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Food and Nutrition of The Tibetan Women in India

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INTRODUCTION

Human diet differs in quantity and composition in different climatic regions. Although much of this variation may be due to availability of food in a given area, there is the intriguing possibility of selection of certain classes of food or adaptations of dietary habits, which help in acclimatisation to a given environ-ment.

Nutritional status refers to the health of an individual as it is determined by the intake of nutrients and their utilization. Here food consumption is one of the major factors determining nutritional status of any community, which is also influenced by the environmental changes. The need for assessment of the nutritional status is to identify individuals or the community at risk (due to malnutrition) in a certain region and to provide nutritional aid.

Keeping this view in mind, the purpose of the present study to examine the food habits and to assess the nutritional status of the Tibetan women who had migrated in India from high altitude Tibet.

MATERIALS AND METHODS

The present survey was conducted among the Tibetan refugee population, concentrated in different locations in north India who had migrated from the high altitudes of Tibet (average elevation of 4,500 meter above sea level). The northern region in India recorded the largest share of the Tibetan refugee population. Among the migrant Tibetans in Northern India, a total of 12 clusters having population size greater than 1,000 individuals have been identified. For the purpose of selecting a representative sample of the migrant Tibetans in Northern India out of the twelve clusters, two clusters were selected by random sampling. The two clusters so identified were in Dekyling Settlement in Dehradun (600 m above sea level) of Uttaranchal and other in McLeod Ganj in Dharamsala (2000 m above sea level) of Himachal Pradesh. A total of 227 families were selected randomly from these two areas. The adult women of these selected households were interviewed using a questionnaire schedule.

The information on the kinds and frequencies of food eaten by subjects were collected. Information regarding food, food habits and the amount of food consumed for three consecutive days were collected from the respondents using 24 hours recall method (Weiner and Lourie, 1969). Cooked intake was converted to its raw equivalents. The exact quantity of food consumed by the families was recorded daily for three consecutive days to obtain the average quantity of daily consumption in the family. The calculation of calories and other nutritive intake was calculated by using the table of nutritive value of Indian food (ICMR, 1994). Anthropometric measurements such as height and weight of the selected women were taken following the standard methods (Weiner and Lourie, 1969). In the present study, for assessing the nutritional status of the Tibetan women, Body Mass Index (BMI) has been derived and used. Body Mass Index was calculated by the method given by Gopalan (1989).

RESULTS AND DISCUSSION

Food Habits of Tibetans

The diet of the high altitude people is rather a tedious one as the ecological conditions permit only a limited variety of plants to flourish and make rising of poultry or livestock extremely difficult. Consequently, the source of food (nutrition) of these people is limited (Gupta, 1998). As reported (Bell, 1928), the common diet of the native Tibetans like most of the highlanders, comprised of high animal proteins and fat. The staple diet of an ordinary Tibetans in Tibet was yak's meat, mutton, barley-flour, cheese and invariably butter tea. Along these items, especially the rich Tibetans or those who dwelled in the lower altitudes in Tibet consumed few vegetables and fruits.

The main staple food, *tsampa* (Tibetan toasted flour) was made from barley. Wheat and maize were also eaten in Tibet. Most of the Tibetans in Tibet preferred three regular meals in a day. The first meal was taken in the morning usually with *tsampa* soup, sometimes with roasted soyabeans,

pieces of *chura* (dried cheese), butter and occasionally with dried meat and *tsilu* (dried fat). They took hot buttered tea with the soup. The major meal of the day was served at noon and dinner was always light. The native Tibetans confined themselves to eating mutton and pork as much as necessary. Beef was not a taboo in ancient Tibet but they refrained themselves from eating water born animals such as fish, crabs, shrimps and various other seafood. They believed it was sinful to kill an animal with full of life.

