



ASSESSMENT OF GROWTH AND DEVELOPMENT WITH RAGI SATWA IN INFANTS

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ABSTRACT

The aim of this study was to assess the effect of “**Ragi Satwa**”, weaning food on growth and development of Infants. Infants were selected from OPD of M. S. Ayurved College, Kudwa Gondia, Maharashtra .Study and control group, each contains 20 patients for study Ragi Satwa as a weaning powder was given orally in dosage of 10g twice daily with 100ml of milk. In control with breast milk, homemade mashed food was advised. Infants of age 6-9 months were selected for study. After study, weight gain in study group was 27% while in control group its 22% height gain was 5-10% in study group while in control group it is 6.76% and chest circumference gain is 5.52% where as it is 5.5% in control group. A significant improvement also has been observed in reduction of attack of diseases in sleep pattern. Hence Ragi Satwa was found very effective in accelerating growth & development in Infants.

KEYWORDS: Ragi Satwa, growth & development, weaning food, breast milk.

INTRODUCTION

A nutritional concentrated energy dense supplementary food is very essential to achieve proper growth & development in an Infant.^[1] Weaning is defined as the process of progressive transfer of the baby from breast milk to adult diet. In Ayurveda, Annaprashna sanskara is mentioned as a ceremony of initiation of introduction of semisolid complimentary food.^[2-4] The World Health Organisation defines complementary food as any food which is suitable as a complement to breast milk or to Infant feeding formula, when either become insufficient to satisfy the nutritional requirement of Infant.^[5] Weaning food must be with qualities like high in energy, easy to digest, low in bulk and viscosity and easy to prepare. This food should contain optimum nutritional value and also should be economic.^[6]

Ragi, known as millet, Nachani, Sollar or sattermavu is rich in calcium, iron, protein and some rare nutrients such as methionine. It is easily digestible in all ages. It costs less than wheat, rice or dairy milk.^[7] Ragi is an ideal first food after an infant reaches at least 6 months of age. Carbohydrate contents are 80% in Ragi. Fat percentage is quite low and that is good. 100 grams of Ragi has roughly on an average of 336 kcal of calories in them. Ragi also has some good number of essential amino acids such as valine, methionine, isoleucine, threonine and tryptophan. Valine is essential for repair of

tissues, muscle coordination and metabolism and also to maintain nitrogen balance in body. It also helps to maintain mental peacefulness. Isoleucine is essential to keep check on blood sugar level & helps to heal and repair muscle tissues, bones and skin. Threonine helps to maintain protein level in body and helps in formation of tooth enamel. It prevents formation of fat in the liver. Tryptophan is a natural relaxant and helps to fight anxiety, depression and insomnia. It is also helpful in migraine. It reduces excess appetite and help to control weight gain. It releases growth hormones. Methionine promotes growth of healthy skin and hair. The sulphur from methionine produces lecithin which helps to reduce cholesterol, fat inside liver and protect kidneys. This methionine is generally lacking in vegetative diet hence regular intake of Ragi will help to get enough amino acids.^[8]

Table 1.

Content (in grams)	Brown Rice	Wheat	Maize	Ragi
Energy kcal	362	348	358	336
Carbohydrates	7.9	11.6	9.2	7.7
Proteins	7.9	11.6	9.2	7.7
Fiber	1.0	2.0	2.8	3.6
Fat	2.7	2	4.6	1.5

Ragi has very high amount of calcium. It has traces of Iron. It contains carbohydrates, protein and fats relatively less.

Objective: To assess the effect of Ragi satwa on Growth & Development in Infants.

Source of Data: Infants were randomly selected from OPD of M. S. Ayurved College, Kudwa, Gondia, Maharashtra, India. Ethical clearance was obtained from Institutional ethical committee of M.S. Ayurved College.

Methods of collection of data

Inclusion criteria: Infants between the age group of 6 to 9 months of both sexes. Immunised children are only selected.

