkim.* Calcutta/Sikkim: AIIPH/DoHFW.
14. Anderson LT, Thilsted SH, Nielson BB & Rangasamy S (2003) Food and nutrient intakes among pregnant women in rural Tamil Nadu, South India. *Public Health Nutr* **6**, 131–137.
15. Tamang JP (2005) *Sikkim Study Series.* vol. IV: *Food Culture of Sikkim.* Gangtok: Information and Public Relations Department, Government of Sikkim.
16. Census of India (2001) *Provisional Population Totals. Census of India, Series-12.* Sikkim: Directorate of Census Operations.
17. Singh RD, Singh GB, Gupta RK & Gupta SK (1998) Crops and cropping patterns in Sikkim. In *Sikkim: Perspectives for Planning and Development*, pp. 255–274 [SC Rai, RC Sundrial and E Sharma, editors]. Dehra Dun: Bishen Singh Mehendra Pal Singh.
18. Tamang JP (1998) Indigenous fermented foods of the Sikkim Himalaya: a socio-economic study. In *Sikkim: Perspectives for Planning and Development*, pp. 513–523 [SC Rai, RC Sundrial and E Sharma, editors]. Dehra Dun: Bishen Singh Mehendra Pal Singh.
19. Tamang JP, Thapa S, Tamang N & Rai B (1996) Indigenous fermented food beverages of Darjeeling hills and Sikkim: process and product characterization. *J Hill Res* **9**, 401–411.