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Evaluation of the efficacy of *Shiva modaka* on Hematological, Biochemical and Immunological Parameters in the management of malnutrition among school going children

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A B S T R A C T

Malnutrition is an issue of global dimensions affecting all ages. Malnutrition in children is common in early age especially during infancy and weaning. However, it also prevails during early schooling. In adults and elderly it is studied as under Protein Energy Malnutrition. It has not only short term adverse effects but also exhibits long term sustained and progressive effects. Kuposhana/Bala Shosha is explained in the Ayurveda literatures and elaborate therapeutic interventions are also described. The disease Karshya also applies to this condition. Shiva Modaka, a drug described under Bala Roga seems to act on vide dimensions of pediatric health with indications in common pediatric ailments too. The present clinical study is an effort to evaluate the efficacy of the said drug on hematological, biochemical and immunological parameters in Malnutrition in school going children.

Key words: *Malnutrition, Bala Shosha, Kuposhana, Shiva Modaka, Karshya, Hematological, Biochemical, Immunological.*

INTRODUCTION

Malnutrition is a mirror to the social status in which the people are living. It is a big challenge to the country. Malnutrition in growing children poses a major problem to the physical and mental development.[1,2] Protein Energy Malnutrition is also considered in the purview.[4] Kuposhana/Bala Shosha is explained long back and many remedial measures have been explained for the same in Ayurveda treatise.[6-10] Failure to thrive and susceptibility to other diseases are the main implications. [3,5] Shiva Modaka explained in Bhaishajya Ratnavali, Bala Roga Adhikara is selected for the present study.[11] Hence, present study has been carried out to bring out the best possible key to solve the malnutrition problem.

MATERIALS AND METHODS

The ingredients of Shiva modaka were procured from genuine sources and the preparation was done at Dr. Krisna Muniyal life sciences Pvt Ltd, Manipal.

Dosage

5g single dose, empty stomach in the morning with milk.

Duration of the study

3 months, during which BMI, anthropometric measurements, IQ level and subjective assessments were done on monthly basis. Hematological, Biochemical and Immunological investigations were done before and after the intervention.

Source of data

Patients fulfilling the diagnostic criteria of malnutrition were selected from government schools of Udupi district. A total of 60 students fulfilling the

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diagnostic criteria were selected for the study in a single group.

Inclusion Criteria

The children between ages 5-10 years suffering from *malnutrition* were included in the present study on the basis of IAP criteria for diagnosis of PEM - Grade I: Patients with 71 − 80% of expected weight for age, Grade II: Patients with 61 − 70% of expected weight for age, Grade III: Patients with 51 − 60% of expected weight for age, Grade IV: Patients with < 50% of expected weight for age [1]

Exclusion Criteria

Cases with devitalizing diseases like Tuberculosis, Mal-absorption syndrome, Chronic diarrhoea, congenital heart disease, Mental retardation, Cerebral palsy, Mongolism, seizure and any sort of grave diseases.

Investigations

Haemoglobin percentage, lipid profile, serum protein, Immunoglobulin assay (Ig M and Ig A) were investigated before and after treatment.

Criteria for assessment of patients

The clinical evaluation of the patient was done by following particulars.

Objective assessment - The objective assessment was done on the basis of the Investigation report of the patient, IQ level, BMI and the anthropometric measurements before and after the treatment.

Subjective assessment - The subjective assessment was made on the basis of signs and symptoms and divided in three groups as + Mild degree of sign and symptoms, ++ Moderate degree of sign and symptoms, +++ Severe degree of sign and symptoms.

Clinical Assessment of Result

The values of Hematological, Biochemical and Immunological tests before and after treatment were compared. The symptom scores were also assessed before and after treatment.

RESULT

The Data collected from the study are grouped as under

Number of Subjects: 60

Mean Age of Subjects: 8.37 (yrs)

Parameter		Hb	T.Chol	HDL	T. Prot	IQ	BMI	Height	Weight	Head Circ	Chest Circ
Mean	BT	11.316	156.40	53.757	7.387	86.40	13.116	121.99	19.41	50.40	61.90
	AT	12.047	151.12	49.523	7.163	87.00	15.032	123.21	22.38	50.68	62.30

Mean of the values of various parameters are showed in the table which shows improvement in Hemoglobin percent, IQ, BMI, Height, Weight, Head circumference and Chest circumference. Total Protein, Lipid Profiles showed mixed results. Immunological tests such as IgM and IgA values showed lot of variation in the subjects before treatment. However after treatment the variation reduced.

