Published online in http://ijam. co. in
ISSN: 0976-5921
International Journal of Ayurvedic Medicine, 2014, 5 (3), 269-277

To Study the effect of *Swarna Prashan* on Physical Growth Parameters of Weight and Height in Children

Research article

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Abstract

In Ayurveda *Swarna Prashan* (SP) is quoted to be effective in increasing intelligence, strength and potency to longevity. This study aims to observe effect of SP on physical growth parameter weight and height. Total 120 children were selected randomly from outpatient department (OPD) with age group ranging from 0 to 12 years. SP as trial drug and *madhu jala* as placebo was administered in children of trial group and control group respectively, for 14 times in duration of 1 year. Growth parameter weight and height was assessed on every visit of children. It is found that SP has significant($p<0.05$) result in weight gain of male and female children in relation with control group as well as standard group (book value) while SP has no significant($p>0.05$) effect on height in male and female children in relation with standard group.

Key words: Ayurveda, Height, *Swarna Prashana*, Weight

Introduction

Infant or childhood is the growing state of life. Good health in this state gives strong foundation to the future building of life. Proper growth is observed by their physical characters like anthropometry and physiosocial development. Growth is an increase in physical size of whole or any of its part and can be measured in inches/centimeter and in pounds/kilograms. There are many factors influencing the rate of growth like inadequate nutrition, physical hyperactivity, lack of adequate rest, physical illness and emotional illness which cause increase in nutritional need but at the same time result in poor appetite and poor absorption. Such situations during rapid growth period and critical period of development have a temporary or permanent delaying effect on the achievement of normal growth and development (1). Ayurveda science is more concerned for better life by preventive and supportive measures for pediatric age group. *Aacharya* Kashyap stated that healthy and unhealthy condition depends on the *lehana*. (2) *Aacharyas* have mentioned four *swarna yogas* for proper growth and development of child. In all the four *yogas swarna* (gold), ghee and honey are present. (3). As *swarna* is the main ingredient of this *leha*, it is named as *Swarna Prashan* (SP) (4). It is an ancient process of administering *swarna* and other useful medicines through oral route in

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children for better health and prevention from many diseases. *Acharyas* have mentioned the benefits of SP. They have stated that regular use of SP helps to sharpen the memory to its extreme level, help in proper growth and development and prevent from diseases (5). Through this article researchers wants to evaluate the effect of SP on physical growth parameter weight and height in order to improve general health condition of children.

Aims and Objectives

- To study the effect of *Swarna Prashan* on physical growth parameter weight and height.
- To improve the general health condition of children.

Materials and Methods

Total 120 children consisting 60 male and 60 female genders were selected randomly from the college OPD of *Kaumarbhritya,* after taking permission from institutional ethical committee and oral consent from their parents. General examination of each child was carried out to rule out deformity as per hospital case paper, those children were selected only who fulfill the inclusion criteria. This clinical study involved two main groups divided into two sub groups for drug intervention and one standard group.

1. Trial group - comprises two sub groups, male trial group and female trial group of 30 children each was administered orally with SP for 14 times on every 27th day of month throughout year.
2. Control group - comprises two sub groups, male control group and female control group of 30 children each was administered orally with *madhu jala* for 14 times on every 27th day of month throughout year.
3. Standard group - contains the standard required measurement for weight and height according to age and gender as mentioned in text book. (6)

Inclusion criteria

- Children irrespective of gender up to the age of 12 years.
- Symptom free child during first general clinical examination.

Exclusion criteria

- Child suffering from any congenital disease.
- Child was irregular for intervene scheduled.
- Children were rejected, whose parent denied to comply with protocol.

Formulation of SP as per traditional method

Contents

Swarnabhasma 10 mg, *vacha ghana* 2 gm, *kushta ghana* 2 gm, cow's ghee 5 gm, honey 25 gm. (7)

Preparation

Swarnaprashan (SP) was prepared in *rasashala* of institute under all aseptic precaution. Preparation involved the mixing of honey and cow ghee till the formation of homogeneous mixture. Then *vacha ghana, kushta Ghana* and *swarnabhasma* was added to this mixture, then mixture was again triturated until the formulation becomes homogeneous. Besides this formulation of madhu jala (honey water) was done and stored in sterilized glass bottle.

Dose of SP

Dose of SP was decided on the basis of quantity of *swarnabhasma* 1 mg/kg body weight. SP was given on *pushya nakshatra* of followed on every 27th day. Such 14 dose of SP was given to children of trial group. Similarly control group was treated with *madhu* jala. On every visit each child was examined for weight and height.

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Instruments required

Infantometer, stediometer and electronic weighing machine.

Method for assessment of weight and height

1. Assessment of weight
   a. Weight of infant and neonates was measured with infant weighing machine, keeping the child in supine position on the measuring pan and weight was recorded.
   b. