

Early Childhood Growth among Mahadev Koli Tribe of Maharashtra

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Abstract

The present study aims "to study the growth status of the children of age group 0 to 5 years of Mahadev koli". This cross-sectional study focuses on growth of children of age group 0 to 5 years in Ambegaon Taluka, Pune district, Maharashtra. Using De-facto population, 110 Mahadev Koli- 51 girls and 59 boys were screened. Data were collected through Anthropometry and Interview Schedules. Anthropometric parameters, height and weight show that children of Mahadev koli have low growth status. According to Gomez Classification, in boys, Weight-for-age, shows, 13.79% Grade I, 60.34% Grade II malnutrition, 22.41% Grade III malnutrition and 3.44% are normal. In boys, Weight-for-height shows 48.27% severe malnutrition, 37.75% moderate malnutrition, 10.34% marginal malnutrition and 8.62% normal. In case of girls, by Weight-for-age, 1.96% girls are normal, 41.17% are Grade III malnourished, 21.56% are Grade II malnourished and 35.29% Grade I malnourished while by Weight-for-height, 13.72% girls are normal, 39.21% are severely malnourished, 27.45% are moderately malnourished and 19.60% are marginally malnourished. According to Waterlow's classification, in boys, 37.93% are severely malnourished, 39.65% are moderately malnourished, 18.96% are marginal malnourished and 3.44% are Normal while in girls, 49.01% are severely malnourished, 27.45% are moderately malnourished, 9.80% are marginal malnourished and 13.72% are normal. According to HC/CC ratio, only 1 year girls are malnourished and others are normal and boys of age group 1 to 5 years are normal. Maternal age, birth spacing and parity were found to be the influencing factors. The overall growth status of boys and girls are low.

Keywords - Growth Status, Cross-Sectional Study, Anthropometry

Introduction

Growth is an increase in the size of the body as a whole or the size attained by specific parts of the body. As children grow, they become taller and heavier, they increase in lean and fat tissues, and their organs increase in size (Malina R.M., et al., 2004). Growth

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assessment best defines the health and nutritional status of children, because disturbances in health and nutrition, regardless of their etiology, invariably affect child growth and hence provide an indirect measurement of the quality of life of an entire population (De Onis et al., 1993).

The general pattern of postnatal growth is quite similar from one individual to another, but there is considerable individual variability in size attained and rate of growth at different ages. This variability applies both to the body as a whole and to specific segments and tissues. As indicated earlier, growth processes are difficult to study directly because only the outcomes of these processes, that is, size attained by the body and specific segments and tissues, can be measured. Thus, the study of growth is synonymous to a large extent with measurement (Malina R. M. et al., 2004:41). Growth status of children is widely accepted as a good index of nutritional status of a community. Due to diversified dietary pattern there seems to be differences in growth of children in different social and economic groups. Children from well to do populations have shown better growth than those from low income groups (Thimmayamma et al. 1973, quoted by C. Venkateswarlu et al., 2000).

Nutritional status depends on the consumption of food in relation to the needs. The dietary pattern of a tribal community is greatly influenced by the availability of the food in the locality. In recent times due to destruction of forests and change in occupation pattern (from agriculture to agricultural labour, casual labour and industrial labour), the food habit of the tribals has also changed. A majority of the tribal population have limited economic resources due to which they are unable to purchase wide variety of foods, and therefore it has become difficult for them to acquire adequate nutrients. The worst sufferers of under-nutrition are the infants and children, pregnant and nursing mother of the under-privileged classes (Shukla, 1982, quoted by Kh. Narendra Singh, 2002). Energy intake far below requirement leads to under-nutrition and loss of body weight (ICMR, 1966).

Anthropometric parameters such as weight-for-age, height-for-age and body mass index are commonly used for assessing malnutrition and evaluating the effects of dietary treatment on a child. The anthropometric indices can be used to assess child growth status. The weight-for-age represents linear growth and body proportions. Height-for-age shows linear growth and measures long

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term growth faltering. Weight-for-height reflects body proportions or the harmony of growth and is particularly sensitive to acute growth disturbance (WHO 1986). Head circumference is mainly related to brain size. The head circumference is a good indicator of growth and nutritional status of the children. Chest circumference is a practical and useful indicator of growth in second and third year of the age. Chest circumference and head circumference together are useful to detect malnutrition in children.

The recent WHO survey shows that approximately, 43% of children (230 million) in developing countries are malnourished and hence have hampered growth, (WHO, 1992). Therefore, the present study aims at assessment of early childhood growth among Mahadev Koli Tribe of Maharashtra. The study focuses of age 0 to 5 years children of Mahadev kolis of Ambegao Taluka, District Pune, Maharashtra.

Material and Methods

The present cross-sectional study has been conducted on total 110 children consisting of 51 girls and 59 boys in age group of 0 to 5 years. The data were collected from 05 different villages of Ambegao Taluka, District Pune. The data were of two types. The quantitative data were collected by Anthropometry and the qualitative data from Interview schedule. The anthropometric measurements are height, weight, head circumference, and chest circumference. The mean values of height and weight were compared with the National Standards. The quantitative data collected from Anthropometry were subjected to indices: Height-for-age, Weight-for-age and ratio of HC/CC. De-facto population were used for anthropometry. De-facto population is the population which are the resident of the study place and present at the time of taking measurement. Systematic sampling was used for interview scheduled. Systematic sampling is a type of probability sampling in which each and every unit of the population has an equal chance of being selected and that chance is quantifiable. Probability sampling is useful type of sampling by which one can yield good and accurate results. In systematic sampling, we have a specific sampling interval and using that sampling interval the interview scheduled were filled up.

Results and Discussion

For each parameter, the quantitative information is represented

in table form followed by the graphical representation. The results are discussed in the following paragraph.

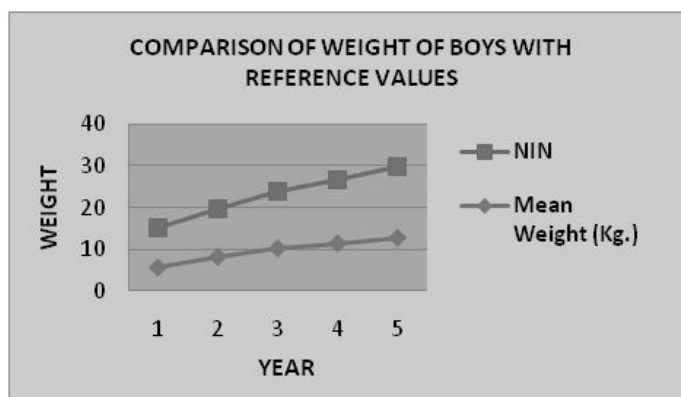
Weight of Mahadev Koli Boys

It is the most useful Anthropometric measurement which is related to the body mass index as its potential value is not appreciated by the health personnel. The prevalence of protein-calorie malnutrition is best indicated by weight deficiency in children of all age groups. (Surinder Nath, 1993).

Table 1 (a): Comparison of Weight of Mahadev Koli Boys with Reference Values.

Age	N	Mean Weight (Kg.)	NIN
1 year	9	5.61	9.45
2 year	5	8.2	11.56
3 year	16	10.25	13.52
4 year	14	11.5	15.23
5 year	14	12.85	17.02

Fig. 1 (a): Comparison of Weight of Mahadev Koli Boys with Reference Values.



From Table no 1 (a), it is clear that there is a constant trend of increase in the mean values of weight as the age progress. The graph is plotted to compare the observed mean values of weight with the National standards. It can be easily seen that the observed mean values are far lesser than the reference values representing the major growth faltering.

It is clear that Mahadev Koli boys from all age groups are undernourished (see figure 1.a). All of them fall below the reference value i.e. not in a normal condition. It is evident that in earlier age group in between 1 to 3 years the growth is steady but at age group 3 to 5 years, the difference between the observed and the reference value is greater as compared to rest of the ages showing possibility of relative disturbance in the growth pattern.

Weight of Mahadev Koli Girls

Table 1 (b): Comparison of Weight of Mahadev Koli Girls with Reference Values.

