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THERAPEUTIC EFFICACY OF DADIM GHRITA IN THE MANAGEMENT OF SAHAJ PANDU ROGA (SICKLE CELL DISEASE): A HUMAN TRIAL BASED STUDY

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ABSTRACT

Changing in environmental condition as well as daily life style leads to the changes in the pattern of the diseases. Although sickle cell anaemia disease has not mentioned in ayurveda text, sahaj pandu disease has been described which has similar sign and symptoms. In the present human based study, we see the therapeutic efficacy of Dadim ghrita, a herbomineral preparation in the patients with the symptoms of sickle cell anaemia. We also compared its efficacy with folic acid. Results from present study show the superiority of herbal formulation over the folic acid in terms of quick and significant recovery from the symptoms of sickle cell anaemia.

KEYWORDS Sickle cell anaemia, sahaj pandu roga, human trial, dadim ghrita, folic acid

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INTRODUCTION

Sickle cell anaemia can be characterized by the abnormal shape of red blood corpuscles (RBCs) due to abnormal kind of haemoglobin (Hb-s) that believe to cause the low oxygen transport to the tissues. The disease is not limited upto a particular society, region or country rather it is very common in many countries including India. Most of the patients with this syndrome suffer from haemolytic anaemia with hematocrits of 15 to 30% and significant reticulocytosis. Although many diseases have been mentioned in Aurvedic literature, some of the diseases including sickle cell anaemia have not been mentioned in the same that suggest the changing nature and environment with the passage of time is one the chief contributor in the emergence of new disease. In addition, some diseases in ayurveda text have been showing the similar sign and symptoms with disease that are not described in ayurvedic literature. Sahaj is a Sanskrit word that has several meanings like (i) self (ii) brother (iii) own people (iv) people belonging to a family or to a community or society. Thus sahaj rogas include those diseases which are seen in brothers or own people or the member of a family or a person belonging to the same society or in other words the disease is inheritable in nature. In spite of the unavailability of literature about the sickle cell disease in ancient ayurveda text, disease called pandu has shown the same characteristics in terms of pathogenesis, diagnosis and clinical features with sickle cell anaemia. To accommodate inheritable nature of sickle cell anaemia "sahaj" word has been added to pandu. Like Sahaj pandu roga, sickle cell disease is also inheritable disorder. In addition to this, other characteristics like raktalpata (haemolytic anaemia), aruchi (anorexia), hatanal (reduced digestive powder), daurbalya (debility), shwas (dyspnoea), jwar (fever) etc are also similar in both the diseases suggest the correlation between these two diseases[1]. In India, sickle cell disorder has proved to be expressively fatal and contributes to infant mortality. Moreover, for the patients of sickle cell disease, no curative therapy is available; we made an attempt to provide possible remedy for the management of disease. In the treatment of pandu, Acharya Charak has suggested to give medicated ghrita after proper shodhan karma. Since the patient of sahaj

pandu were from pediatric age group, they were not suitable for shodhan because of sukumarita. As these patients are already weak and fatigue is often present, they need some drug which will help them overcome the symptoms, sooth the body and reduce anaemia. Therefore medicated ghrita was chosen for the management of disease.

Many types of ghrita have been described in Ayurvedic text; however Dadimadi ghrita could be a drug of choice as contents of this drug belongs to Balya and deepaniya, panchaniya gana and Rasayana varga. These herbs are supposed to increase the digestive power and clear the srotorodha, thus helping in propagation of nutrients required for formation of next dhatus. Keeping in mind the severity as well as versatility of disease and the description of dadim ghrita in Ayurveda text, the present clinical study was planned to see the clinical efficacy of Dadim ghrita in the management of Sahaj pandu (Sickle cell disease).

MATERIALS AND METHODS

Selection of Cases

The patients were selected from outdoor and indoor department of Kaumar-Bhritya of Pakwasa Rugnalaya, Nagpur attached to Shri Ayurved College Nagpur. These patients were first distributed in various groups according to age, sex and socio economic status. The institutional ethical committee approved the protocols for the experiment. Patients who were previously diagnosed with sickle cell pattern by electrophoresis and possessed reliable reports were chosen for study. Patients in acute crisis at the time of starting the treatment were not included in the study. The patients, who were not diagnosed were advised Hb electrophoresis and then selected based on the results. In this way, total 33 patients were selected for the study. Selection of patients was not biased and male and female children below 16 years were selected randomly and divided into following groups

Group I Dadim Ghrita; 2.5-10 ml per day in divided doses

Group II Folic acid; 2.5-5 mg

Total duration of research was of two years and patients were treated for 3 months and follow up was done every 15 days during the treatment and later also.