DISCUSSION

Analysis of Data obtained by the clinical study shows that the individual data showed an Extreme Variation (Outline Values) in certain parameters such as Triglycerides, LDL cholesterol, VLDL Cholesterol, IgM and IgA. Though the intended Statistical tool initially suggested was Students' Paired "T" Test, in case of Outline Values the calculated Mean is not all suitable. Hence, Wilcoxon's Signed Rank Test was used for the above 5 parameters. The other parameters were analysed based on Paired "T" test.

Parameter	Mean			N	S.D.			S.E.		P value
	BT	AT	Dif		BT	AT	Dif	BT	AT	
Hb	11.3162	12.0470	-.7308	60	1.5026	1.2311	1.7191	.19484	.15881	0.077	> 0.05
T.C	156.4	151.1	5.2	6	22.92	30.78	32.49	2.96	3.97	0.0	< 0.

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hol	0	2	83	0	4	5	5	0	4	2 2	0 5
HDL	53.757	49.523	4.233	60	9.6929	9.9513	10.7661	1.2514	1.2847	0.0002	<0.05
Total Protein	7.387	7.163	.223	60	.7459	1.0625	.9838	.0963	.1372	0.0000	<0.05
IQ	86.40	87.00	-.600	60	4.882	4.487	1.182	.630	.579	0.0000	<0.05
BMI	13.1168	15.0320	-1.91517	60	1.97223	1.97093	1.56537	.25461	.25445	0.0000	<0.05
Height	121.992	123.217	-1.22500	60	9.5120	9.4986	.5401	1.2280	1.2263	0.0000	<0.05
Weight	19.418	22.383	-2.96500	60	4.3965	4.3534	1.6906	.5676	.5620	0.0000	<0.05
Head Circum	50.40	50.683	-.28333	60	.978	.9341	.3836	.126	.1206	0.0000	<0.05
Chest Circum	61.9088	62.3000	-.39017	60	1.9277	1.6879	.4228	.2489	.2179	0.0000	<0.05

Hemoglobin though showed some improvement after treatment, the Mean value Before treatment being 11.3162 and AT the Mean Hb being 12.0470 it was not statistically significant (P>0.05).

Total Cholesterol showed a borderline decrease in Mean values from 156.4 before treatment to 151.12 after treatment which was statistically significant (P<0.05).

Total Protein showed a slight reduction from mean value of 7.387 BT to 7.163 which was statistically significant (P<0.05).

IQ level showed a borderline increase from Mean 86.4 BT to 87 AT and the improvement was statistically significant (P<0.05).

Mean value of Body Mass Index (BMI) before treatment was 13.1168 which increased to 15.0320 and the improvement was statistically significant(P<0.05).

The Mean Height before treatment was 121.992 cm which increased to 123.217 cm and was statistically significant (P<0.05)

The change in Weight from Mean Value of 19.418 before treatment to 22.383 after treatment was statistically significant (P<0.05).

Head circumference changed from the mean value of 50.4 before treatment to 50.683 after treatment which was statistically significant (P<0.05).

The Chest circumference improved slightly from a mean value 61.908 before treatment to 62.300 after treatment which was statistically significant (P<0.05).

The parameters such as Triglyceride, LDL, VLDL, IgM and IgA with Extreme (Outline) Values were subjected to Wilcoxon's Signed Rank Test and 2-tailed test which showed that the results were significant and the variability of the values in these parameters reduced significantly after treatment.

Overall assessment of improvement in IAP scale and Symptoms suggested 80.5% of the subjects obtained significant relief of symptoms with treatment and about 19.5% obtained moderate relief.

CONCLUSION

The study concludes that the drug Shiva Modaka is very beneficial in the management of Malnutrition in the school going children of age 5-10 years. It significantly relieved the symptoms of Malnutrition and other associated symptoms and also helped to improve the immunological status and promoted the growth. It improved the haemoglobin concentration

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though it reduced the Serum Protein and Cholesterol levels. There by the Bala Rogaghna, Balya, Brimhana, Medhya effect stands proved justifying the selection of the drug here for this study.

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