ABSTRACT

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In the present study the influence of type of tea plantation on the health and nutritional status of the male and female plantation workers was investigated.

Nine hundred male and 900 female tea plantation workers were randomly selected equally from each type depending on the management. These were the British plantations ('British'), the Tea Corporation plantations ('Tea Corporation') and the Native plantations ('Native').

Results of the study reveal that a majority (72%) of the workers in the 'British' lived in nuclear families with an average family size of 4.1 whereas a large number of workers in the 'Tea Corporation' (56%) and the 'Native' (60%) lived in extended families with an average family size of 5.1 and 5.5 respectively.

Illiteracy was near universal, it being as high as 97% in the 'Native' and 90% in the 'Tea Corporation', whereas it was 63% in the 'British'.

Ninety-eight per cent of the workers in the 'British' resided in semi 'pukka' houses (a house in which both roof and walls are made of corrugated or galvanized tin sheets, concrete or cement, and floor is of plain earth) as against 58% in the 'Tea Corporation'; while a majority of the workers in the 'Native' (94%) lived in 'kutcha' houses (a house with thatched

roof, walls made of concrete pillars and bamboos plastered with mud and the floor of plain earth)[9].

Safe drinking water was available to 99.8% and 98% of the residents of the 'British' and the 'Tea Corporation' respectively while only 2% of the 'Native' residents had an access to the same. A higher percentage (82%) of the 'British' availed of sanitary toilet facilities than the 'Tea Corporation' (0.3%) and the 'Native' (0.2%). The most common method of disposal of human waste in the 'Tea Corporation' and the 'Native' was the use of non-sanitary toilets (76% and 12% respectively) and open air defecation (24% and 88% respectively).

The per capita monthly income of the workers of the three plantations varied significantly ($p<0.001$). The workers from the 'British' received the highest per capita remuneration (Rs.136); followed by those from the 'Tea Corporation' (Rs.109) and lastly by the 'Native' (Rs.100).

The diet of all the workers was predominantly cereal based, namely: rice and wheat which was one and a half to two times more than the RDA. The intake of pulses was only 50% of the RDA. A small quantity of vegetables like gourd, brinjal, potato and green papaya was consumed. The diet lacked variety in general and was monotonous irrespective of the season. The lean tea plucking season coincided with availability of food in abundance and adequate food intake by the subjects. During the peak tea plucking season, food intake was lower among all the workers due

to non-availability of food and lack of time to consume what was available. The food intake was significantly higher in the 'British'; followed by the 'Tea Corporation'; and lastly the 'Native'.

On an average the diets of all the workers met the RDA for protein, thiamine and niacin. The average food energy intake of the female workers met the RDA while that of male workers was 96% of the RDA. The intake of iron met 82%, 78% and 69% of the RDA for male workers and 66%, 60% and 60% of the RDA for female workers from the 'British', 'Tea Corporation' and 'Native' respectively.

A higher percentage of both male and female workers from the 'British' enjoyed better nutritional status as indicated by a Body Mass Index of greater than 18.5 (93% and 61% respectively) as compared to the 'Tea Corporation' (87% and 53% respectively) and the 'Native' (64% and 42% respectively).

The male and female workers from the 'British' had better iron nutriture, as indicated by haemoglobin levels (10.15 g/dl and 9.31 g/dl respectively) than those of the 'Tea Corporation' (9.13 g/dl and 8.71 g/dl respectively) and the 'Native' (7.90 g/dl and 7.21 g/dl respectively).

Twenty two per cent of the male workers from the 'British' were free from parasitic infection as against 11% and 3% from the 'Tea Corporation' and the 'Native'. Similar trends were observed

for female subjects. The haemoglobin levels of the subjects who had parasitic infection were significantly lower than the non-infected ones.

The prevalence rates of signs of vitamin A or B-complex deficiencies or of both were 65% to 66% for male and female workers respectively from the 'British' while they were near universal for the 'Tea Corporation' and the 'Native'.

Common cold and cough, diarrhoea and fever, alone or in combination, were found to be the most frequently occurring morbidities. A higher percentage of the male and female workers from the 'Native' (71% and 81% respectively) were found to suffer from the common morbidities than those from the 'Tea Corporation' (62% and 58% respectively) and the 'British' (50% and 53% respectively).

A significant association ($p<0.001$) was observed between the socio-economic, environmental factors and health and nutritional status of the tea plantation workers. Severe anaemia with haemoglobin less than 8 g/dl, prevalence of parasitic infections, common morbidities, vitamin deficiencies and undernutrition (assessed by BMI <18.5 for the developing world) were near universal among the workers who were illiterate, lived in huts, used unsafe drinking water and unsanitary toilets and had monthly per capita income of less than Rs.50. The picture improved in case of those with some years of schooling, who lived in semi pukka or pukka houses, used safe water and sanitary toilets and had a monthly per capita income above Rs.126-150.

A composite Quality of Life Index (QLI) was evolved by applying a scoring system to various indicators or variables namely education, income, housing, water source and sanitation. The type of housing, water source and sanitation were found to be the major determinants of the QLI scores.

The bulk of plantation workers in the 'British' had a QLI of 'Good' whereas the QLI was 'Fair' in the 'Tea Corporation' and the 'Native' plantations. The mean QLI score of 19.22 in the 'British' was significantly ($p<0.001$) superior to that of the 'Tea Corporation' (15.50) and the 'Native' (12.34).

The QLI score of 'Good' was found to be associated with higher haemoglobin levels, lower rate of parasitic infections, low prevalence of morbidities and clinical signs of vitamin deficiencies among plantation workers. The 'Good' QLI score was found to correspond to better nutritional status as assessed by Body Mass Index (BMI > 18.5 for the developing world).

Multiple regression analysis revealed a close positive association between socio-economic and environmental factors and the haemoglobin status.

Further, on controlling for **income**, it was still found that literacy/educational status, and environmental factors such as housing, water source & sanitation were found to significantly influence the nutritional status of the tea plantation worker in terms of hemoglobin level, anthropometric status (height & weight) and macro-nutrient intake (energy and protein).

To conclude, the present study demonstrated that the management of tea plantations in Assam could easily improve the health and nutritional status of their labourers by improving the environment on the plantations. This specifically means safe drinking water, better housing and better sanitation. Such steps would result in a better haemoglobin status of the workers and therefore, in improved productivity. The study also demonstrated that the QLI is a simple and reliable proxy for the management to assess the health and nutritional status of their workers.