Assessment of response to the drug was based on improvement in sign and symptoms of the patient. Some of sign and symptoms of ayurveda can not be graded simply. They require detailed history to bring out the facts. Therefore assessment of such signs and symptoms was done with minute observation and help of questionnaire. Their answer helped in staging of sign and symptoms and recording the improvement.

Assessment of Symptoms

While assessing the symptoms the references like agnimandya i.e. patient's appetite, daurbalya in terms of exercise tolerance and relation to the physical activity with food consumption has been included in study.

Grading of Signs

All sign and symptoms were graded according to the severity of disease or in other way patients with severe symptoms got higher grade and the grade was decline with the declination of severity of disease. Sum of grad was thus used as a parameter indicative of overall patient's health as well as the overall therapeutic efficacy of dadim ghrita. Many symptoms have been taken in consideration during grading, some of important symptoms with grading has summarized in **table 1**.

Statistical Analysis

Data are expressed as means±SEM. Data comparisons were carried out using one-way analysis of variance followed by Tukey's post hoc test to compare means between the different treatment groups. Difference between control (folic acid) and treatment group with a P value of 0.05 was considered significant.

RESULTS

Table 2 shows the effects of Dadim Ghrita treatment on sickle cell anaemic patient's disease symptoms like pindikodveshtan (cramps), nakha-netra shwetata (pallor) and dactylitis. In Dadim Ghrita group, patients with cramp symptom showed significant relief following the treatment after 2 months (Table 2a) while the significant relief from this symptom in patients with folic acid group was observed following treatment for three months (Table 2b). In pallor symptom, the significant results were observed after three month treatment while there was no significant symptomatic relief observed in patients of folic acid group. Although there is no significant relief observe in dactylitis symptoms in either of the group, the marginal changes were noticed in Dadim Ghrita group. The results from above table show the superiority of Dadim Ghrita over the folic acid in terms of significant and quick relief from the symptoms of sickle cell anaemia.

The effect of Dadim Ghrita on the diet and appetite (agnimandya) in the patients suffering form sickle cell anaemia is depicted in **Figure 1**. The significant changes were started to appear in first month of treatment with Dadim Ghrita while the significant results were observed only after three months of treatment with folic acid. The same pattern was observed on the health and stamina (daurbalya) of sickle cell anaemic patients (**Figure 2**). All patients with gatra shool (pain) were significantly recovered following 2 months treatment of polyherabal formulation while the significant effect were late (after 3

month treatment) in patients taking folic acid (**Figure 3**). All patients have been recovered from jwar (fever) following dadim ghrita post-treatment for 3 months. Folic acid, on the other hand, unable to provide 100% recovery form jwar in patients at same time period (**Figure 4**). Therapeutic potential of herbal formulation not only effective in above said symptoms but also it has showed significant recovery in some other symptoms like shwas (dyspnea), akshikoot shotha (periorbital edema). These effects were faster and more significant compare to folic acid (**Figure 5 and 6**).

DISCUSSION

Many diseases with their management have been described in the old text of Ayurveda. However with the changes in environmental conditions as well as people's daily life style, many new diseases have been come in existence. Sickle cell disease is one of the examples of such diseases. Although the disease is nowhere described in Ayurveda text, disease with similar sign, symptoms, and similar pattern called pandu roga is already mentioned in the same text. Keeping this in mind, present study was designed to see if Ayurveda treatment can provide the safer therapeutic approach in patients suffering from sahaj pandu disease. For the study, patients were distributed in to various groups according to age, sex and socio economic (data not provided). The results indicated that all the patients were from Annad Avanstha (the child is dependent upon the feeding upon grains cereals, only from 4 to 16 years) while no patients from Ksheerad (children up to 1 year of age) and Ksheerannad avastha (up to 4 year of age). When patients distributed according to age group total 77.27% was male (17 out of 22 patients) and 22.72% patients were female (5 out of 22 patients). When patients distributed according to their socio economic status, most of the patients were form lower age group (68.18%) followed by middle (27.27%) and higher group (4.54%). The data indicates the basic relationship between sex, age, socio economic status with the occurrence of disease. The highest ratio of disease was observed in people with lower class group showing the importance of proper diet and nutrition in food. Since the nutrition value plays the significant role in the aetiology of disease, the most of the patients were in lower class family. Unlike research indicates the higher female up on male ration of this disease, the higher percentage of male patients was observed showing the less awareness of the disease to women. Moreover, the primary goal of the study was to check therapeutic efficacy not to collect statistical survey data on male female ratio of sahaj pandu disease.