Age	N	Mean Weight (Kg.)	NIN
1 year	12	5.25	8.76
2 year	8	7.31	10.92
3 year	11	9.090	12.96
4 year	12	11.66	14.46
5 year	8	12.62	16.32

Fig. 1 (b): Comparison of Weight of Mahadev Koli Girls with Reference Values.

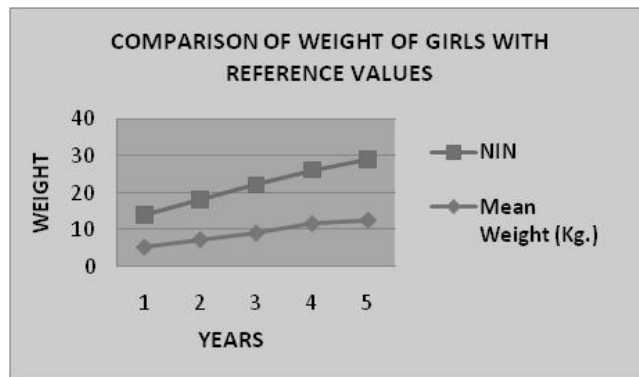


Table 1 (b) shows comparison of weight of Mahadev Koli girls with the National reference values. The increase in the value is almost constant, showing steady type of growth pattern in girls.

The graph represents the comparison of observed mean values of weight of girls with the reference values. Girls are also very low in growth status; similarly in the later ages the difference

in the values of observed mean weight and reference weight is higher as compared to the early ages. Even though the normal trend is increasing, it is found to be lower than the expected values. This also might be because of growth faltering.

Height of Mahadev Koli Boys

Height of an individual is another important anthropometrical measurement which sums up the linearity of the body. Height of a person is composed of legs, pelvic, trunk and the head. In the field of nutritional anthropometry usually the total height is measured. (Surinder Nath, 1993).

Table 2 (a): Comparison of Height of Mahadev Koli Boys with Reference Values.

Age	N	Mean Weight (Kg.)	NIN
1 year	9	60.5	74.5
2 year	5	75.3	84.9
3 year	16	85.16	93.4
4 year	14	92.62	100.1
5 year	14	99.72	106.9

Figure 2 (a): Comparison of Height of Mahadev Koli Boys with Reference Values.

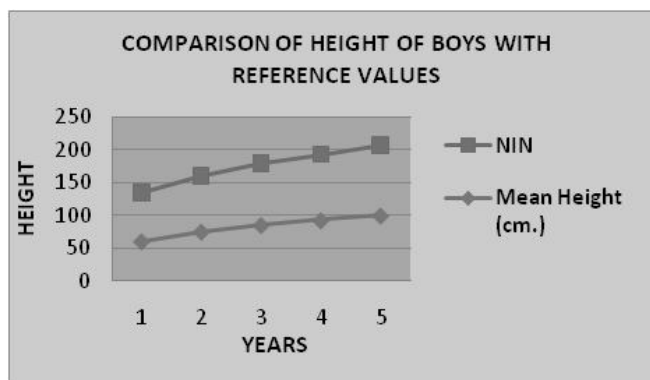


Table no. 2 (a) shows the comparison of height of boys with the National reference value. The sample shows higher difference in the mean values of height in the earlier 1 to 2 years of ages than the later ages. From the graph, it is clear that the difference in the

observed value line and the reference line is lesser. Here the earlier ages show slightly more deficits in height than the later ages. This is might be because of low sample size of age group 1 to 2 years. After 2 years of age the growth of height is quite steady.

Height of Mahadev Kolhi Girls

Table 2 (b): Comparison of Height of Mahadev Koli Girls with Reference Values.

Age	N	Mean Weight (Kg.)	NIN
1 year	12	61.16	72.5
2 year	8	73.62	82.8
3 year	11	82.09	92.2
4 year	12	94.08	98.9
5 year	8	98.83	105.6

Figure 2 (b): Comparison of Height of Mahadev Koli Girls with Reference Values.

