

Clinical Study on Paushtika Biscuit and Wheat Flour Biscuit in Malnourishment (Underweight Children)

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ABSTRACT **Background:** Protein energy malnutrition i.e. under nutrition hampers growth and development of child and in Ayurveda it is addressed as *Karshya*. Forty percentage of India's children below the age of three years are malnourished (underweight). **Aims:** To assess the efficacy of *Paushtika* biscuit (PB) in the management of *Karshya* & its comparison with wheat flour biscuit (WFB). **Materials and Methods:** The children fulfilling the criteria of study were selected from the survey and O.P.D. of *Kaumarbhritya* Dept. I.P.G.T. & R.A. Jamnagar. Total 91 patients were registered and randomly divided in two groups, among them 75 patients completed their treatment and remaining 16 patients dropped out. **Results:** Weight increased 6.38% in PB group, 6.22% increase in WFB group. Effect of WFB on Biceps, Triceps and Gluteal skin fold thickness were more than that of PB. Haemoglobin was increased by 0.80% and Total Protein increased by 0.81 in PB group. **Conclusion:** It was concluded that *Paushtika* biscuit and wheat flour biscuit are effective in the management of underweight children.

Keywords: *Karshya*, *Paushtika* biscuit, Wheat flour biscuit

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INTRODUCTION

Under nutrition is a condition where there is inadequate consumption, poor absorption or excessive loss of nutrients. Sometimes malnutrition and protein energy malnutrition (PEM) are used interchangeably the concept of under nutrition.¹ *Ahara* (food) is the prime among the triads of health, the other two being *Nidra* (sleep) and *Bramhacharya* (abstinence). Nutritional disorders are described in scattered manner among the Ayurveda texts. Many common health problems can be prevented through nutritious diet. In the field of paediatrics, there are numerous diseases which haven't had any satisfactory answers from the contemporary life sciences. There are conditions in nutrition like inadequate consumption, poor absorption or excessive loss of nutrients due to varying reasons. Growth and development may be a normal physiological process provided all factors influencing them are healthy. Failure to thrive or stunted growth when these necessary are deficient, and in Ayurveda the conditions

is addressed as *Karshya*. *Karshya* is disease which may be correlated to 'under nutrition'. Similarly, diseases like *Pariagarbhika*, *Phakka*, *Balashosha*, and *Shuska Revati* described by various authors of Ayurveda also can co-relate to under nutrition. Research has decisively shown that malnutrition during pregnancy causes the kid to have enlarged possibility for various diseases, physical retardation, and reduced cognitive abilities in future. Many diseases are known to afflict human being like infectious, metabolic, genetic and nutritional deficiency disorders. Out of these nutritional diseases are by far the most common throughout the world. And among them protein energy malnutrition is the commonest one. It is the foremost widespread health and nutritional problem especially in developing countries.

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EPIDEMIOLOGY

Under nutrition may be a major underlying cause for child mortality in India and India is one of the countries where child under nutrition is severe. In India as per National Family Health Survey IV (2014–2015, recent within the series) 38.4, 21 and 35.7% of youngsters below 5 years suffer from stunting, wasting and underweight respectively. Prevalence of severe acute malnutrition (SAM) in India is 7.5%. In India 46.6 million stunted children, a 3rd of world's total as per Global Nutrition Report 2018. Nearly half all under-5 child mortality in India is due to undernutrition.² Madhya Pradesh, Jharkhand, and Bihar have high rates of under-nutrition. States with lowest percentage of under-nutrition include Mizoram, Sikkim, Manipur, Kerala, Punjab, and Goa.³

AIMS AND OBJECTIVES

To assess the efficacy of *Paushtika* biscuit in the management of *Karshya* and its comparison with Wheat flour biscuit.

