# Body Mass Index of the Kandeganvila Veddas

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**Abstract**

BMI was calculated from the heights and weights of 37 Veddas (18 males and 19 females) measured in 1971/73 when they were living at Kandeganvila, and of 247 Veddas (109 males and 138 females) measured in 1993/94 at Hennanigala South of Mahaweli System 'C', ten years after their change of habitat. Significantly lower BMI's ($p<0.05$) were observed in the pre-adolescent children, both males and females, in 1993/94. In general in the adults too a trend towards lower BMI's was observed. The impact on nutrition, as judged by BMI, of the relocation of the Kandeganvila Veddas has been detrimental.

**Key Words:** Veddas, body mass index, habitat.

## Introduction

Quetelet's body mass index is accepted as a convenient and reliable index of obesity(1). It is also used for identifying groups at risk of developing degenerative diseases related to obesity (2,3). For adults a BMI of 20 is accepted as being compatible with health and a value less than 17 is considered a risk to health (4,5). A BMI of 18.5 has been suggested as a cut-off point for defining chronic energy deficiency in adults (5). For children between 5 and 9 years of age, a cut-off point of 13.5 has been suggested (6,7) and a value of 15.0 for children between 13-18 years (7).

Although BMI has been studied among Sinhalese, Ceylon Tamils and Ceylon Moors (7, 8, 9, 10, 11) no values have been reported for the Veddas. Since 1945 some of the Uva Bintenne Veddas had been colonised at Kandeganvila. In 1982, when this area was declared a forestry reserve, the Veddas were relocated at Hennanigala South in the Mahaweli System 'C'. This is a report of a study of their BMI before and after this change of habitat.

## Population and Methods

The heights and weights of the Veddas at Kandeganvila measured in 1973/74 (12) have been used in calculating their BMI. The relocated Veddas (total population 750) live in 132 households in Hennanigala South. They have been measured during 14 field visits between October 1993 and March 1994, approximately 10 households being studied at each visit. The ages were those recorded at interview. The ages of the children were obtained from their mothers. In both the 1971/73 and 1993/94 studies a Harpenden anthropometer and a standard weighing scale were used. In each study the measurements were taken by one observer throughout.

## Results

The sample size in 1971/73 study totalled 37, with 18 males and 19 females. The sample size in the 1993/94 study totalled 247, with 109 males and 138 females.

Table 1 gives the results of the adult Veddas separately for the males and females in the two studies, as percentages of the population with BMI values < 15, between 15.0 and 18.4 and ≥ 18.5.

Table 2 gives the BMI of the pre-adolescents (ages 1-9.9 years) and adolescents (ages 10-18.9 years) separately for males and females, in the

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two studies, as percentages of population with BMI values < 13.5, between 13.5-14.9 and > 15.0.

**Table 1. Percentage of adult Veddas with BMI values < 15.0, between 15.0 and 18.4 and ≥ 18.5.**

| | No. | | < 15.0 | | 15-18.4 | | ≥ 18.5 | |
|---|---|---|---|---|---|---|---|---|
| | M | F | M | F | M | F | M | F |
| 1971-1973 | 13 | 08 | 0% | 0% | 46% | 38% | 54% | 62% |
| 1993-1994 | 52 | 64 | 6% | 12% | 50% | 59% | 44% | 29% |

M – Male F – Female

**Table 2. Percentage of Vedda children with BMI values < 13.5, between 13.5 and 14.9 and ≥ 15.0.**

| Age group (Years) | No. | | < 13.5 | | 13.5-14.9 | | ≥ 15.0 | |
|---|---|---|---|---|---|---|---|---|
| | M | F | M | F | M | F | M | F |
| Pre-adolescents | | | | | | | | |
| 1 – 9.9 | | | | | | | | |
| 1971-1973 | 5 | 6 | 20% | 50% | 60% | 50% | 20% | – |
| 1993-1994 | 22 | 41 | 63% | 69% | 27% | 20% | 10% | 11% |
| Adolescents | | | | | | | | |
| 10-18.9 | | | | | | | | |
| 1971-1973 | – | 5 | – | 0% | – | 40% | – | 60% |
| 1993-1994 | 35 | 33 | 30% | 5% | 30% | 32% | 40% | 63% |