Exclusion criteria

1. Infants of premature birth.
2. Infants having severe to moderate malnutrition like kwashiorkor or marasmus.
3. Infants with congenital disorders like cleft lip or cleft palate etc.
4. Infants suffering from systemic diseases like tuberculosis, HIV & HbsAg positive patients.
5. Infants having CNS disorders like cerebral palsy, mental retardation & congenital disease
6. Unimmunised Infants.

Research Design: 40 infants between age group 6 to 9 months who were attending OPD of Kaumarbhryatantra department of M.S. Ayurved college & Hospital, Gondia; according to above criteria. These 40 patients were divided randomly into two groups. 1. Group A –Study group -20 patients 2. Group B – Control group-20 patients These infants were assessed before, during and after study about following growth & development using parameters as per Trivendrum screening test.^[9]

Preparation of trial Drug: Dried grains of Elusin corcana Garten were collected from local market of Gondia, Maharashtra. This raw material was authenticated in the pharmacognosy laboratory. Preparation of Ragi starch: The starch was prepared in department of Rasashastra & Bhaishyajakalpana of M.S. Ayurved College, Gondia. Procedure: Ragi grains were soaked in lukewarm water for half an hour. After half an hour grains were taken out and mildly crushed. After that these grains were rubbed with hands till their stratum was removed. The remaining matter was kept for precipitation for an hour. Then starch precipitated at the bottom of the vessel was collected and allowed to dry in cool place.

Dose: 10 grams twice a day. Anupan/sahpan: Warm milk 100 ml. Ragi powder mixed with milk and boiled slowly for few minutes to attain semisolid homogenous consistency. 1 teaspoon sugar added for taste and it enhances energy also. Along with this breast feeding was

advised to continue. In control group; along with breast feeding; homemade mashed food was advised.

Follow up: When study started, the parents and their infants were asked to attend the OPD once in a month for 3 months to know whether the improvement is taking place or not. Observations: In this study 20 children were male whereas the other 20 were female. All are from Hindu community. 24 subjects were 1st child and 16 were second. Age wise distribution showed that 7 were of 8 months, 17 were of 7 months, 9 were of 8 months and 7 were of 9 months. All the subjects were vaccinated as per age. All were delivered in hospitals. 26 subjects were of normal delivery & remaining 14 were by LSCS. No patient was dropped out or withdrawn due to adverse condition.

RESULT

The initial mean weight of the infant in study group before starting weaning food was 6.2438kg. After the completion of intervention the mean weight was 7.9280kg. There was 27% improvement within the study group at P value <0.001 on applying paired “t” test. The initial mean height of the infants in the study group before starting the weaning food was 64.67 cms. After the completion of intervention the mean height was 68.04 cms. There was 5.52% improvement within the study group at P value <0.001 on applying paired “t” test. The initial mean head circumference (HC) of the infants in the study group before starting the weaning food was 42.79cms. After the completion of the study the mean head circumference was 43.62cms. There was 2% improvement in the study group at p value < 0.001 on applying paired “t” test. The initial mean chest circumference (CC) of the infant in the study group before starting the weaning food was 41.53cms. After the completion of the intervention the mean chest circumference was 43.65cms. There was 5.10% improvement within the study group at P value < 0.001 on applying paired “t” test. The initial mean mid arm circumference (MAC) of the infants in the study group before starting the Ragi satwa was 13.70 cms and after the completion of the intervention the mean mid arm circumference was 15.08cms. There was 10% improvement within the study group at P value <0.001 on applying paired “t” test within the study group.

Table 2: Paired “t” test in the study group.

