Research Article

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EFFECTIVENESS OF AYURVEDA INTERVENTION IN THE MANAGEMENT OF KARSHYA (GRADE I AND II UNDER NUTRITION) IN CHILDREN

Saranya Sivaraj [1], Vijayalaxmi Mallannavar [2], Shailaja U [3], Arun Raj GR [4]*

[1]PG Scholar, Department of Kaumarabhritya, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India
[2]Associate Professor, Department of Kaumarabhritya, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India
[3]Professor and Head, Department of Kaumarabhritya, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India
[4]Assistant Professor, Department of Kaumarabhritya, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India

*Corresponding author
E-mail: drdrarunraj26@gmail.com

ABSTRACT

Aim: To evaluate the effect of Ayurveda intervention in the management of Karshya (grade I and II under nutrition) in children. Methods: In this study 27 children of age group 3-5 yrs were diagnosed as Karshya (grade 1 and 2 under nutrition) and selected for study from outpatient department of Kaumarabhritya, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, on the basis of subjective and objective parameters which includes signs and symptoms and anthropometric measurements respectively. 14 subjects were given Amritapraasha Ghrita and were compared with control group who were on home based nutritive diet. Both the groups were assessed on 1st, 14th, 28th, 42nd and 56th day of follow up, based on the objective and subjective parameters. Result: Considering the overall effect of therapy, the intervention with Amritapraasha Ghrita in Karshya is found to be effective in subjective parameters as well as in weight gain. The mean weight gain in study group was 1.1 kg and 0.1 kg in control group. Discussion: Throughout the study no adverse reaction was recorded. Karshya can be coherently and efficaciously managed using Ayurvedic medications and thus prevent further complications.

Keywords: Karshya, under nutrition, Amritapraasha Ghrita

INTRODUCTION

Good nutrition is an imperative factor for leading a healthy life in current changing environment.[1] It helps in maintaining healthy weight, prevents chronic diseases and provides overall health. The food we eat, and the nutrients they provide influence our growth, development, functional abilities, and health.[2] To ensure the growth, health, and development of children to their full potential adequate nutrition during infancy and early childhood is essential.[3] Poor nutrition increases the risk of illness, and is responsible, directly or indirectly, for one third of the approximated 9.5 million deaths that happened in 2006 in children less than 5 years of age.[4] Early nutritional deficits can be linked to long-term impairment in growth and health.[5] There is corroboration that adults who were malnourished in early childhood have impaired intellectual performance and may also have reduced capacity for physical work.[6] Those women who had malnourishment in childhood are prone to defective reproductive capacity.[7] Moreover the child born to such women may have lower birth weight.[7]

Malnutrition among under-five children is a major public health problem in India.[8] Malnutrition during the first 2 years of life results in stunting.[9] Under nutrition is an underlying factor in 45 % of all deaths in children under 5 years old globally.[10] More than 90 % of stunted children in the world have been living in Africa and Asia.[11] Worldwide, an estimated 101 million children below five years of age were underweight.[12] The other predictor of under nutrition is wasting; 52 million children below five years of age were moderately or severely wasted globally.[13] An estimated 80 % of world's stunted children lives in just fourteen countries and India is one among those countries.[14] A report on the survey conducted by District RCH officer of Hassan District, Karnataka, estimates a prevalence of 28 % of under nutrition in children of 0-6yrs of age.[15] The present study was to evaluate the effectiveness of Amritapraasha ghrita in the management of Karshya (grade I and II under nutrition) in children.

Objectives

- To evaluate the effect of oral administration of Amritapraasha Ghrita[16] along with dietary advice in children with Karshya (61 – 80 % IAP classification.)[17]
- To evaluate the effect of dietary advice alone in children with Karshya (61 – 80 % IAP classification)[17]
- To evaluate if there is any added benefit by the oral administration of Amritapraasha Ghrita along with dietary advice when compared to the effect of dietary advice alone in children with Karshya (61 – 80 % IAP classification)[17]

MATERIALS AND METHODS

Source of Data

Subjects of Karshya (under nutrition) were recruited from Kaumarabhritya outpatient department of Sri Dharmasthala Manjunatheshwara college of Ayurveda and Hospital, Hassan, Karnataka. Ethical clearance was obtained from Institutional Ethics Committee (IEC) of Sri Dharmasthala Manjunatheshwara college of Ayurveda and Hospital, Hassan, Karnataka (IEC NO-SDM/IEC/59/2015-2016 dated 17/03/2016, SDMCAH/IEC). Assent was obtained from parents before registering the child for clinical trial.