M – Male F – Female

In the adults none of the males or females had BMI values less than 15 in 1971/73 whereas 6% of the males and 12% of the females are below this value in 1993/94. Only 46% of the males had BMI values less than 18.5 in 1971/73 whereas 71% are below this value in 1993/94. Among females, only 38% had BMI values less than 18.5 in 1971/73 whereas 59% has less than this value in 1993/94. Although these figures consistently point towards a greater degree of undernutrition in the adults in 1993/94, the differences between the two studies are not statistically significant.

The percentage of male pre-adolescents with BMI values less than 13.5 is 20% in 1971/73 which is significantly lower ($p < 0.05$) than the 63% in 1993/94. Further the percentage of male pre-adolescents with BMI values between 13.5 and 14.9 is 60% in 1971/73, which is significantly higher ($p < 0.05$) than the 27% within this range of BMI in 1993/94.

The percentage of female pre-adolescents with BMI < 13.5 is 50% in 1971/73 which is not significantly lower than the 69% in 1993/94. However the percentage of female pre-adolescents in the BMI range 13.5-14.9 is 50% in 1971/73, which is significantly higher ($p < 0.05$) than the value of 20% in 1993/94.

There are no male adolescents in the 1971/73 study for comparison. The percentage of female adolescents with a BMI values less than 15 is

40% in 1971/73 which is not significantly higher than the 32% in 1993/94.

Thus, when the BMI is used as a criterion of dietary energy adequacy, the Veddas appear to have been better nourished at Kandeganvila than in their new habitat at Hennanigala.

## Discussion

With the opening up of the irrigation systems after independence the hunter-gatherer life style of the Veddas became increasingly imperilled. In the 1940s an attempt was made to introduce the Veddas to a settled life style by colonising some of the Uva Bintenne Veddas at Kandeganvila. Even in 1971/73 these Veddas were practising only very rudimentary agriculture in the form of chena cultivation, mainly of maize. Although settled they continued hunting and gathering food in the easily accessible forests. The excursions into the forest did not last more than a day. After the marketable meat was separated the viscera was shared by the family. The sale of meat and bees honey enabled them to buy cereals and pulses.

When compared with the anthropometric measurements taken in the 1930s no secular trend towards an increase in body size was observed in the Veddas, as had been shown for the Sinhalese and Sri Lankan Tamils, indicating that the improvements in the health and educational services which have taken place in Sri Lanka after independence did not have the same impact on the Veddas as on the other two ethnic groups (12).

The anthropometric measurements including weights of the 1971/73 study were taken twenty five years after they were settled in Kandeganvila.

With the expansion of the Mahaweli irrigation system in the 1980s the hunting grounds of the Kandeganvila Veddas was declared a forest reserve. Seventy nine Vedda families from Kandeganvila were relocated in Hennanigala South in Mahaweli System 'C' in 1982. The subjects of the 1993/94 study were these Veddas.

Although the sample size of 1971/73 is small, with no representation of male adolescents, the results of this study highlights the fact that the Veddas in general are worse off nutritionally as estimated by BMI at Hennanigala south than when they were at Kandeganvila.

At Hennanigala the Veddas lived under more hygienic surroundings. All pre-adolescents included in the study would have been born and reared in Hennanigala, where more primary health care providers were available than at Kandeganvila. Despite these advantages, the BMI of pre-adolescents (and of adolescents) has not increased. Could the differences be due to nutrition ?

The most notable change in their mode of living is in the accessibility of forest for hunting. As the forest at Hennanigala is at some distance from their homes, hunting expeditions last 2 to 3 days. The muscle of hunted animals is sundried for the market, and the viscera eaten by the hunters themselves. Thus the women and children and the elderly receive less animal food than they did at Kandeganvila.

The Veddas have not as yet mastered the art of cultivating rice and pulses. Ten years have not been long enough for the transition from a hunter-gatherer life style to settled farming. It seems necessary to take steps to ensure adequate nutrition to these settlers during a prolonged transition period.

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