

Case Study

Clinical Study on the Effect of Swarnamritaprashana (Modified Swarna Prashana) on Immunity (IgG) in Children of 3 to 5 years

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A B S T R A C T

Background: Owing to reduced immunity, more children are becoming prone to various recurrent infections especially upper respiratory tract infections, lower respiratory tract infections and gastro intestinal tract infections. Swarnamritaprashana has been practiced for many years in many institutions throughout India, and it has been proved that regular administration of Swarnamritaprashana improves immunity. That is the reason this study was taken to evaluate the effect of Swarnamritaprashana on immunity [IgG] in children of 3 to 5 years.

Materials and Methods: 60 Children, fulfilling the inclusion criteria and willingly participating under the parental assent between the age group 3 and 5 years, were recruited and were allocated into two groups (Study Group, Control Group), each consisting of 30 children in which study group children were recruited from Swarnamritaprashana Program on every Pushyanakshatra day at Shree Dharmasthala Manjunatheshwara College of Ayurveda, Hassan, and control group children were recruited from different Anganwadis of Hassan. The 30 children in the study group were administered with Swarnamritaprashana for continuous nine Pushyanakshatra day while another 30 children in control group were not given any medication. Routine blood investigations were done in order to rule out the secondary conditions and IgG levels were also accessed for immunity before and after intervention. General health was also accessed on the basis of recurrent infection episodes.

Results: Positive results were seen in the study group while number of recurrent episodes of infection showed a decreasing trend while control group showed an increasing trend. Accelerated growth (anthropometry) was more seen in study group than in control group. Levels of IgG were also seen in near normal range after nine months in study group.

Conclusion: Swarnamritaprashana helps in modulating the immunity.

Keywords: Swarnamritaprashana, Immunity, Modified Swarna Prashana

Introduction

In a world filled with pathogens and microbes, good health, and resistance to disease is not an accident. It requires a vigorous vigilant immune system to keep the body free from pathogens.¹

Because of low immunity, children are more prone to various recurrent infections.² The contributing factors include polluted environment, improper food habits and improper activities. The specific features of a child like Soukumaryata, Aparipakwa Dhatu, Asampurna Bala, Kleshahishnutwa³ which makes him/ her subject for special consideration. Also, incidence of newly emerging infectious disease has increased in the past years and could increase in the near future. Drug resistant organisms are creating their own havoc in the general health of the children. The use of human pathogens as weapons has created a fear of bioterrorism, which can stop the growth of any country. So, it is the need of the hour to find out other solutions to this burning issue instead of developing vaccine for each organism which is impractical. These factors, indicates the lower immune status of the child that makes him/her more susceptible for repeated infections. So, our main aim is to improve the immunity and to prevent any such diseases to child so that it does not affect their growth and development further.

Primary aim of Ayurveda is the promotion of health and prevention of diseases. Ayurvedic medicines are of greater value in combating and preventing many diseases of modern era. Gold is one of the noble metals being used in continuity to increase the vitality and immunity.⁴ The antioxidant and restorative effects of Swarna Bhasma in rats have recently been demonstrated.⁵

Swarnaprashana is one of the Lehana (licking) procedure mentioned in Kashyapa Samhita along with Jatakarma. Swarnamritaprashana,⁶ which is an adaptation of Swarnaprashana, is practiced in SDM Ayurveda College, Hassan, by administering it monthly once and has receiving good response from the society.

The proposed Swarnamritaprashana Lehana comprises *Svarna* (gold), *Madhu* (honey) and *Ghrita* (ghee) along with few drugs. Benefits out this are *Medha Vardhana* (promoting intelligence), *Agni Vardhana* (promoting digestive power), *Bala Vardhana* (increasing physical strength & vigour), *Punya* (reward), *Ayushakaraka* (promoting longevity), *Varnya* (improves complexion), *Garhapaham* (protection against infections/ organisms).⁷

Modern vaccination techniques are organism specific and are of a great help in prevention of many infectious disorders. But the Ayurveda drugs in the form of *Rasayana* (rejuvenation) like Swarnamritaprashana exhibit nonspecific but more holistic effects as it boosts the general immunity

and host resistance apart from improving overall general health.

Objectives of the Study

- To evaluate the effect of monthly administration of Swarnamritaprashana on Immunity (IgG) and haematological parameters
- To evaluate the effect of monthly administration of Swarnamritaprashana on measures of morbidity
- To evaluate the effect of monthly administration of Swarnamritaprashana on general health of children

Materials and Methods

Ethical Considerations

Ethical clearance was obtained from the institutional ethics committee (IEC) of SDM College of Ayurveda and Hospital, Hassan, Karnataka (IEC No: SDM/IEC/54/2014-2015). Informed assent was obtained from the parents before registering the child for the trial.

Source of Data

Study Group: Children attending Swarnamritaprashana Program on every Pushya Nakshatra day at Shree Dharmasthala Manjunatheshwara College of Ayurveda, Hassan.

Control Group: Children of different Anganwadis of Hassan.

Inclusion Criteria

- Healthy children of age group 3 to 5 years, irrespective of gender, religion, and socio economic status
- Parents who were consciously willing to participate their children in the study and ready to sign the informed consent (Assent) form
- Children who were receiving Swarnamritaprashana for 1st time

Exclusion Criteria

Children who were already receiving Swarnamritaprashana and suffering from any congenital illness, congenital anomalies, and diagnosed case of systemic illness.

Diagnostic Criteria

Healthy child volunteer Those children who fulfilled eligibility criteria and were consciously willing to participate in the study were selected and allocated into two groups.

Group A- (Study Group)

Study Group: Subjects received 4 drops of Swarnamritaprashana, equivalent to 2 mg of Swarnabhasma once in a month. It will be repeated for nine consecutive months.

Group B- (Control Group)

No drug will be given for subjects in this group.

Preparation of Medicine

4000 ml of Kashaya of Guduchi green stem (reduced to quarter) was taken and 1000 ml of ghee along with Kalka of Brahmi, Vacha, Jatamamsi, Yashtimadhu, Ashvagandha, Shankpushpi, Pippali Choorna (40 gm each), heated on low temperature according to Madhayam Paka by Snehapaka Vidhi with reference to Sharangadhara Samhita. At the time of administration, 1.2 gm of Swarna Bhasma added to whole material, 50 ml of honey were added and triturated with 50 ml of material. To maintain a consistency, hot water bath was given to Swarnamritaprashana before adding honey.⁶

Dose

- 4 drops of Swarnamritaprashana, (equivalent to 1.2 mg of swarnabhasma)
- **Route:** Oral
- **Duration of Study:** 9 months

Assessment Criteria

Assessment of effect of treatment was done based on the following parameters.

Subjective Parameters

- Measures of morbidity (RTI, GITI)
- Parental feedback on general health of child

Objective Parameters

- Anthropometry for height, weight, chest circumference, mid-arm circumference
- **Laboratory Parameters:** Complete Blood Count
- **Immunoglobulin Test:** IgG

Parameter related to general health and anthropometry were assessed on every month on the day of administration of Swarnamritaprashana.

Statistical Analysis

Data was collected using case report designed by

incorporating all aspects (Ayurveda & modern medicine) for the study. Such collected data was tabulated and analyzed using SPSS (Statistical package for social sciences) version 20 and analyzed using appropriate statistical test.

Nominal and ordinal data was analyzed using non-parametric tests like Friedman's test, Wilcoxon sign rank test as post hoc after applying Bonferroni correction.

Cumulative scores (numerical) of Hamilton's Depression rating scale and self-prepared scale was analyzed using parametric test like repeated measure ANOVA with paired t test as post hoc test. The changes (one tailed) with p value < 0.05 were considered as statistically significant.

Results

Children registered for this study were 60 in which 30 children were enrolled in Study Group, in that 19 completed the treatment with blood sample and 11 completed without giving blood sample and 30 children were enrolled in control group, in which 12 completed the treatment with blood sample and 16 completed without giving blood sample. The Study Group was administered with Swarnamritaprashana and Control Group was not given any drug.