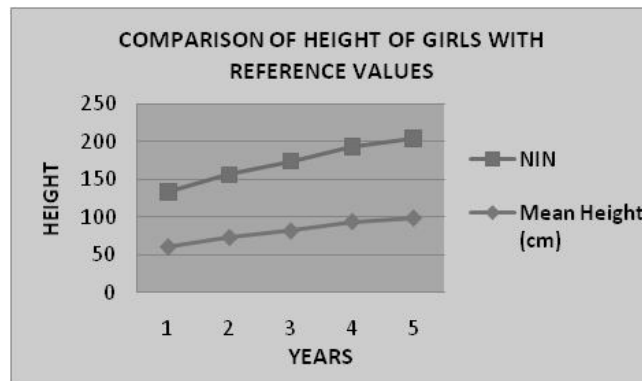


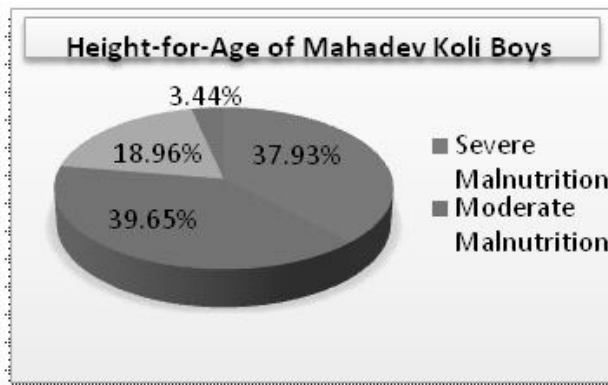
Table no. 2 (b) shows the comparison of height of girls with the reference values. The pattern is somewhat different than in the boys. The growth in a year considering height is relatively constant except age group 4 year. In age group 4 year, the observed value is quite closer to the reference value i.e. they are slightly closer to the normal condition.

Height-for-Age of Mahadev Koli Boys:

Height reflects the total increase in size of the individual up to the moment it is determined. A child gains about 5 cm in height
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every year, until the age of 10 years. (Indira Gandhi National Open University. DNHE I, 2002.) Recording the height so would help us to know whether the child is growing normally and is in good health or not. Low height for age corresponds to stunting of the child.

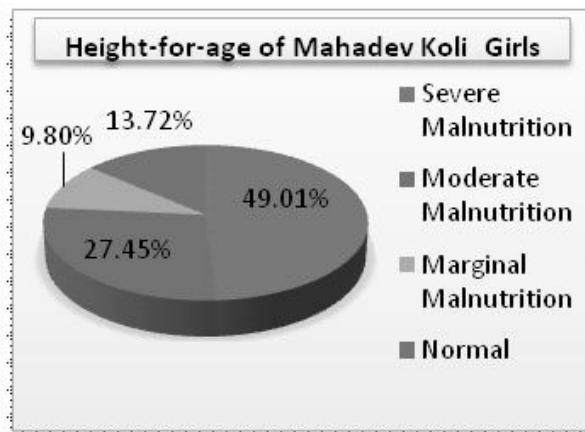
Figure 3 (a): Height-for-Age of Mahadev Koli Boys



The graph represents the Height-for-age of Mahadev Koli boys. From the graph it is observed that 37.93% of Mahadev Koli boys are severely malnourished, 39.65% are moderately malnourished, 18.96% are marginally malnourished and only 3.44% are normal.

Height-for-Age of Mahadev Koli Girls :

Figure 3 (b): Height-for-Age of Mahadev Koli Girls



The graph represents the Height-for-age of Mahadev Koli girls. From the above graph, it is clear that 49.01% of Mahadev Koli girls are severely malnourished, 27.45% are moderately malnourished,

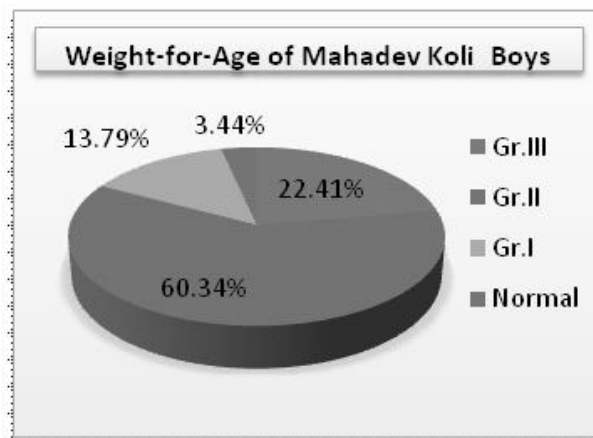
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9.80% are marginal malnourished and 13.72% are normal.