Dadimadi ghrita is a medicated ghrita prepared form a decoction of Dadim, Dhanyaka, Chitrak, Pippali, Sunthi, and Ghrita using specific parts and quantity. The medicine has been prescribed for the management of pandu roga chikitsa by Charaka. The ghrita destroys heart disease, jaundice, spleen diseases etc. Due to its deepan karma it increases the strength of Jatharangi. It gives relief from shwas, kas and Mudhavata. Based up on the above properties, the present study was planned to see if the drug provided the therapeutic efficacy in patients suffering form sahaj pandu disease. We also checked the comparative therapeutic efficacy of dadim ghrita with folic acid. Folic acid has been treatment of choice in many blood related disease like anaemia, sickle cell anaemia etc[2,3]. Dadim (*Punica granatum*) is one of the important ingredients of herbal formulation. Many properties of this herb have been described in ayurveda text as well as modern text. Because of amla rasa, it help to increase appetite and digestion, hence it is used in agnimandya (low appetite). Sidhu et al[4] have also reported its medicinal use in some problems like constipation, low appetite, stomach pain, vomiting etc. In addition, it also has other medicinal properties like snigdha (unctuous), deepan (appetizers), pachan (digestive) that make it is one of the useful remedies for the management of disease related to blood purification, and other digestive problems. Because of tikta rasa (bitter), katu rasa (pungent) and ushna veerya (hot potency) properties of dhanyak (*Coriandrum sativum*), it has having antibacterial, antidiarrhoeal, antipyretic activities. Many reports also suggest the same properties of this herbal plant[5,6]. Another ingredient of the formulation is chitrak (*Pulmbago zeylanica*) that has been reported with good antibacterial, antioxidant, blood formation, antidiarrheal activities[7,8]. Chitrak is laghu (light), sheeta veerya (cold, pitta-vatashamak (alleviate vata and pitta dosha) that also make it useful in pain, fever, post fever weakness, acidity, diarrhea etc[9]. In our present study we also observed quick and potent therapeutic effects in sickle cell anaemic patients with symptoms like fever, joint pain, less appetite, weakness, respiratory tract weakness etc that suggest the potent therapeutic efficacy of above said medicinal plants. In addition to this, pippali *(Piper longum)* in dadim ghrita is very well described in ancient ayurveda text. In the sixth kand of Atharva veda, it is labelled as drug for person with multiple and serious wounds and capable of giving life and maintaining vitality. In spleenic disorder, this is one of the best choices of treatment. It is also one of important component of patented drug used for treating sickle cell anaemia[10].

CONCLUSION

Thus present study provides an important data about the efficacy of dadim ghrita on patients with sickle cell anaemia disease. We also checked the comparative therapeutic efficacy of this drug with folic acid. We observed very significant results in terms of fast recovery from symptoms indicative of sickle cell disease. The data from present study also suggest the properties of each ingredient present in dadim ghrita. In our knowledge there is no treatment available that provides quick and significant recovery in sickle cell anaemic patients. In this context, the data of present study shows the importance of our drug in such symptoms.

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Table 1: Grading of different sign and symptoms according to the severity of disease

Grading Range	Symptoms (Normal to severe)
0-1	Glossiness and cyanosis of the skin at the root of the nail
0-4	Abdominal pain
0-4	Body temperature from normal to 107'F
0-4	Shwas
1-2	Exertional dyspoes
0-4	Hamoglobin level
0-4	Joints pain

Table 2a: Time dependent therapeutic efficacy of Dadim Ghrita on of the sickle cell anaemic patient with different symptoms

