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MENARCHEAL AGE AND NUTRITIONAL STATUS OF SRI LANKAN GIRLS

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SUMMARY. The mean age at menarche based on recall data of a sample of 303 girls was 13.83 years. This mean was 0.6 years higher than the mean of 13.2 years observed among Kandy urban children of a slightly higher socio-economic status. It was found that the nutritionally poor girls are at a disadvantage and reach menarche about 0.5 years later than the nutritionally good.

Key words: Menarche, Nutritional Status

INTRODUCTION

The influence of several environmental factors on the mean age at menarche have been studied in Sri Lanka. Differences between urban and rural groups were reported by Wilson and Sutherland (1) and more recently Kodagoda and Rajapaksa (2). Findings from the studies on the influence of socio-economic level have not been consistent. Chinnathamby (3) reported a lowering of the mean age with increase in socio-economic conditions while Jayasekara and Gunawardena (4) could find no significant influence of the father's occupation or family size. The differences in the mean age at menarche between Kandy and Nuwara Eliya school girls were attributed by us mainly to the differences in the socio-economic status (5). In a more recent study by Godawatta and Wikramanayake (6) the differences observed between Colombo amd Kadawata were attributed to differences in the socio-economic status. These workers also noted that the girls who had reached menarche are significantly taller, heavier and had higher body mass indexes than those who had not. Mid-arm circumference and the skinfold thickness too were found to be higher in those who had reached menarche. No other attempts have been made to study the influence of nutritional status on the age at menarche.

The most widely accepted classification for nutritional status is the Waterlow Classification (7) which is derived from weight for height and height for age. This classification distinguishes normal children from those acutely undernourished, chronically undernourished and those with acute and chronic undernutrition. This present study is an attempt to relate the existing nutritional status of school girls to the mean age at menarche.

MATERIAL AND METHODS

The study was carried out in the Hindagala Community Health Project area - the field practice area of the Faculty of Medicine, Peradeniya. A medical inspection of all school children of the area was conducted in 1989. As a part of this inspection height,

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weight and age of the children were measured. All girls over the age of 10 years were questioned as to whether they had reached menarche and if so, the date of menarche. Most girls could recall the exact date and the few who could not were excluded from the study. The mean age at menarche (MAM) was calculated using the date of birth from the school register.

Weight was measured using a calibrated bathroom scale. Measurements of height was done using the Stanley (Microtoise 04-116) steel tape provided by the Health Ministry for use in School Medical Inspections. Two Public Health Inspectors who were previously trained undertook both measurements with the assistance of a Public Health Midwife.

Each child was assigned to one of the nutritional status groups using the reference charts provided by the Ministry of Health.

Means and standard deviation of the MAM were calculated for each nutritional group using a computer.

RESULTS

The total school population of the area was 3279. The coverage for School Medical Inspection exceeded 85% for all schools. The total number of girls who had reached menarche was 321. Of them 18 (5.6%) could not recall the date of menarche and were excluded.

The distribution of girls by nutritional status is shown in Table 1. Of the 303, 240 (79.2%) were classified as normal, 5 (1.6%) had acute undernutrition, 32 (10.6%) had chronic undernutrition while another 26 (8.6%) had concurrent acute and chronic under nutrition. In all 31 (10.2%) children had acute undernutrition while 58 (19.1%) were chronically undernourished.

The MAM for normal girls was 13.79 with a standard deviation of 1.71 years. The acutely undernourished girls (acute only+acute on chronic) had a mean of 14.38 with a standard deviation of 1.62 years, while the chronically undernourished (chronic only+acute on chronic) had a mean of 14.27 and a standard deviation of 1.58 years. The difference of 0.48 years between the acutely undernourished and the normal was highly significant ($t=3.75$, $p<0.001$) while the slightly larger difference of 0.59 years between the normal and the chronically malnourished falls just short of significance ($t=1.90$, $0.05<p<0.01$).

TABLE 1. Distribution of the girls by nutritional status

Nutritional status	Number	%
1. Normal	240	79.2
2. Acute undernutrition only	05	1.6
3. Chronic undernutrition only	32	10.6
4. Acute on chronic undernutrition	26	8.6
Total	303	100,2

The number of girls with acute undernutrition only is too small and no significance tests were undertaken with that group. However the MAM of those who had 'pure' (only) chronic undernutrition was 14.00 years while that for the group with acute on chronic undernutrition was 14.62 years (Table 2). The difference between the means of normal girls and those with only chronic undernutrition was not significant ($t=0.739$, $0.4<p<0.5$) while those who had concurrent (acute and chronic undernutrition) had a significantly lower mean value ($t=2.1998$, $p<0.05$) than the normals.

The MAM of the present sample is 13.8 years and this is different from the mean value of 13.2 years observed by us in a previous study in Kandy District (6). The previous study was on urban girls of slightly higher socio-economic status. In the present study the area was a rural one and the socio-economic status is expected to be lower than those from the Kandy Municipality area reported earlier. The study therefore provides supportive evidence on the importance of socio-economic status on the MAM as seen in a few previous studies in Sri Lanka (2, 4, 6).

TABLE 2. Mean and Standard Deviation of the mean age at menarche, by Waterlow classification of nutritional status

Current nutritional category	Number	Mean	Standard deviation
1. Normal	240	13.79	1.71
2. Acute undernutrition (Acute+Concurrent)	31	14.38	1.62
3. Chronic undernutrition (Chronic+Concurrent)	58	14.27	1.58

TABLE 3. Mean and Standard deviation of the mean age at menarche, by Waterlow cassificatton

Nutritional Grouping	Number	Mean	Standard deviation
1. Normal	240	13.79	1.71
2. Acute only	5	13.20	1.48
3. Chronic only	32	14.00	1.48
4. Concurrent	26	14.62	1.84
All	303	13.83	

DISCUSSION

The present study covered only 300 children and the representation of some nutritional status groups is not adequate. Nevertheless it has demonstrated some trends and even significant differences. The only previous study where nutritional status is related to nutritional groups is that of Godawatta and Wikramanayake (6) who concluded

that there was a significant difference in nutritional status between those who had reached menarche and those who had not. However, their interpretations were based on three anthropometric indices taken on their own. Our findings on the other hand are based on two anthropometric indices taken together. In this study we compare the current nutritional status with the MAM.

Significant difference was observed between the normal girls and those who had concurrent undernutrition, where a delay of 0.84 years was observed in the latter group. A delay of 0.48 years among the acutely undernourished was also noted. The chronically undernourished showed a delay of about 0.6 years. These findings suggest a delay of menarche of the undernourished as compared to the normal. The lack of significance in the last instance described earlier is probably due to small numbers in that group and it is recommended that further studies be undertaken to clarify the position.

The question may be asked as to whether the current nutritional status of the girls is reflective of their nutritional status before or at the time of menarche which took place a few months or even years earlier. The answer is not straight forward. In a subsistence level community, like the one we studied, there is no reason to expect changes in nutritional status within short periods. If we consider the country as a whole there is no evidence, that the food availability varied appreciably during the period 1985-1989, the period in which most of the girls in the sample reached menarche. Even if there were minor changes the reflection is expected to be on acute undernutrition (wasting) as opposed to chronic undernutrition (stunting). The fact that the delaying of menarche was seen in both groups is suggestive that the current nutritional status is not very different from the past nutritional status and that the poorly nourished tend to show a delay in reaching menarche. These findings are consistent with those reported by Godawatta and Wikramanayake.

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