Method of Collection of Data

Data was collected from subjects using specially prepared case report form with all the points of history taking, physical signs and symptoms of Karshya, anthropometric measurements and laboratory investigations.

Sampling Method

Subjects were selected as per inclusion criteria and convenience sampling technique was used to randomly allocate the subjects into study group and control group.

Diagnostic Criteria

Diagnosis was made on the basis of expected weight for age criteria and the subjects with weight for age between 61 – 80 % according to the IAP classification 78 were included in this study.

Inclusion Criteria

- Subjects within age group 3-5 years were included in the study irrespective of gender, caste and religion.
- Weight for age: between 61 – 80 %.[17]
- Those parents who were ready to sign informed assent form.

Exclusion Criteria

Subjects with acute and chronic infections, Mal-absorption syndrome and Inborn errors of metabolism were excluded from the trial based on clinical presentations.

Study design

The study was double arm, active control clinical trial with pre-test and post-test design wherein 34 subjects of age group 3-5 yrs who were diagnosed with Karshya (61 – 80 % IAP classification) P were enrolled and divided into study and control group among which 27 subjects completed the study.

Intervention

Subjects selected as per inclusion criteria were randomly allocated in study group and control group and the comparative clinical study was done for 56 days.

Study group

- De worming with albendazole 400 mg 1 HS.
- Deepana and pachana with chitrakadi vati ½ BD for three days.

Drug

Amritapraasha Ghrita 6 ml twice daily with warm milk after food for period of 42 days along with dietary advice, considering the uttarottara dhatuposhana for six dhatus i.e. rasa-majja dhatu.7 days for nourishing one dhatu according to kedarakulya nyaya was calculated and a period of 42 days was fixed for the administration of the study drug.[17]Amritaprasha ghrita[16] comprises of fifty drugs such as Jivaka (*Pueraria tuberosa* (Willd.) DC) Rishabhaka (*Pueraria tuberosa* (Willd.) DC), Shringhataka (*Trapa bispinosa* Roxb.), Tamalaki (*Phyllanthus niruri* L.), Vidarikanda (*Pueraria tuberosa* (Willd.) DC), Pippali (*Piper longum* L.), Bala (*Sida cordifolia* L.), Veera (*Nardostachys jatamansi* (D. Don) DC.), Jivanti (*Leptadenia reticulata* (Retz.) Wight and Arn), Shunti (*Zingiber officinale* Roscoe), Shati (*Hedychium spicatum* Sm. in A.Rees), Shalaparni (*Desmodium gangeticum* (L.) DC.), Prishniparni (*Uraria picta* (Jacq.) DC.), Mudgaparni (*Phaseolus trilobus* Ait.), Mashaparni (*Teramnus labialis* (L. f.) Spreng.), Meda (*Asparagus racemosus* Willd.), Kantakari (*Solanum xanthocarpum* Schrad. and H. Wendl.), Sweta Punarnava (*Boerhavia diffusa* L.), Rakta Punarnava (*T. portulacastrum* L.), Madhuka (*Glycyrrhiza glabra* L.), Kapikachu (*Mucuna pruriens* (L.) DC.), Shatavari (*Asparagus racemosus* Willd.), Riddhi (*D. bulbifera* L.), Vriddhi (*Dioscorea bulbifera* L.), Parushaka (*Grewia asiatica* L.), Vatama (*Prunus amygdalus* Batsch), Abhishuka (*Pistacia vera* L.), Dhatri (*Phyllanthus emblica* L), Ikshu (*Saccharum officinarum* L.), Maricha (*Piper nigrum* L.), Twak (*Cinnamomum zeylanicum* Blume), Ela (*Elettaria cardamomum* (L.) Maton), Patra (*Cinnamomum zeylanicum* Blume), Bharangi (*Clerodendrum serratum.* (L)), Mrudvika (*Vitis vinifera* L.), Badara (*Ziziphus jujube* Mill.), Akshotaka (*Juglans regia* L.), Kharjura (*Phoenix dactylifera* L.), Nagakesara (*Mesua ferrea* L.), Mahameda (*Asparagus racemosus* Willd.), Kakoli (*Withania somnifera* (L.) Dunal), Ksheerakakoli (*Withania somnifera* (L.) Dunal), Bruhati (*Solanum indicum.*), Chaaga Mamsarasa (meat soup of goat fried with ghee), Go ksheera, Go ghrita, Madhu (honey), Sarkara (sugar).