Symptoms	Groups	Before treatment	After one month	After two months	After three months
Pindikodveshtan (Cramps)	Dadim Ghrita	2.09 ± 0.28^{a}	1.72 ± 0.27^{a}	1.09 ± 0.21^{b}	0.27 ± 0.14^{b}
Nakha-Netra shwetata (Pallor)	Dadim Ghrita	1.72 ± 0.23^{a}	1.45 ± 0.16^{a}	1.27 ± 0.14^{a}	0.54 ± 0.16^{b}
Dactylitis	Dadim Ghrita	0.45 ± 0.15^{a}	0.45 ± 0.15^{a}	0.45 ± 0.15^{a}	0.18 ± 0.12^{a}

Table 2b: Time dependent therapeutic efficacy of folic acid on of the sickle cell anaemic patient with different symptoms

Symptoms	Groups	Before treatment	After one month	After two months	After three months
Pindikodveshtan (Cramps)	Folic acid	1.45 ± 0.16^{a}	1.45 ± 0.16^{a}	1.18 ± 0.12^{a}	0.54 ± 0.16^{b}
Nakha-Netra shwetata (Pallor)	Folic acid	1.27 ± 0.14^{a}	1.27 ± 0.14^{a}	1.27 ± 0.14^{a}	1.00 ± 0.19^{a}
Dactylitis	Folic acid	0.18 ± 0.12^{a}	0.18 ± 0.12^{a}	0.18 ± 0.12^{a}	0.18 ± 0.12^{a}

Values are mean ± Standard error (SE); ^{a,b} differences between values with matching symbol notations within each row are not statistically significant at 5% level of probability.

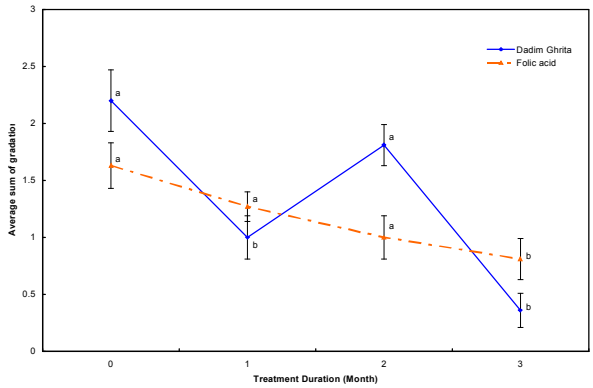

Figure 1: Therapeutic efficacy of dadim ghrita in patients with agnimandya (loss of appetite) symptom. Values are mean ± Standard error (SE); a,b differences between values with matching symbol are not statistically significant at 5% level of probability.

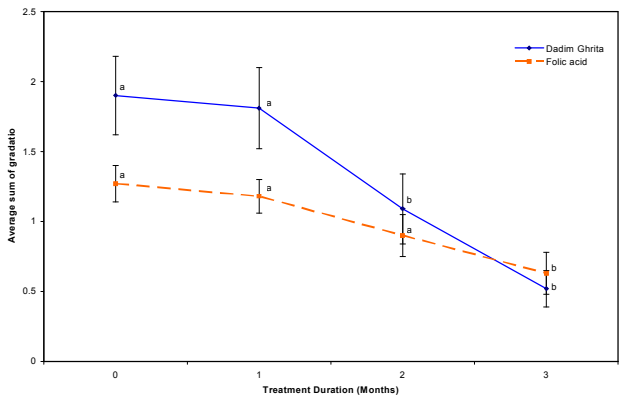

Figure 2: Therapeutic efficacy of dadim ghrita on daurbalyata in sickle cell anaemic patients. Values are mean ± Standard error (SE); ^{a,b} differences between values with matching symbol are not statistically significant at 5% level of probability.

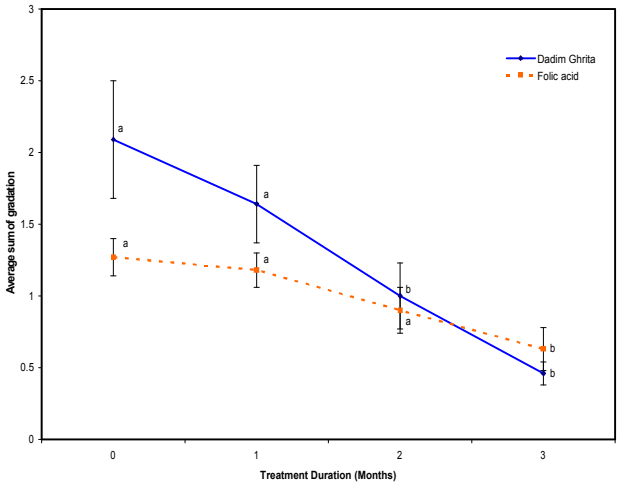

Figure 3: Therapeutic efficacy of dadim ghrita in patients with gatra shool (pain) symptom. Values are mean ± Standard error (SE); [a,b] differences between values with matching symbol are not statistically significant at 5% level of probability.