Weight-for-Age of Mahadev Koli Boys

It is an indicator of body size. It reflects level of food intake. The relative change in the weight with age is sensitive to change in the growth pattern of the individual. Low weight for age corresponds to underweight condition of children.

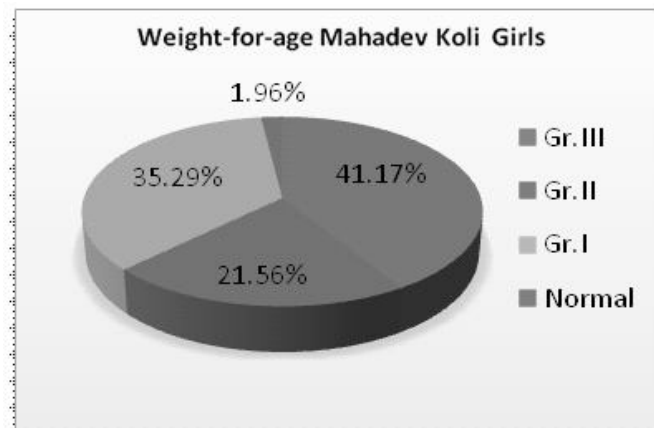
Figure 4 (a): Weight-for-Age of Mahadev Koli Boys.



The above graph represents the weight-for-age of Mahadev koli boys. From the graph it is clear that, 60.34% of Mahadev koli boys are Grade II malnourished, 22.41% are Grade III malnourished, 13.79% are Grade I malnourished and 3.44% are normal.

Weight-for-Age of Mahadev Koli Girls

Figure 4 (b): Weight-for-Age of Mahadev Koli Girls

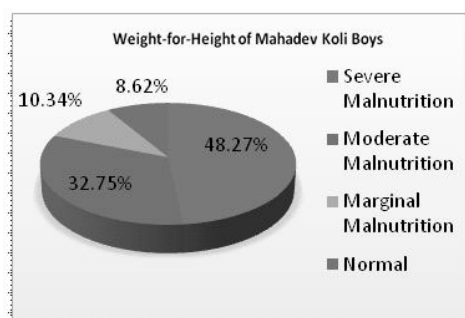


The graph shows the weight-for-age of Mahadev Koli girls. From the graph, it is clear that 41.17% of Mahadev Koli girls are Grade III malnourished, 21.56% are Grade II malnourished, 35.29% are Grade I malnourished and 1.96% are normal.

Weight-for-Height of Mahadev Koli Boys

By relating the weight of the child to the height or length, an objective measurement of the child's degree of thinness can be obtained. For this index, one added advantage is that, accurate age assessment is not required. The index is age independent, hence can be easily used in the tribal population where usually children's age is accurately not known. (Indira Gandhi National Open University, DNHE I, 2002 nutrition for the community)

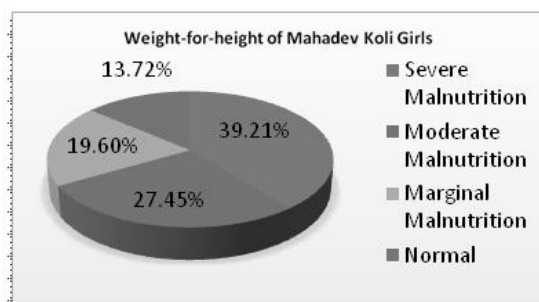
Figure 5 (a): Weight-for-Height of Mahadev Koli Boys



The above graph represents the weight-for-height of Mahadev Koli boys. From the graph, it is clear that 48.27% of Mahadev Koli boys are severely malnourished, 37.75% are moderately malnourished, 10.34% are marginally malnourished and 8.62% are normal.