Comparison within the Group

Nine consecutive months of administration of Swarnamritaprashana showed 59% improvement on episodes respiratory tract infection after the treatment which was statistically significant at p value < 0.001, where as control group (p value < 0.001) showed increased episodes of respiratory tract infection (Table 1).

Administration of Swarnamritaprashana showed 47% improvement in gastro-intestinal Tract (GIT) infection after the treatment which was statistically significant at (p value < 0.001), where as control group (p value < 0.001) showed increased episodes of GIT infections (Table 2).

Table 1. Effect of Swarnamritaprashana on RTI

Group & Pair			Mean	Std. Deviation	T	Sig. (2-tailed)
Study	Pair 1	No. of episodes of RTI in last 6 months - Total RTI AT	1.13333	1.35782	4.572	.001
Control	Pair 1	No. of episodes of RTI in last 6 months - Total RTI AT	-2.13333	1.71672	-6.806	.001

Table 2. Effect on Episodes of Gastro-intestinal Tract Infection

Group & Pair			Mean	Std. Deviation	T	Sig. (2-tailed)
Study	Pair 1	No. of episodes of GITI last 6 Month - Total episode of GITI AT	0.400000	.96847	2.262	.001
Control	Pair 1	No. of episodes of GITI last 6 Month - Total episode of GITI AT	-1.0000	.74278	-7.374	.001

Table 3. Effect on IgG Levels

Group & Pair			N	Mean	Std. Deviation	T	P value
Study	Pair 1	Investigation IgG BT Investigation IgG AT	19	722.95455	1053.10161	3.220	0.004
Control	Pair 1	Investigation IgG BT - Investigation IgG AT	12	-290.000	779.32022	-1.234	0.245

Table 4. Effect on Weight

Group	Source/ Parameters		F	Sig	Partial Eta Squared
Control	Weight	Sphericity Assumed	40.024	0.001	0.580
		Greenhouse-Geisser	40.024	0.001	0.580
Study	Weight	Sphericity Assumed	133.799	0.001	0.822
		Greenhouse-Geisser	133.799	0.001	0.822

Administration of Swarnamritaprashana showed 33.16% improvement on IgG levels after the treatment, which was statistically significant with value = 0.004 whereas in control group it was non-significant with p value 0.245 (Table 3).

Discussion

Astanga Hrudaya says Swarna Prashana benefits in increasing the Medha, Aayu and Bala.

In Susruta Samhita, we also get information about its role in development of a child both physically and mentally. Acharyas have mentioned about increase in Bala which is considered as Vyadhikshamatva (immunity) in present context.

Swarnamritaprashana is a herbomineral formulation which is a modified form of likable preparation of Svarnaprashana, providing a wholesome care for growing children, since birth to 16 years of age which is practiced in SDM College of Ayurveda in Hassan since the year 2009. It is a way of boosting the immunity and preventing diseases.

There are several published literatures of the Swarnamritaprashana supporting its immunopromotive action.

Effect on Episodes of Respiratory Tract Infection

- Administration of Swarnamritaprashana showed 59% improvement with decreasing trend of repeated infections was seen from 6.23 to 4.10 making the difference of 2.13 episodes which was statistically significant at p value <0.001, whereas in control group there was no improvement after the treatment (p value <0.001), but there were increased episodes from 6.37 to 8.50

Effect on Episodes of Gastro-intestinal Tract Infection

- Administration of Swarnamritaprashana showed

65% improvement with decreasing trend of repeated infections seen from 1.03 to 0.63 making the difference of 0.40 episodes, showing better aspect which was statistically significant at p value <0.001, whereas in control group there was no improvement after the treatment (p value <0.001), and it showed increased episodes from 0.96 to 1.97 rising to average 1.01 episode

- In study group, if results were to be seen for 6 months, before intervention, no of episodes were 1.03 and after intervention which got reduced to 0.42 episodes, making difference of 0.61 years. This shows the role of Swarnamritaprashan in modulating the immunity. In control group, when results were seen for 6 months before intervention number of episodes was 0.96 and after 6 months number of episodes was approximately 1.31 episodes
- Here, the reduction in number of recurrent episodes can be attributed to effect of Swarnamritaprashana in study group which might have boosted the immune system, with its ability to modulate the immunity so that recurrent episodes were reduced

Effect on IgG

- Normal reference range of total IgG for children aged 3 to 5 years was 280 to 1108 mg/dl. In both the groups, before treatment total IgG levels were much greater than normal range (study group 1947.73; control group 2181.82). This shows a hyperactive immune system which was probably because of recurrent infections not letting IgG levels to reach basal levels
- In post-treatment scenario, study group showed a steep reversal trend, where the levels reached near normal (1224.77 mg/dl) with a mean decrease of 722.95 mg/dl; the change was statistically highly significant with a p value of 0.004. While in control group, post-treatment assessment of IgG showed mean increase of 290 mg/

dl with total IgG level of 2471.82; this increase was statistically non-significant with p value of 0.245

- This shows that the administration of Swarnamritaprashana is responsible for reduction of above normal Ig G levels in circulation near to normal which is probably due to an increased immunological competence and due to reduced recurrent infections in the children of study group. On the other hand, control group in which no medication was given, showed increased level of recurrent episodes which resulted in increased value of IgG levels.

Effect on Anthropometry

Here, the anthropometric data shows that growth was better in study group in duration of 9 months by comparing the total mean of value (Table 5).

Table 5. Mean Comparison of Anthropometry within Group

Parameters	Control Group	Study Group
Weight	0.657	0.9943
Height	3.1923	3.8395
HC	0.4910	0.5770
CC	1.0900	1.1516

Weight: Even though in both the groups significant result was observed with the p value 0.001 but, in study group, total mean weight gain was more (0.9943 kg) if compared to control group (0.6570 kg). If compared between groups, the mean difference of the groups at different treatment levels for variable weight indicate that study group has marginally more gain in weight than control group.

Height: In both the groups, significant result was observed with the p value 0.001 but in study group total mean height gain was more (i.e., 3.8395 cm) if compared to control group (i.e., 3.1932 cm) If compared between groups. The mean difference of the groups at different treatment levels for variable height indicated that study group had marginally more gain in height than control group.

Head Circumference: Even though in both the groups significant result was observed with the p value 0.001 but in study group total mean head circumference gain was more (i.e., 0.5770 cm) while in control group it was 0.49100 cm.

Chest Circumference: In both groups, significant result was observed with the p value 0.001 but, in study group, total mean cc gain was 1.1516 cm while in control group it was 1.09001 cm.

Results show that even control children improved in this parameter, but the study group showed better growth, this can be attributed to Swarna Bhasma, Ghrita and Madhu which are the main ingredients of Swarnamritaprashana,

having Madhura Vipaka, Sheeta Virya, and Rasayana properties, which helps to attain normal growth in significant level, and it may be due to the dietary and habits advice given to parents during follow up.

How Improved Immunity Changes the Growth Pattern

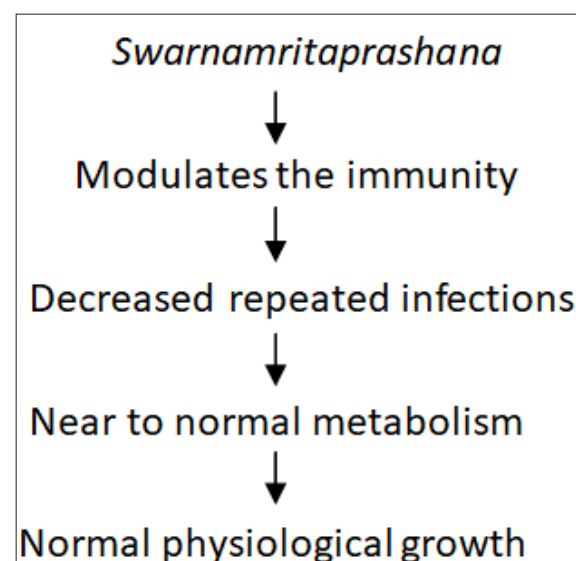
- As it is known that infection decreases nutrient intake and increase nutrient loss which includes decreased intestinal absorption, direct loss of nutrients in gut, internal diversion for metabolic responses and increased BMR. There is more catabolism than anabolism. This interaction between the nutrition and infection is synergistic as it not only worsens the nutritional status but also the resistance to infection is reduced which can lead to recurrent infection or any complication
- Decreased episodes due to Swarnamrita Pprashana affect growth rate by improving nutritional availability to the body and there is shift towards more anabolism than catabolism. Here, we can have an idea about an average about the energy loss during respiratory and gastrointestinal illness (Table 6)

Table 6. Energy Losses in Children Suffering from Illness

Symptoms	Energy (Kcal/ day) average	Protein (g/ day) average
Respiratory illness	67	1.0
GITI(diarrhea)	160	3.0

Table 6 shows the energy losses in children if they are suffering from illness.

Probable Action of Swarnamritaprashana is as Follows



Mode of Action

The main ingredient of Swarnamritaprashana is Svarnabhasma, it is said to be Uttarottara Dhatuposhanakara which thereby does Ojovardhana, improving the Vyadhikshmatwa of a person.

Ghrita, Madhu, and Swarna Bhasma altogether help to pacify Pitta and keeps the Pitta in normal state which mainly contributes to maintenance of all types of Agni thereby helps in Uttarottara Dhatuposhana leading to Ojovrudhi as it is the Tejobhaga (essence) of all the shukraadi Dhatus. Guru, Snigdha, Sheeta Guna helps in pacifying the Vata and nurtures the Kaphadosha, as Kaphadosha functions as Baala in Prakruta Avastha, and it is also required for Preenana and Samhanana of Rasadi Dhatus of the body which is very essential in Baala who are with Asampoorna Dhatu. Vata, Pittashamaka property of Ghrita helps to maintain the Prakrita Kapha in Balyavastha. Other Karmas of Ghrita include Indriya Balavridhikara, Rasayana, Agnivaradhaka, Kantivaradhaka, Buddhivaradhaka. Ghee (unlike other oils) is rich in butyric acid (a short chain fatty acid). When taken internally, beneficial intestinal bacteria convert fiber into butyric acid, it is used for energy and intestinal wall support.

Research shows adequate production of butyric acid supports the production of killer T cells in the gut, and thus helps in generating strong immune system in the body. Researches have shown that gold nano-rods were successfully found to increase protection from RSV which is leading viral cause of lower respiration tract infections, when experiment was done in a lab.⁸

In another study it was stated that GNP uptake into cells of the immune system activates the production of pro-inflammatory cytokines, a finding which indicates directly that GNPs are immunostimulatory.⁹ Traditional preparations of gold have also shown the immunostimulant activity on macrophage functions. Kustha Tila Kalan (KTK), a Unani-Tibb preparation containing gold is claimed to possess general tonic, rejuvenating, and immunomodulatory properties.¹⁰

Gold Nanoparticles conjugated with antigens were found to influence activation of T-cells (an increase in proliferation by a factor of 10 compared to that upon the addition of the native antigen). This fact shows that the targeted activation of T-cells (For example, by antigens of Mycobacterium tuberculosis, HIV, etc.) followed by activation of macrophages and pathogen killing is possible, in principle, which holds considerable promise for the design of new generation vaccines.

Conclusion

The final assessment concluded that Swarnamritaprashana was effective in reducing the recurrent episodes of infection from 6.23 to 4.10 making the difference of 2.13 episodes in

RTI and reducing the episodes from 1.033 to 0.63 making the difference of 0.403 episodes in GITI. Swarnamritaprashana also strengthens the immune system of the body that was also supported by laboratory investigation, which showed the improvement in IgG levels in study group. It has also showed accelerated growth, when the mean of the anthropometric values were compared.

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