Based on previous information (Majupuria, 1990), drinking tea was almost a habit with the Tibetans in Tibet. Most people drink tea throughout the day when they were at home. They prefer mostly drinking butter-tea. The Tibetan butter-tea prepared by mixing butter and salt with the juice from fully boiled fermented tealeaves. Before serving, the mixture needs to be further blended in a special blender. In Tibet, either butter tea or sweet tea was served in small or large thermo flux because both give their best smack when served hot. The local habit of drinking tea had a relation with the local food composition. As the native Tibetans in Tibet were in the habit of taking meat of yak and goat in large quantities; the strong butter tea not only helped to keep the body warm at high altitude but also helped to promote the digestion of the meat that was taken almost three meals a day. Bell (1928) reported that butter was one of the main dairy products of Tibet, a country where cattle form the principal livestock. Understandably, milk and milk products were plentiful and cheap there. Fat products like butter also keep the body warm and help to fight against cold climate. For these reasons, the consumption rate of butter continued to be very high among Tibetans in Tibet. Earlier studies (Bell, 1928; Dorje, 1985; Yongming, 1988) reported that *chhang* was a common drink enjoyed by both male and female native Tibetans in Tibet. It was commonly made from barley though it could also be made from rice, wheat, corn oats and millet. On ceremonial occasions, guests expect *chhang* after each meal. *Arag* was another beverage that occupies a special place in Tibetan life. It was used in certain rituals performed by the monks and nuns and on ceremonial occasions.

As a continuation of their traditional food habits in most of the cases the migrant Tibetans in India prefer to take *tsampa* in the morning and rice as a meal with *dal* (pulse) and vegetables in the afternoon. *Chapatti*- flat bread made of flour, is the other staple diet used in place of rice. *Thukpa* (noodle soup with vegetables and meat) is one of the favourite dishes among the Tibetans. They prefer to take *thukpa* in dinner. They always like to have food with spices like fried green chilies or a paste of red chilies. In India, the Tibetans also eat sufficient quantity of meat, mostly mutton and pork. They prefer to use meat in any form of preparation. However, due to the close association with Indians, nowadays they abstain from eating beef.

The new generation of the migrant Tibetans generally prefer to drink sweet tea, which is prepared by mixing milk and sugar with boiled fermented tealeaves. It serves as the refresher. But aged people still prefer butter tea more out of their old habit than anything else. The migrant Tibetans consume butter in a high quantity, not for any such need, but more as an old habit. *Chhang* is home-brewed rice or more traditionally barley beer and most accepted beverage among the migrant Tibetans. They cannot think of success of any occasion or function without ample supply of *chhang*. All members of the family in their daily life also frequently consume *chhang* freely. It has social and religious value as it is taken especially during marriage ceremonies, religious functions and other ceremonial festivals. In the Tibetan society women generally consume *chhang* during the festivals. *Ara*, a spirit distilled from rice, maize, wheat or barley, is also widely favored. *Doma* or betel nut is offered as a customary gesture of greetings.

Nutritional Status of the Tibetan Women

This section highlights the nutritional status of Tibetan women through the study of their dietary intake, nutrient intake and anthropometric measurements. The dietary intake explains the average daily food intake and the nutrient intake explains the average energy intake, through different foodstuffs among the population.

Dietary Intake of the Tibetan Women: Table 1 explains the average daily food intake among Tibetan women. The mean intake of cereals among women is 477.9 g/day, which is approximately 8.6 percent more than the RDA (ICMR, 1990). The main staple food *tsampa*, which is a flour meal, made of a special kind of barley. The migrant Tibetans also eat wheat as second cereal. Rice is also an essential among them. The mean

intake of pulses among the women is 33.2 g/day, which is 26 percent less than the RDA of ICMR (1990).

Green leafy vegetables intake among women varies from 33 to 250 g/day with a mean intake of 100.5 g/day, which is normal and is as par with RDA (ICMR, 1990). The mean intake of other vegetables among Tibetan women is 44.9 gm, which is 12.3 percent more than the RDA. Roots and tubers intake ranges from 10 to 160 g/day with a mean value of 66.9 gm. The average intake of roots and tubers for all women is 34 percent more than the RDA (ICMR, 1990). The Tibetans largely consume radish, potatoes and onion because of their easy availability in the local market.

The mean intake of milk and milk products by the Tibetan women is 63.2 g/day, which is significantly less than the RDA. But the Tibetans usually take milk in the form of butter-tea and cheese with barley flour and bread. The average intake of fruits among women is 43.3 gm, which is approximately 45 percent more than the RDA. (Table 1). Substantial intake of fruits may be because of easy availability of fruits in local markets especially during summer.

The average intake of oil and fats among women is 40.2 g/day, which is approximately 60 percent more than the RDA. Greater intake of fat is due to high consumption of butter with butter-tea, bread and *tsampa* (toasted flour) regularly. The daily consumption of sugar is adequate among the Tibetan women. The mean intake of sugar is 21.9 gm, approximately 10 percent more than the RDA.

The consumption of meat is quite high among the Tibetan women. The mean daily intake of meat and egg by a woman is 95 gm. The consumption of meat is relatively higher in winter among the Tibetans, because they consider that it helps them in combating the stress of the cold climate. Similarly, butter consumption also becomes higher in winter.

Nutrient Intake of Tibetan Women: The mean energy intake of the Tibetan women, through different foodstuffs, along with the recommended allowance is summarised in Table 2. The mean consumption of calorie is 2504.2 kcal in women, that is, approximately 12.5 per cent more than the RDA. The mean energy intake among the Tibetan women varies from 1907.7 to 3250.4 kcal. But there is no definite pattern of relationship between the mean calorie intake and the age of women.

The mean protein intake of women is 75.7 gm, which is approximately 51.0 per cent more than the RDA. The protein requirement of the Tibetan women is usually met from meat, egg and cereals. The meat intake is quite high in the Tibetan women leading to high protein intake.

Table 1: Average daily food intake (g) of Tibetan Women

Food Stuffs	*N*	*Mean*	*SD*	*Range*	*RDA**
Cereals	227	477.9	54.4	340 - 696	440
Pulses	227	33.2	13.0	15 - 50	45
Green Leafy Vegetables	227	100.5	25.0	33 - 250	100
Other Vegetable	227	44.9	19.4	0 - 150	40
Root & Tuber	227	66.9	29.7	10 - 160	50
Milk & Milk Products	227	24.3	63.2	0 - 300	150
Fruits	227	43.3	80.1	0 - 450	30
Oil & Fat	227	40.2	15.4	8 - 90	25
Sugar	227	21.9	5.4	7 - 35	20
Meat & Egg	227	95.0	55.2	0 - 250	30

*RDA given by ICMR (1990)

Table 2: Average daily nutrient intake (g) of Tibetan women

Nutrient	*N*	*Mean*	*SD*	*Range*	*RDA**
Calories (Kcal)	227	2504.0	226.8	1907.7 -3250.4	2225
Carbohydrate (g)	227	424.0	42.3	322.3 - 591.8	-
Protein (g)	227	75.7	11.5	50.6 - 110.4	50
Fat (g)	227	51.7	15.4	17.3 - 93.0	-

* RDA given by ICMR (1990)

The mean carbohydrate and fat intake are found to be 424.0 gm and 51.7 gm respectively.

Nutrient Adequacy: Table 3 presents the nutrient adequacy level (%RDA) of women among the Tibetans. Energy intake by the majority of women (89.0 percent) is adequate, and in few cases it is marginally adequate (11.0 percent). Protein and fat intake are adequate in 100.0 percent respondents.

Anthropometric Measurements for Nutritional Assessment

Anthropometry is a powerful tool for the assessment of nutritional status, particularly in field conditions where it is difficult to conduct clinical and laboratory tests (Johnston, 1981). Weight and stature are the two basic measurements used for assessing nutritional status (WHO, 1986). Raman et al. (1989) suggested body mass index is a good index to assess the current forms of malnutrition in a community, though anthropometric measurements could also be used as one of the indicators for assessing the nutritional status (Bishnoi et al., 1999). Body mass index, which is derived from anthropometric measurements, is also an important indicator of nutritional status of adult population. Knight (1984) also provided information on nutritional status of adults according to BMI classification.

The mean height and weight of the Tibetan women are 154.05 cm and 57.10 kg against the Indian standards of 151.00 cm and 50.00 kg (Indian standards, ICMR, 1972) respectively (Table 4). The results show that the average height and weight of the Tibetan women are higher than Indian standards. The mean BMI is 24.03 among the Tibetan women (Table 4). On the basis of BMI classification (Gopalan, 1989) it is observed that the majority of Tibetan women (63.4 percent) have normal body weight, 26.4 percent is overweight, 6.5 percent is obese and only 3.7 percent is underweight (Table 5).

The higher intake of protein and fats were found among the high altitude population in Chile (Arteaga et al., 1968) where it is not clear whether this diet pattern is due to socio-economic factors or it is an adaptive response to life at a higher altitude. Then again Picón-Reátegui (1978) suggested that protein intake at high altitude might be quanti-tatively and qualitatively adequate for maintaining nitrogen balance in adults. The diet of the migrant Tibetans at low altitude also contains high fat and animal proteins, which might have more out of their old habit as a high altitude population than anything else.

Earlier investigators (Srivastava et al., 1977) also observed that the natives of high altitude had significantly low serum cholesterol levels in spite

Table 3: Nutrient adequacy level (%RDA) of all Tibetan women

	Nutrient Adequacy level (% of RDA)		
Nutrients	*Adequate*	*Marginally Adequate*	*Marginally Inadequate*
	> 100	*75-100*	*≤ 75*
Energy	202 (89.0)	25 (11.0)	–
Protein	227 (100.0)	–	–
Fat	227 (100.0)	–	–

Value in parentheses indicate percentage of RDA

Table 4: Mean values of height, weight and BMI of Tibetan women

N	*Height (cm)*		*Weight (kg)*		*BMI*
	Tibetan	*Indian Standard**	*Tibetan*	*Indian Standard**	*Tibetan*
216	154.05	151.00	57.10	50.00	24.03

* Indian Standard Given by ICMR (1972)

Table 5: Nutritional status of all Tibetan women on the basis of BMI classification

*BMI Classification**		*n*	*%age*
< 18.5	(Under Weight)	8	3.7
18.5-25	(Normal Weight)	137	63.4
25-30	(Over Weight)	57	26.4
>30	(Obese)	14	6.5
	Total	216	100

*BMI Classification after Gopalan (1989)

of the heavy caloric (4830 kcal) and fat (138 g/ day) intake. Rai and his co-workers (1975) reported that the digestion and absorption of fats at the high altitude (4000 m) remain normal, and tolerance to heavy fat intake was not impaired. Therefore, it was likely the metabolism of cholesterol was affected at high altitude resulting in decreased cholesterol levels. Recent study (Beall et al., 1996) show that the Tibetan nomads in Tibet accumulate body fat during winters, which might have buffer the summer period of low intake. The higher intake of fat especially in winter is also observed among the migrant Tibetans at lower altitudes in India. But the diminution in the energy expenditure because of decreased physical work among them as compared to the high altitude Tibetans, might have responsible for accumulation body fat. As a consequence, the migrant Tibetans particularly the women now suffer from the problem of obesity.

Recent study indicated that 50 percent of the female cirrhosis patients among Tibetans in Tibet were associated with malnutrition (Zhao and Li, 1989). Whereas the present study reveals that malnutrition is not prevalent among the migrant population. According to BMI values, majority of the migrants women are having normal body weight and only 3.7 per cent are underweight indicating mild form of malnutrition (Table 5). Besides, the above mention diet composition of the migrant Tibetan women suggests that their calorie intake is sufficient, rather more than adequate, as compared to the RDA for the Indians but it is not a balanced diet. The imbalance in diet is because of higher consumption of fat and protein among the migrant women like natives of high altitude. Therefore, this unfavourable dietary pattern, over and above reduction in the energy expenditure are liable for over-weight and obesity among the migrant population particularly in women (Table 5).

SUMMARY AND CONCLUSION

The migrant Tibetans have almost similar consumption pattern as their counterpart at high altitude. The caloric intake of this migrant population is sufficient but is not balanced in terms of proxemic principles viz., protein, fat and carbohydrates. The persistence of high protein and fat diet like populations at high altitudes but reduction in the energy expenditure because of decrease physical work among the migrant Tibetans in the lower altitudes are accountable for the comparatively higher body weight among them. Hence, the dietary pattern of the migrant population has increased the health risk among the women.

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KEYWORDS Food Habits. Nutritional Status. Tibetan Migrant Women

ABSTRACT The paper aims to study the food habits as well as nutritional status of the Tibetan women in India. The Tibetan refugee population concentrated in different locations of northern India, who had migrated from the high altitudes of Tibet. The adult women of the selected families (227 households from two locations of North India) were interviewed using questionnaire schedule. For the nutritional assessment the information on the kinds and frequencies of food eaten by subjects were collected, using 24 hours recall method. The anthropometric measures were also used following the standard method. The diet pattern of the migrant Tibetan women at low altitudes in India is likely to similar as the native Tibetans at high altitudes. The caloric intake of the migrant women is sufficient, rather more than adequate, as compared to the Recommended Dietary Allowances (RDA) for the Indians. The diet of the migrant population consists of high protein and fat like most of the high altitude populations. Higher consumption of fat but decline in the energy expenditure due to decrease physical work at lower altitudes is liable for accumulation of body fat. As a result, at present the Tibetan women in India suffer from the problem of obesity.