Weight-for-Height of Mahadev Koli Girls

Figure 5 (b): Weight-for-Height of Mahadev Koli Girls



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The above graph represents the weight-for-height of Mahadev koli girls. From the graph, it is clear that 39.21% of Mahadev koli girls are severely malnourished, 27.45% are moderately malnourished, 19.60% are marginally malnourished and 13.72% are normal.

Head Circumference/Chest Circumference of Mahadev Koli Boys

Table 3 (a): HC/CC of Mahadev Koli Boys

Age	HC (cm)	CC (cm)	HC/CC (cm)
1 year	40.91111	41.88889	0.979606
2 year	44.5	45.4	0.981656
3 year	46.78125	47.28125	0.990802
4 year	46.80714	47.75	0.980974
5 year	47.52143	49.17143	0.967063

The above table shows, the HC/CC ratio of Mahadev koli boys. From the table it is clear that boys from all 1 to 5 years of age group are normal.

Head Circumference/Chest Circumference of Mahadev Koli Girls

Table 3 (b): HC/CC of Mahadev Koli Girls

Age	HC (cm)	CC (cm)	HC/CC (cm)
1 years	40.11667	40.16667	1.002329
2 years	43.125	43.5625	0.99158
3 years	44.52	45.27273	0.984061
4 years	46.05833	48.125	0.958709
5 years	46.7375	48.4	0.966581

The above table shows, HC/CC ratio of Mahadev koli girls. From the table it is clear that girls from age group 1 year are malnourished it is due to sample and other from the age group 2 to 5 years is normal.

Diet Record

In Mahadev koli tribe, the baby is breast fed up to 2 to 3 years. The top food is started from 3 to 6 months which include top milk also. The cow milk is preferred because of the availability. In very early phase of starting top milk they give only 2 to 3 teaspoon

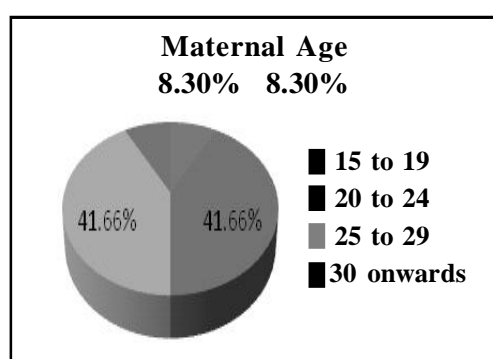
of milk to baby two times in a day. Then the quantity is increased from time to time. The frequency of giving breast milk varies according to the age of the baby. Breast milk is given more in the early months and then in the later months it is decreased. After completion of 1st year the baby is given smashed Dal-rice to baby. Dal is made up of Tur or Mug. At age group 3 to 4 years, baby starts eating all type of food which is available. This food includes Dal-rice and Bhaji-Bhakri. Bhakri is made up of rice and nagli; Bhaji is made up of Brinjal, Cabbage, Beans and leaves of Bengol gram. There is no variation in the diet of Mahadev koli because they do not have access of market as well as transport facilities. It is found in the study that there is less availability of animal protein.

Other Demographic Factors

Other factors such as maternal age, parity and birth spacing were shown to have an important role in the growth of the child. In the present study, few cases of low (between 15 to 19 years) and very high maternal age (above 30 years) were found. An early marriage of the girls is hazardous for the forthcoming child as the mother's body is not prepared physiologically for conception and pregnancy. This leads to lack of nutrient supply to the growing embryo. Thus the foetus born is malnourished from birth.

Figure 6 Maternal Age

Parity is shown to be a factor affecting childhood growth.