Control group

De worming with albendazole 400 mg 1 HS. Dietary advice considering Home based Food along with 2 Glass of Milk (150 ml), one or two seasonal Fruits and one egg daily was advised for 42 days.

Follow Up

The patients of both the groups were followed up for a period of 56 days i.e. on the 1st, 14th, 28th, 42nd and 56th day.

Assessment Criteria

Anthropometrical measurements and state of health was assessed dividing them as objective and subjective parameters.

Objective parameters

1. Weight (Wt)

An electronic scale or a balance-beam scale that is accurate to 0.1 kg is used for assessing weight in the study. Zero calibration of the scale, subjects without shoes and light clothing were ensured prior to taking the measurements. The subjects in this study were made to stand still with the weight equally distributed on both feet and without holding onto to anything for support. Subjects with weight for age: between 61 – 80 % were assessed.

2. Height (Ht)

Height of the subjects was measured using a right-angled headboard and a non stretchable tape measure with 1 mm increments fixed to a vertical surface. Subjects were measured without shoes and socks and with feet placed together, arms to the side, legs straight and shoulders relaxed. The head maintained in the Frankfort horizontal plane (looking straight ahead) and heels, buttocks, shoulder blades and back of the head against the vertical surface.

3. Head Circumference (HC)

HC is measured over the most prominent part of the occipital and just above the supra orbital ridges using a flexible, non stretchable tape. The tape was placed on the same plane on both sides of the head and tight enough to compress the hairs.

4. Chest Circumference (CC)

CC was measured at the levels of nipples using a flexible, non stretchable tape and at full expiration.

5. Mid Upper Arm Circumference (MUAC)

MAC was measured on the left upper arm midway between the acromion and olecranon processes using a flexible, non stretchable tape. The subjects were made to stand with arms relaxed at the side and with the palm facing towards the thigh. MUAC was measured by placing the tape perpendicular to the long axis of the arm and without cutting into the flesh.

6. Body Mass Index (BMI)

BMI of the subjects were calculated by using the formula:

$$BMI = \text{Weight in kilograms} / (\text{Height in meter})$$

Statistical Method

Data was collected using case report form (CRF) designed by incorporating all aspects (Ayurveda and modern medicine) for the study. Such collected data was tabulated and analyzed using SPSS (Statistical package for social sciences) version 20. Demographic data and other relevant information were analyzed with descriptive statistics. Continuous data are expressed in mean, standard deviation, and nominal and ordinal data expressed in percentage.

Continuous data were analyzed using parametric test like repeated measure ANOVA, paired 't' and unpaired 't' test. The changes (one tailed) with p value < 0.05 were considered as statistically significant. Nominal and ordinal data were analyzed using non parametric tests like friedman's test, wilcoxon signed rank test with bonferroni correction and mann whitney test.