MATERIALS AND METHODS

The children fulfilling the criteria of study were selected from the survey of local school, Angawadi in Jamanagar and O.P.D. of *Kaumarbhrtiya* Dept., I.P.G.T. & R.A. Jamnagar. Crude drugs were procured from Pharmacy of Gujarat Ayurved University, Jamnagar except *Makhana* and wheat flour. The final product *Paushtika* biscuit and Wheat Flour Biscuit are baking in Raj Laxmi Bakery Jamanagar. Ingredient and proportion of *Paushtika* biscuit and Wheat Flour Biscuit. [Table No. 1].

Ethical clearance

This trial was cleared by Institutional Ethics Committee, Ref-No.PGT/7-A/Ethics/2013-14/2753 Dt.09-12-2013.

Registration in CTRI

The clinical trial was registered under Clinical Trials Registry – India (CTRI). The registration number is CTRI/2016/01/006506 [Registered on: 11/01/2016] - Trial Registered Retrospectively.

Table 1: Ingredients of *Paushtika* Biscuit & Wheat Flour Biscuit with Proportion

S. No.	Name	Latin Name	Part to be used	Proportion
<i>Paushtika</i> Biscuit				
1	<i>Godhuma</i>	<i>Triticum turgidum</i> var mirabile	Seed	50%
2	<i>Makhana</i>	<i>Euryale ferox</i> Salisb	Fruit	10%
3	<i>Amalaki</i>	<i>Emblia officinalis</i> Gaertn.	Dried Fruit	1 Part
4	<i>Madhuyashti</i>	<i>Glycyrrhiza glabra</i> Linn.	Root	1 Part
5	<i>Mandukaparni</i>	<i>Centella asiatica</i> Linn.	<i>Panchanga</i>	1 Part
6	<i>Guduchi</i>	<i>Tinospora cordifolia</i> Willd.	Stem	1 Part
7	<i>Atibala</i>	<i>Abutilon indicum</i> Linn.	Root & seeds	1 Part
8	Dry <i>Kharjoora</i>	<i>Phoenix dactylifera</i> Linn.	Dried Fruit	1/3 rd of Total
9	<i>Shunthi</i>	<i>Zingiber officinale</i> Roxb.	Rhizome	1/10 th Part
10	<i>Pravala</i>	Coral	<i>Bhasma</i>	1/10 th Part
11	<i>Mandura</i>	Red iron oxide	<i>Bhasma</i>	1/10 th Part
12	Sugar	-	-	- QS -
Wheat Flour Biscuit				
1	<i>Godhuma</i>	<i>Triticum turgidum</i> var mirabile	Seed	100%
2	Sugar	-	-	- QS -

Inclusion Criteria

Children from age of 2-10 years of either gender. Children with poor growth (Nutritional Grade I & II According to IAP classification)

Exclusion Criteria

Children below 2 years and above 10 years, Children who was seen with the evidence of helminthiasis, *Grahani Dosh* etc, GI tract diseases., Children, having systemic disorders, congenital anomalies, neurological disorders, endocrine disorders and anatomical defects etc. and Children with less than 60% of ideal weight for age.

Laboratory investigations

Haemogram (%), total leukocyte count (TLC), differential leukocyte count (Neutrophils, Leukocytes, monocytes, eosinophils), erythrocyte sedimentation rate (ESR), total red blood cell, bio-chemical investigation such as total protein, Albumin globulin ratio, blood urea nitrogen, Sr. Cholesterol, Sr. Creatinine, urine and stool (microscopic and macroscopic) were done at baseline and after treatment.

Sampling Method

Simple Random Sampling Method was adopted in this clinical trial.

According to the Indian Academy of Paediatrics (IAP)⁴

- First degree : Weight between 80 and 70% of expected for age
- Second degree : Weight between 70 and 60% of expected for age
- Third degree : Weight between 60 and 50% of expected for age
- Fourth degree : Weight below 50% of expected

GROUPING

The selected patients were divided into two groups as shown below:

Group A: *Paushtika* Biscuit Group (PB Group)

Group B: Wheat Flour Biscuit Group (WFB Group)

Posology: Table No.2

Follow up- After completion of the clinical trial of three months, the patients were followed up for further two months. They were evaluated for recurrence or aggravation symptoms and recurrent infections. General health profile was noted.