REFERENCES

Arteaga, A., Lacassie, Y. and Castro, N.: Estudia de la alimentacion y del estado nutritivo de la poblacion indigena de la precordillera de Arica, Chile. *Revista Chilena de Pediatria*, **39**: 631 – 644 (1968).

Beall, C.M., Henry, J., Worthman, C. and Goldstein, M.C.: Basal Metabolic Rate and Dietary Seasonality among Tibetan Nomads. *Am. J. Hum. Biol.*, **8:** 361- 370 (1996).

Bell, C.: *The People of Tibet*. Clarendon Press, Oxford (1928).

Bishnoi, S., Jood, S., Sehgal, S., Kwatra, A. and Yadav, S.K.: A study on nutritional status of rural lactating women of Hariyana. *The Ind. J. Nutr. Dietet*., **36:** 275 – 284

(1999).
Dorje, R.: *Food in Tibetan Life*. Prospect Books, London (1985).
Gopalan, C.: *Growth of affluent Indian girls during adolescence*. Scientific report (Serial No.10) of the Nutrition Foundation of India, New Delhi (1989).
Gupta, R.: A study on the food and Nutrition among the high altitude dwellers. Unpublished article was presented at the National Seminar on *Food and Nutrition management in Mountaineering, West Bengal*. Mountaineers and Trekkers confederation at Department of *Food* technology and Biochemical Engineering, Jadavpur University (1998).
ICMR: *Growth and Physical Development of Indian Infants and Children*. Indian Council of Medical Research, New Delhi (1972).
ICMR:*Nutrient Requirement and Recommended Dietary Allowance for Indians.* New Delhi (1990).
ICMR: *Nutritive Value of Indian Foods.* Indian council of medical Research, Hyderabad (1994).
Johnston, F.E.: Anthropometry and nutritional status, pp. 252-264, In: *Assessing Changing Food Consumption Patterns.*National Academy press, Washington (1981).
Knight, I.: The height and weights of Adults in Great Britain. *Office of Population Census and Surveys*, Social Survey Division. Her Majesty's Stationery Office, London (1984).
Majupuria, I.: *Tibetan Women: Then and Now.* M. Devi (1990).
Picón-Reátegui, E.: The food and nutrition of high-altitude populations, In: *IBP 14 – The Biology of High - Altitude Peoples.* P.T. Baker (Ed.). Cambridge University Press, Cambridge (1978).
Rai, R.M., Malhotra M.S, Dimri G.P. and Sampathkumar, T.: Utilization of different quantities of fat at high altitude. *Am. J. Clin. Nutr.*, **28:** 242 - 245 (1975).
Raman, L., Vasanthi, G., Vesweswara Rao, K., Parvathi, C., Balakrishnan, Vasumathi, N., Arjuna Raval and Adinarayana, K.: Use of body mass index for assessing the growth status of infants. *Indian Pediatrics*, **26:** 630 - 635 (1989).
Srivastava, K.K., Bharadwaj, S.K. and Malhotra, M.S.: Effect of prolonged stay at an altitude of 4000 m on blood cholesterol of lowlanders. *Indian. J. Exp. Boil*., **15:** 557-558 (1977).
Weiner, J.S. and Lourie, J.A.: *Human Biology: International Biological Programme.* Burgess and Son (Abingdon) Limited, Abingdon, Berks (1969).
World Health Organisation (WHO): Use and interpretation of anthropometric indicators of nutritional Status, *Bulletin of the World health Organization*, **64**: 929 - 941 (1986).
Yongming, H. and Xiuyuan, C.: *Tibetans on Tibet*. China Reconstructs Press, Beijing, China (1988).
Zhao, G.B and Li, L.: Analysis of the etiology and clinical characteristics of Tibetan Cirrhosis in Tibet. *Zhonghua. Nei. Ke. za. Zhi*., **28:** 529 - 531 (1989)

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