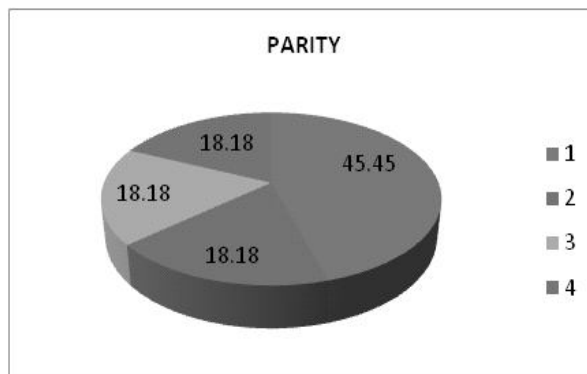


Here, there are few cases found with birth number 4. As the body grows older and older, its functionability goes on reducing. Thus the child of birth number 4 and above receives very less amounts

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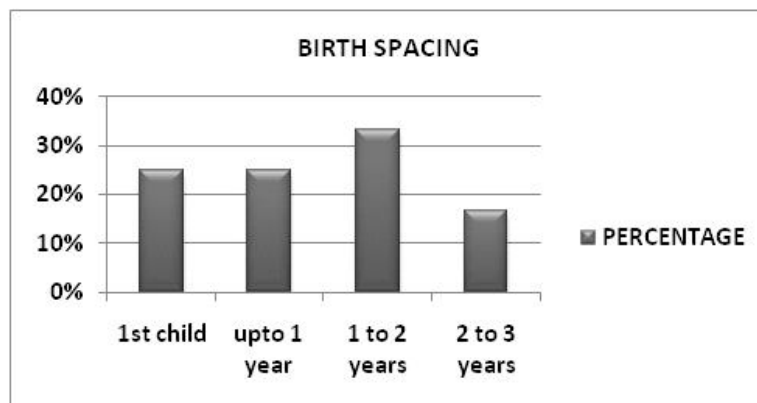
of nutrients from the mother's body. This results in malnutrition of the child.

Figure 7 Parity



Similar is the case of birth spacing. If the difference in the two consecutive children is inadequate, it will result in ignorance to the earlier child. In the present study fewer cases of birth spacing less than one year were also found. This lesser difference affects the breast feeding of the earlier child.

Figure 8 Birth Spacing



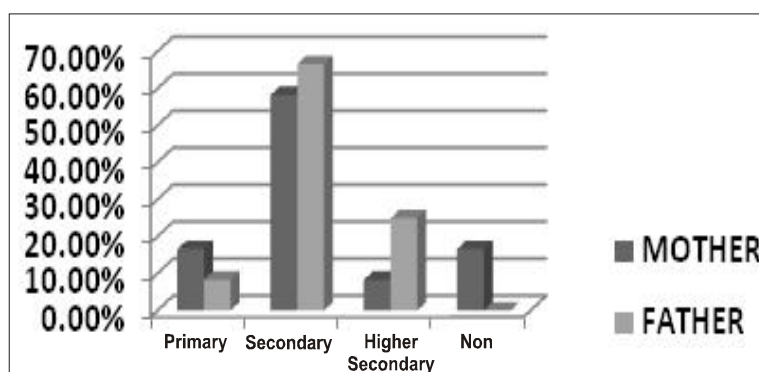
In the present study most of the families are nuclear families so it also related to the avoidance to the baby's health.

These people do not have any other income source other than agriculture and collection of Terminalia Belarica (Hirida). These

people have less income so that they are not able to fulfill the needs of the baby.

Parent's education, especially mother's education plays an important role in the growth of child. The present study found that the fathers are more educated than mothers.

Fig.9 Parent's Education



Limitations of the Study

- (i) It is very difficult to get sample of age group 0 to 5 years.
- (ii) Overall population of age group 0 to 5 years are less.
- (iii) Birth weight was not available.
- (iv) Considering the diversity of Indian population we in-fact need specific standards for comparison at least in terms of regions or cultural groups. But unfortunately in India any such study makes use of only the National Standards. This study could have been more accurate if there is separate standards available atleast for tribal population.

Suggestions

- (a) The Government needs to improve the infrastructure facility such as transport in the area of study.
- (b) PHC's are not available or if available people are reluctant to visit the PHC.
- (c) To campaign in tribal for better awareness about health care.
- (d) Simple diet, lack of variety. Provide nutritional food to children between age group 0 to 5 years.

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