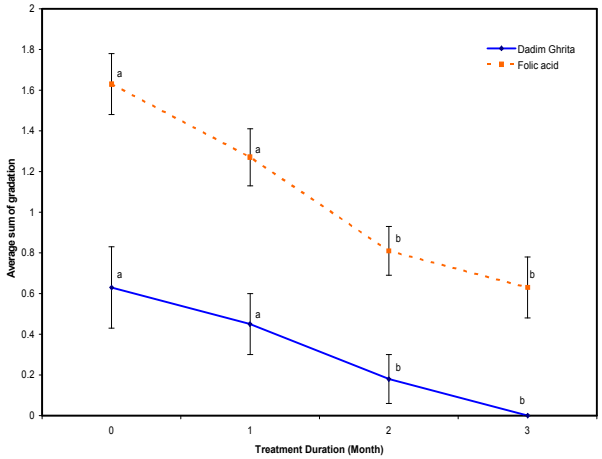

Figure 4: Therapeutic efficacy of dadim ghrita in patients with jwar (fever) symptom. Values are mean ± Standard error (SE); [a,b] differences between values with matching symbol are not statistically significant at 5% level of probability.

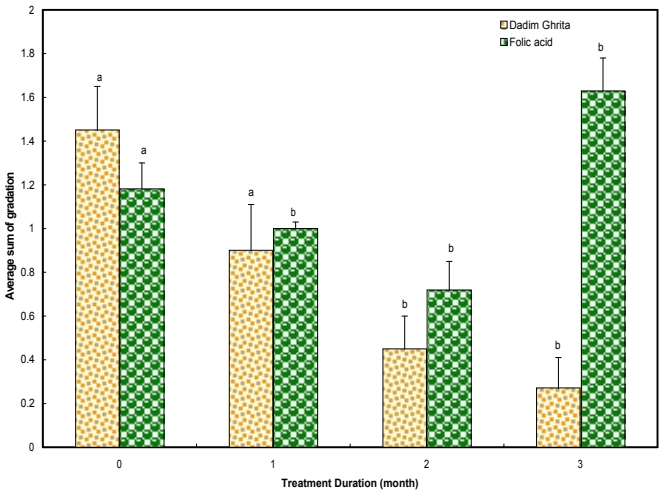

Figure 5: Therapeutic efficacy of dadim ghrita in patients with Shwas (dyspnea) symptom. Values are mean ± Standard error (SE); [a,b] differences between values with matching symbol are not statistically significant at 5% level of probability.

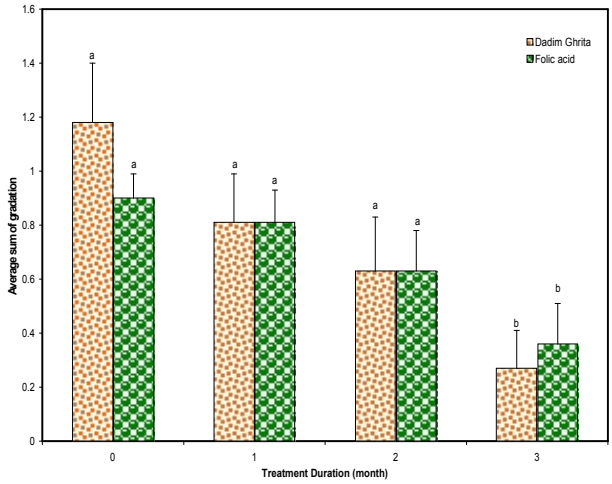

Figure 6: Therapeutic efficacy of dadim ghrita in patients with akshikoot shotha (periorbitl oedema) symptom. Values are mean ± Standard error (SE); [a,b] differences between values with matching symbol are not statistically significant at 5% level of probability.

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