Assessment Criteria

A. Subjective parameter: Table No 3.

B. Objective Criteria: Weight (Kg), Height (cm), Mid Arm Circumference (cm), Mid thigh Circumference, Abdominal Circumference and Skin fold thickness- bicep, tricep gluteal (mm).

OBSERVATIONS

Total 91 patients were registered; among them 75 patients completed their treatment and remaining 16 patients were drop outs. In PB Group 43 patients were registered, among them 33 patients completed their treatment and 10 patients were drop outs. In WFB Group 48 patients were registered, among them 42 patients completed their treatment and remaining 6 patients were drop outs. In all of the 91 registered patients, maximum 36.36% patients belonged to age group of 4-6 years, 59.34 % were males, and 90.10% were Hindus. According to *Aaharaja Nidana* wise distribution; 56.04% patients had taken *Ruksha Aahara*, 46.15% patients had taken chocolate/icecream etc. in diet. According to *Viharaja Nidana* wise distribution, 30.76% patients had done *Ativyayama* (excessive playing). In chief complaints 81.31% patients

Table 2: POSOLOGY

Age in years	2- 3	3-4	4-5	5-6	6-7	7-8	8-9	9-10
Dose of biscuit /Day	1	1.5	2	2.5	3	3.5	4	4.5
Route	Oral							
Duration	12 week							
<i>Anupana</i>	Water							
<i>Aushadha Sevana Kala</i>	<i>Adhobhakta</i> in two divided doses							
Note: 1 Biscuit= 10 gms.								

Table 3: Scoring pattern for Subjective parameter	
Subjective parameters	Score
1.	Fat deposition on gluteal, abdominal & neck region
Normal	0
Moderate	1
Less	2
Very less	3
2.	Dhamani Jala Darshan
Not visible easily even after pressure	0
Visible & prominent on Pressure	1
Visible without pressure	2
Prominent without pressure	3
3.	Sthula Parva
Deeply seated with extra fat	0
Covered	1
Prominent	2
Relatively look Larges	3
4.	Appetite
Child himself asks foods & also take adequately	0
Child himself asks food but not take adequately	1
Child does not ask but takes food considerably by request	2
Child does not take food considerably even by force	3
5.	Sleep
Long (> 8Hours) & sound	0
Short (< 8Hours) but sound	1
Disturbed	2
Crude	3
6.	Appearance
Healthy - cheerful	0
No cheerful / Tense looking	1
Old looking / Depressed	2

Table 3 (Cont.)	
Subjective parameters	Score
Ill looking	3
7.	<i>Daurbalya</i> - activeness
Very active	0
Active	1
Moderately Active	2
Dull	3
8.	Krodha
No anger even for reasonable cause	0
Gets angry only for reasonable	1
Gets angry even for unreasonable cause	2
Highly irritable for no cause (uncontrollable anger)	3
9.	Shoka
No sorrow fullness even for reasonable	0
Sorrowful only for reasonable cause	1
Sorrowful only for non-reasonable cause without anybody gesture	2
Most sorrowful for no cause, unable to control his feelings, body gestures present	3
10.	Harsha
Always joyful & enjoys the life	0
Happy with particulars enjoyable things & company	1
Occasionally happy with every enjoyable things & company	2
No happiness by any means	3
11.	<i>Shrama (sahas)</i> :
Physical <i>Shrama</i>	
Excessive playing not tired	0
Excessive playing tired	1
Tired with some physical activity or playing for some time	2
Tired without playing	3
12.	Fatigue
No fatigue	0

Subjective parameters	Score
Work full time despite fatigue	1
Patient must interrupt work to rest	2
Fatigue at rest	3

complained of *Karshya*, 75.82% were having *Agnimandya*, and fatigue was found in 36.26% patients. Regarding associated complaints, respiratory tract infection was found in 9.89% patients, abdominal pain was found in 15.38% patients,

constipation found in 5.49% and hypo-pigmented patches was found in 5.49% patients. Effect of therapy on subjective, objective, haematological and biochemical parameters are shown in Tables 4, 5, 6 and 7 respectively. Overall effect of

Symptoms	Group	Mean Score		% relief	± S.D.	± S.E.	't +'	p
		BT	AT					
Fat deposition on gluteal, abdominal & neck region	Group A	2.061	0.8182	60.29	0.6629	0.1154	435	>0.05
	Group B	2.286	0.9286	59.37	0.5329	0.0822	861	>0.05
<i>Dhamani Jala Darshana</i>	Group A	2.152	0.9394	-56.38	0.5999	0.1044	465	>0.05
	Group B	2.228	0.9762	-56.38	0.5437	0.0838	820	>0.05
<i>Sthula Parva</i>	Group A	2.303	0.9697	-57.89	0.4787	0.0833	561	<0.02
	Group B	2.190	0.9524	-56.52	0.5763	0.0889	820	>0.05
Appetite	Group A	2.242	0.8788	60.81	0.5488	0.0955	528	>0.05
	Group B	2.143	0.9762	54.44	0.4897	0.0755	820	<0.05
Sleep	Group A	1.182	0.4848	58.97	0.7282	0.1268	171	<0.0001
	Group B	1.119	0.5000	55.31	0.6228	0.0961	276	<0.0001
Appearance	Group A	0.5758	0.1515	73.68	0.7084	0.1233	55	<0.05
	Group B	0.4286	0.1905	55.55	0.6172	0.09524	21	<0.0001
<i>Daurbalya</i>	Group A	2.061	0.8788	-57.35	0.5276	0.0918	496	>0.05
	Group B	2.000	1.000	-50.00	0.4939	0.0762	741	>0.05
<i>Krodha,</i>	Group A	1.636	0.9091	-44.44	0.8394	0.146	136	>0.05
	Group B	1.619	0.9762	-39.70	0.6560	0.112	276	<0.05
<i>Shoka,</i>	Group A	1.515	0.9697	-36.00	0.711	0.1238	105	>0.05
	Group B	1.119	0.9524	-14.89	0.377	0.0582	28	<0.0002
<i>Harsha</i>	Group A	1.273	0.7273	-42.85	0.794	0.1382	91	>0.05
	Group B	1.119	0.9048	-19.14	0.716	0.1106	10	>0.05
Physical Activity (<i>Shararika Shrama</i>)	Group A	1.667	0.6970	-41.81	0.8472	0.1475	120	>0.05
	Group B	1.262	0.9762	-22.64	0.5078	0.0783	66	>0.05
Fatigue	Group A	1.667	0.967	-41.81	0.8833	0.1538	105	>0.05
	Group B	1.238	0.9762	-21.15	0.4968	0.0766	55	>0.05

Parameters	Group	Mean score		% relief	± S.D.	± S.E.	't '	p
		BT	AT					
BMI	Group A	13.70	14.23	3.86	0.55	0.09	-5.45	<0.001
	Group B	12.87	13.42	4.29	0.37	0.05	-9.46	<0.001
Weight (Kg)	Group A	14.43	15.35	6.38	0.531	0.092	-9.970	<0.001
	Group B	15.17	16.11	6.22	0.445	0.068	-13.779	<0.001
Height (cm)	Group A	102.33	103.62	1.25	1.00	0.174	-7.397	<0.001
	Group B	108.14	109.19	0.97	0.652	0.101	-10.420	<0.001
CC	Group A	49.15	49.76	1.23	0.541	0.094	-6.467	<0.001
	Group B	50.41	51.14	1.44	0.607	0.093	-7.755	<0.05
MAC	Group A	14.30	14.67	2.58	0.240	0.041	-8.833	<0.001
	Group B	14.50	15.04	3.67	0.270	0.041	-12.894	<0.001
MTC	Group A	27.100	27.691	2.18	0.519	0.090	-6.545	<0.001
	Group B	26.619	27.331	2.67	0.386	0.059	-11.938	<0.001
AC	Group A	45.45	46.07	1.36	0.516	0.089	-6.918	<0.001
	Group B	47.39	48.26	1.83	0.644	0.099	-8.739	<0.001
SFT- Triceps	Group A	6.212	7.242	16.58	0.529	0.092	-11.179	<0.001
	Group B	6.714	8.000	19.14	0.596	0.092	-13.97	<0.001
SFT- Bicep	Group A	5.515	6.515	18.33	0.661	0.115	-8.685	<0.001
	Group B	6.238	7.476	19.84	0.656	0.101	-12.240	<0.001
SFT- Gluteal	Group A	7.091	8.182	15.38	0.678	0.118	-9.238	<0.001
	Group B	7.381	8.619	16.77	0.617	0.095	-13.00	<0.001