Observations

14 out of 17 subjects in the study group completed the study in the study group and 3 were drop outs. 13 out of 17 subjects completed the study in the control group and 4 were drop outs. Among 34 subjects, 10 subjects (29.4 %) were of 3 years, 9 subjects (26.5 %) were 4 years, and 15 subjects (44.1 %) were 5 years. 20 subjects (58.8 %) were females and 14 subjects (41.2 %) were male. 28 subjects (82.4 %) were Hindu and 06 subjects (17.6 %) were Muslims. 02 subjects (5.9 %) were of upper middle class, 08 subjects (23.6 %) were of upper lower class, 23 subjects (67.6 %) were of lower middle class, and 01 subject (2.9 %) was of lower class. 20 subjects (58.8 %) were from nuclear family, 11 subjects (32.4 %) were from extended family and 3 subjects (8.8 %) were from joint family. 09 subjects (26.5 %) were from rural area, 04 subjects (61.8 %) were from urban area and 21 subjects (11.7 %) were from sub-urban area. 31 subjects (91.2 %) had loss of appetite, 34 subjects (100 %) had poor weight gain and 32 subjects (94.1 %) had decreased intake of food. 22 subjects (64.7 %) had irritability, 5 subjects (14.7 %) had abdominal pain and 34 subjects (100 %) had pallor. 24 subjects (70.5 %) had Worms infestation, 07 subjects (20.6 %) had Recurrent RTI, 08 subjects (23.5 %) had Pica, 04 subjects (11.7 %) had Antenatal Maternal hyper emesis, 02 subjects (5.88 %) had Antenatal Maternal hypertension, 02 subjects (5.88 %) was born out of Preterm delivery and 03 subjects (8.82 %) was born with Low Birth Weight. Delayed initiation of breast feeding was present in 2 subjects (5.88 %), early weaning was seen in 2 subjects (5.88 %), late weaning was seen in 5 subjects (14.7 %), 06 subjects (17.64 %) were bottle fed, and 11 (32.35 %) were formula fed. Unwholesome dietary habits such as habitual drinking of tea was seen in 01 child (2.94 %), coffee in 04 subjects (11.76 %) and cool drinks in 04 subjects (11.76 %). Excessive intake of biscuits was seen in 18 subjects (52.94 %), chocolate was seen in 20 subjects (58.82 %), ice-cream in 08subjects (23.52 %). Excessive intake of Ruksha Ahara was seen in 19 subjects (58.9 %) and katu rasa predominant diet in 11 subjects (32.35 %). 5 subjects' (14.7 %) parents were well nourished, 21 subjects (61.7 %) parents were moderately nourished, 08 subjects (36.7 %) parents were poorly nourished. 17 subjects (50 %) were of Vata-Pitta Prakriti and 12 subjects (35.3 %) were of Vata-Kapha Prakriti and 05 subjects (14.7 %) were of Pitta-Kapha Prakriti. 27 subjects (79.4 %) were of mixed food habits and 7 subjects (20.6 %) were vegetarian. 1 subjects (2.9 %) had normal appetite and 33 subjects (97.1 %) had reduced appetite. 23 subjects (67.65 %) had regular passage of stools and 11 subjects (32.35 %) had constipated stools.

RESULTS AND DISCUSSION

The result of therapy on Subjective parameters within study group is detailed in Table 2. The results of therapy on subjective parameters between study and control group is detailed in Table 3. The difference in Objective parameters between study group and control group is detailed in Table 4. It was seen that there was a mean difference of 1.0 kg in the weight of children of study and control group which was statistically significant with p <0.05. There was no significant difference in the height parameter with a mean difference of 1.2 cm more in the study group than control group with p value > 0.05. No significant improvement was seen in the head circumference in both the groups at any point of intervention. There was no significant difference even in the chest circumference with a mean difference of 0.13 cm between the groups with p value > 0.05. In the mid arm circumference, it was seen that there was a mean difference of 0.09 cm more in the study group than the control group which was also statistically not significant with p > 0.05. There was no significant difference even in the BMI with a mean difference of 0.6 kg/m^2 between the groups with p value > 0.05. There was no significant difference even in the hemoglobin % with a mean difference of 0.5 g% between the groups with p value > 0.05. There was no significant difference even in the Serum protein with a mean difference of 0.6 mg/dl between the groups with p value > 0.05.

Table 1: Subjective Parameters And Their Grading

Domain	Assessment	Grade
Daurbalya (General weakness)	Dull	3
	Moderately active	2
	Active	1
	Very active	0
Kshudha (Appetite)	Child does not take food considerably even by force	3
	Child does not ask but takes food considerably by request	2
	Child himself ask food but not take adequately	1
	Child himself asks food and take adequately	0
Nidra (Sleep)	Crood	3
	Disturbed	2
	Short but sound	1
	Long and sound	0
Aakruti (Appearance)	Ill at ease	3
	Dull looking	2
	Playful look	1
	Healthy	0
Vitgraha (Constipation)	Irregular for more than 2 days	3
	On alternate day	2
	Daily but hard stool	1
	No constipation	0
Kapola Gata Vasa (Buccal pad of fat)	Cheeks inside with prominent bones	3
	Cheeks inside	2
	On surface level	1
	Cheeks averted	0
Chesta (Interesting activities)	Dull	3
	Involves when forced	2
	Actively involves on motivation	1
	Very active	0
Academic performance	Poor performance	3
	Below average	2
	Average	1
	Above average	0