Parameter	Mean BT	Mean AT	Mean difference	SD	SE mean	T value	P value
Weight	6.2438	7.9250	-1.68125	.28802	0.07201	-23.349	<0.001
Height	64.6765	68.0471	-3.37059	.65361	0.15852	-21.262	<0.001
HC	42.2941	43.6294	-1.3529	.27143	0.06583	-12.688	<0.001
CC	41.5312	43.6562	-2.12500	.78528	0.19632	-10.824	<0.001
MC	13.7059	15.0882	-1.38235	.37622	0.0925	-15.149	<0.001

The initial mean weight of the Infant in the control group was 6.548 kg. After the completion of intervention the mean weight was 8.018kg. There was 22% improvement within the control group at P value < 0.001 on applying the paired “t” test within the control group. The initial mean height of the infants in the control group before starting the weaning food was 61.93cms. After the completion of the intervention the mean height was 66.12 cms. There was 6.76% improvement in the control group at P value <0.001 on applying the paired “t” test. The initial mean head circumference was 42cms and after completion of the intervention it was 44.75cms in

control group. There was 6.54% improvement in control group at P value < 0.001 on applying the paired “t” test. The initial mean chest circumference before starting the weaning food was 40.56cms. After completion of the intervention the mean chest circumference was 42.81 cms. There was 5.55% improvement within the control group at P value < 0.001% on applying the paired “t” test. The initial mid arm circumference was 13.6 cms. After the completion of the intervention the mid arm circumference was 15.21 cms. There was an 11.67% improvement in control group at P value <0.001 on applying paired “t” test within the control group.

Table 3: Paired “t” test in control group.

Parameters	Mean BT	Mean AT	Mean Difference	SD	SE Mean	T Value	P Value
Weight	6.5488	8.0188	-1.47000	0.38609	0.09652	-15.230	<0.001
Height	61.9375	66.1250	-4.18750	1.75000	0.43750	-9.571	<0.001
HC	42.0000	44.7500	-2.75000	1.03280	0.25820	-10.651	<0.001
CC	40.5625	42.8125	-2.25000	0.73030	0.18257	-12.324	<0.001
MAC	13.6250	15.2188	-1.59375	0.27195	0.06799	-23.442	<0.001

On applying unpaired ‘t’ test both the group, the result showed that though p value was >0.05 but comparing the mean weight of both group study group 7.87 and control group 8.10kg respectively shows that weight gain in study was as good as that at control group. On applying unpaired ‘t’ test both groups, the result showed that when P value >0.05, comparing the mean HC of both group study group 45.33 & control group 44.66 respectively, shows that gain in head circumference in study group was as good as control group on applying unpaired “t” test between the groups, result showed when P value is > 0.05. When we compared the mean of chest circumference of both the groups; in study group 43.58cms and control group 42.78cms respectively,

shows the gain in chest circumference in study group was 2% more than the control group. On applying unpaired “t” test between both the groups when P value is > 0.05 by comparing the mean of mid arm circumference of both the groups, in the study group it was 15.05cms and in control group it was 15.26cms respectively. This shows that gain in mid arm circumference in study group was as good as control group. On applying the unpaired “t” test between both the groups when P value is > 0.05 by comparing the mean height of both the group; in study group it was 68.04cms and in control group it was 66.00 cms shows that the height gain in study group was 3% over than the control group.

Table 4: Unpaired “t” test between both the groups.

Parameter	Mean in study group	Mean in control group	SEM Mean difference	T	P
Wt AT	7.8722	8.1067	-2.3444	-1.182	>0.05
HC AT	45.3333	43.6667	6.6667	1.345	>0.05
CC AT	43.5833	42.7667	8.1667	1.390	>0.05
MAC AT	15.0556	15.2667	-2.1111	-1.282	>0.05
Ht AT	68.0444	66.0000	2.0444	2.043	>0.05

DISCUSSION

This study confirms the beneficial effect of starch of Ragi in malnutrition in infants. Ragi promotes growth and development effectively. It increases height, weight, head circumference, mid arm circumference, chest

circumference significantly. Ragi is bruhaneeya, balya according to ayurved. Conclusion: The nutritional supplement Ragi satwa was highly appreciated by parents as acceptance by infants was very good and no untoward effects were reported. It has better palatability than routine food in the control group. The overall result

shows that the nutritional Ragi satwa is effective in accelerating growth & development of infant in weight, height gain and increase in HC, CC, MAC. This may be because it provides extra calcium, protein & essential fatty acids necessary for growth of body and brain. It compensates the gap between required and provided nutrition.

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