Note: CC- Chest circumference, MAC- Mid Arm circumference, Mid-thigh circumference, AC-Abdominal circumference, SFT- Skin folds thickness

Symptoms	Group	Mean score		% relief	± S.D.	± S.E.	't '	p
		BT	AT					
Haemoglobin (gm %)	Group A	11.706	11.800	0.80	1.069	0.186	-0.505	>0.05
	Group B	11.762	11.843	0.68	0.581	0.089	-0.903	>0.05
TLC	Group A	9154.54	8312.12	-9.20	2466.91	429.43	1.962	>0.05
	Group B	8776.19	8978.57	2.30	2973.00	458.74	-0.441	>0.05
DLC- Neutrophil	Group A	40.394	43.848	8.55	11.702	2.037	-1.696	>0.05
	Group B	44.738	46.833	4.68	13.632	2.104	-0.996	>0.05
DLC- lymphocyte	Group A	50.606	48.636	-3.89	11.428	1.989	0.990	>0.05
	Group B	46.476	45.119	-2.92	13.704	2.115	0.642	>0.05

Symptoms	Group	Mean score		% relief	± S.D.	± S.E.	't'	p
		BT	AT					
DLC-Eosinophil	Group A	6.030	4.242	-29.64	4.037	0.703	2.54	<0.05 (P=0.016)
	Group B	6.242	5.405	-13.68	3.517	0.543	1.57	>0.05
DLC-Monocyte	Group A	2.606	2.727	4.65	0.696	0.121	-1.000	>0.05
	Group B	2.524	2.690	6.60	0.853	0.132	-1.266	>0.05
TRBC	Group A	4.605	4.710	2.29	0.376	0.0655	-1.609	>0.05
	Group B	4.624	4.634	0.22	0.283	0.0436	-0.235	>0.05
ESR	Group A	13.697	13.909	1.54	12.845	2.236	-0.0949	>0.05
	Group B	15.619	10.881	-30.33	11.513	1.776	2.667	p= 0.011

Note: TLC-Total Leucocyte count, DLC- Differential Leucocyte count, TRBC- Total red blood cell, ESR- Erythrocyte sedimentation rate.

Parameters	Group	Mean score		% relief	± S.D.	± S.E.	't'	p
		BT	AT					
Total Protein	Group A	6.679	6.733	0.81	0.489	0.0851	-0.641	>0.05
	Group B	6.519	6.242	-4.23	0.402	0.0621	4.449	p= <0.001
A/G Ratio	Group A	1.439	1.524	5.89	0.335	0.0582	-1.457	>0.05
	Group B	1.562	1.850	18.40	0.362	0.0558	-5.155	P = <0.001)
Blood Urea Nitrogen	Group A	22.030	20.697	-6.05	8.440	1.469	0.908	>0.05
	Group B	19.667	20.476	4.11	5.688	0.878	-0.922	>0.05
Serum Cholesterol	Group A	126.091	128.576	1.97	29.013	5.051	-0.492	>0.05
	Group B	116.929	122.167	4.47	23.920	3.691	-1.419	>0.05
Serum Cretinine	Group A	0.512	0.612	19.52	0.203	0.0354	-2.828	P = 0.008
	Group B	0.521	0.531	1.82	0.171	0.0264	-0.361	>0.05

therapy showed 57.57 % patients had mild improvement, 24.24 % patients had moderate improvement and 18.18% patients had marked improvement in PB group. In WFB group, 69.04 % patients had mild improvement, 23.80 % patients had moderate improvement and 7.14 % had marked improvement.