Table 2: Results of therapy on Subjective parameters within study group

Parameters		Group	Z	P	Remarks
Daurbalya	*Daurbalya*_1-56	Study	2.271	.023	NS
		Control	2.271	.023	NS
Kshudha	*Kshudha*_1-56	Study	3.109	.002	S
		Control	1.857	.063	NS
Cheshta	*Cheshta*_1-56	Study	2.530	.011	NS
		Control	.000	1.000	NS
Akruti	*Akruti*_1-56	Study	2.887	.004	S
		Control	.000	1.000	NS
Vitgraha	*Vitgraha*_1-56	Study	2.333	.020	NS
		Control	.000	1.000	NS

Table 3: Results of therapy on subjective parameters between study and control group

Parameter		Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)	Remarks
Daurbalya	Daurbalya_1	12.000	33.000	2.639	.008	S
	Daurbalya_56	.000	21.000	3.554	.000	S
Kshudha	Kshudha_1	75.000	166.000	.180	.857	NS
	Kshudha_56	7.000	85.000	4.111	.000	S
Cheshta	Cheshta_1	26.500	62.500	.204	.838	NS
	Cheshta_56	5.000	33.000	2.875	.004	S
Akruti	Akruti_1	52.000	143.000	2.168	.030	NS
	Akruti_56	70.000	175.000	1.871	.061	NS
Vitgraha	Vitgraha_1	6.000	12.000	1.464	.143	NS
	Vitgraha_56	7.500	43.500	1.186	.236	NS

Table 4: Difference in Objective parameters between study group and control group

Difference btw groups	Group	Mean	SD	T	MD	P	Remarks
Diff_Weight	Study	1.10643	1.36564	2.512	1.00643	.019	S
	Control	.10000	1.61673				
Diff_Height	Study	1.35000	7.04694	1.507	1.23462	.144	NS
	Control	.11538	7.07278				
Diff_CC	Study	.17857	2.00736	1.695	0.13088	.102	NS
	Control	.04769	1.05343				
Diff_MAC	Study	.20714	.73503	.400	.09835	.692	NS
	Control	.10879	.51178				
Diff_BMI	Study	.69643	1.37625	1.198	.63489	.242	NS
	Control	.06154	1.22464				
Diff_Hb%	Study	.586	.446	.773	.549	.447	NS
	Control	.037	.975				
Diff_SP	Study	.443	.594	1.962	.405	.062	NS
	Control	.038	.435				

Nidanaparivarjana is done as the first step to manage Karshya.[19] Due to deepana action of chitrakadi vati, Agni gets corrected and by its pachana effect ama pachana occurs.[20] Thus by correcting Agni and mitigating Ama, proper formation of Rasadi dhatus takes place. The study drug is a Ghrita preparation, by the action of ghrita further agni deepana occurs.[21] Amritapraasha ghrita[22] is indicated in Kshataksheena[23] It pacifies vata and also has properties like Balya, Rasayana and Brumhana. By Brumhana and Balya action of the drugs, the rasadi dhatus which are formed will get properly nourished and further due to the Rasayana effect, the nourishment achieved is prolonged.

CONCLUSION

Study group showed statistically significant result in improving the weight of children with Karshya than the control group. In the Subjective parameters, study group showed statistically significant result in reducing the Dourbalya (general weakness) and improving Kshudha (Appetite), Chesta (Interest in activities) and Aakruti (Appearance) than the control group. It may be concluded from the clinical study that Amritapraasha Ghrita is effective in improving weight and in reducing the associated complaints of Karshya like Dourbalya (general weakness) and improving Kshudha (appetite), Cheshta (interest in activities) and Aakruti (appearance).

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Cite this article as:

Saranya Sivaraj *et al*. Effectiveness of Ayurveda intervention in the management of Karshya (Grade I and II Under Nutrition) in children. Int. J. Res. Ayurveda Pharm. 2019; 10(2):47-52 http://dx.doi.org/10.7897/2277-4343.100235