DISCUSSION

No abundant description is found relating to *Karshya* particularly in youngsters. The data showed that maximum number of patients i.e. 36.26% belonged to age group of 4-6 yrs which is school going age. This age-group is more susceptible for infections from play schools, KGs and

unhygienic eating habits, hyperactivity etc. leading to *Karshya*. The data showed that 59.34% patients were male and 40.65% female. However the magnitude of disease was equal in both males and females. 90.10% patients were Hindus in this study. This may be due the predominance of Hinduism in that area. According to *Aaharaja Nidana*; Along with normal diet 56.04% patients had taken *Ruksha Bhojana* like *Khakara, Chips, Papad* and 46.15% patients had taken chocolate/icecream/ kurkure etc.

According to Ayurveda *Karshya* is not only energy imbalance between input and output of energy, so to treat the *Karshya*, it is important to understand the *Samprapti* and its prevention.

In chief complaints of all registered patients, *Karshya* was found in 81.31% patients. While other complaints related with this disease like *Agnimandya* and fatigue were found in 75.82% and 36.26% of patients respectively. The other associated complaints including respiratory tract infection (9.81%), abdominal pain (15.38%), constipation (5.49%) and hypo pigmented patches (5.49%) were also found in patients. Infection may lead to PEM by various mechanisms like Reduction of Dietary Intake, Increased excretion of nitrogen, negative nitrogen balance, increased catabolism of proteins, parasitic infestation causing blood loss, and low immunity against viral infections. Infection – malnutrition - infection is a vicious cycle. The therapy showed augmented fat deposition on gluteal, abdominal & neck region in both groups due *Brimhana* effect, presence of proteins, fats and calories in both drugs. In PB group *Dhamani Jala Darshana* was relieved by 56.38% improvement by due to the increase of fat in the body. *Sthula Parva* was relived in both groups due to increase in fat in the body. Nutritional analysis of drugs found that fat is present in both of the drugs. In PB group 57.89 % patients and 56.52 % patients in WFB group had relief in *Sthula Parva*. Appetite was increased in PB group (60.81%) due to *Dipana*, *Anulomana* and *Strotoshodhaka* property that results in *Agnidipana*. Sleep improvement was 58.97% in PB group because of the presence of *Medhya* drugs in *Paushtika* Biscuit. PB group showed 73.68% improvement in appearance with statistically significant result. Appearance of patients changes due to *Poshana* of *Rasadi Dhatu* by *Brimhana* effect, which has *Indriyaprasadaka Karma*. *Daurbalya* was relieved 57.35% in PB and 50.00% in WFB group, and which was insignificant both group. PB have drugs with property of *Balya*, *Strotoshodhana*, *Rasayana*, *Dipana*, which increases the appetite, and causes proper synthesis of *Dhatus*, thereby *Daurbalya* was relieved. *Krodha* was relieved 44.44% in PB group and in WFB there was 39.70% relief. *Brimhana* and *Medhya* Karma of medicine improved the psychological condition leading to less irritation and anger. Effect of therapy on *Shoka* in PB group was 36.00% and in WFB group 14.89% relief was found with statistically highly significance. This may be due to the *Brimhana Karma*, and *Prinama* of all *Dhatu* properly, so *Shoka* is relived in both groups but PB was better than WFB group. In *Manasika Bhavas*, *Harsha*, had results with 38.09% and 19.14% relief in PB group and WFB group respectively. Physical Activity (*Shararika Shrama*) was relived in PB group 41.81%. This is due to *Dipana* and *Pachana* effect of therapy on proper formation of *Rasadhatu* which provides nutrition to *Uttorattara Dhatus*. In PB group, effect of therapy on fatigue was 41.81% relief and in WFB fatigue was decreased is 21.15%. As all *Dhatus* got proper nourishment, it improves the generalised strength of the body, which leads to reduced Fatigue in patients.

The weight gain was found in both groups which were statistically significant. It may be due to growth promoting, *Dipana*, *Pachana*, *Brimhana*, *Rasayana*, *Vrishya* effect of *Paushtika* biscuit which causes *Samyaka Nirmana* of *Rasadhatu* and *Poshana* of *Mamsa* and *Meda Dhatu*. Wheat flour Biscuit also worked on weight due to its *Brimhaniya* property. The results showed that height increased in PB group and WFB group and were statistically highly significant. It is due to combine effect of drug and their growing age period. Chest circumference was increased in both group, it indicates that anabolic effect of both drug. Abdominal circumference increased with 1.36 % in PB group and 1.83% in WFB group which is highly significant. This result showed that both the drugs are effective in *Karshya* by their *Brimhana* properties. Mid Arm Circumference and Mid-Thigh Circumference increased in both groups. The results showed that the *Brimhana* therapy which was given in both groups may increase musculature and deposition of fat under the skin. Biceps skin fold thickness increased 18.33% in PB group and 19.84% in WFB group, Triceps skin fold thickness was increased 16.58 % in PB group and 19.48 % in WFB group, Gluteal skin fold thickness increased 15.38% in PB and 16.77% in WFB group. So, the results show that both the drugs are effective to increase musculature and fat deposition under the skin.

In PB and WFB group, haemoglobin percentage increased 0.80% and 0.68% respectively. *Paushtika* biscuit has shown slightly better increment in the haemoglobin percentage it may be due to it contained *Mandura Bhasma*. In PB group TLC count decreased and in WFB group increased in normal range. Parents of children had reported that their children did not suffer from Respiratory tract infection or any other disease. This may be due to main nutrients of the *Paushtika* Biscuit Group increased immunity against infection.^{6,7,8} In both the groups Neutrophils were increased and Lymphocytes were decreased but it was statistically insignificant. In group PB, Eosinophil's were decreased 29.64% and in WFB Eosinophil's were decreased by 13.68%. Both the group showed decreased eosinophil count and thereby the drugs may also work in allergic condition. Monocytes were increased in both groups but in within normal levels. Result showed that both drugs were effective in increasing the immunity but PB group had shown better results than WFB group. Total R.B.C. count was increased in both groups. PB groups were effective in increasing R.B.C. In both groups, ESR showed insignificant results. Possibly both groups are effective in increasing the immunity and decreasing the recurrent infections^{9,10}

Total protein was increased in PB group and decreased in WFB group. PB group was effective in increasing total

proteins. A/G ratio increased in PB group with 5.89% and WFB group 18.40% with significant result. By this result, it can be said that both groups were effective in increasing A/G ratio. BUN (Blood urea nitrogen??) was decreased in PB group 6.05%, in WFB group it was increased by 4.11%. This result suggests that WFB group have some effect on increasing BUN and that means increased Blood nitrogen level. Increase in serum cholesterol was by 1.97% in PB group and increase in WFB group was by 4.47%. PB and WFB were not much effective in increasing S. Cholesterol. In PB group, S.Creatinine was increased by 19.52% and in WFB group, it was increased by 1.82%. The result showed that in PB group serum creatinine level was increased within normal range.

CONCLUSION

According to Ayurveda, *Karshya* is not only energy imbalance between input and output of energy. *Vyadhi Sambhavaja Phakka, Balashosha, Kshiraja Phakka, Parigarbhika, Garbhaja Phakka, Balashosha* and *Shuska Revati* are similar to malnutrition. Fast and junk foods, wafers, cold drink, ice-cream are the factors responsible for improper weaning and causes of *Karshya*. PB and WFB were both effective on *Karshya* i.e. in underweight children on anthropometrical and subjective parameters. As both the drugs have good palatability and acceptance in children, these are the safe and effective medicine for Grade I and Grade II malnutrition. This study showed that both the groups had effective results in *Karshya*. *Paushtika* biscuit had better result in fat deposition on gluteal, abdominal & neck region, appetite and weight as compared to wheat flour biscuit.

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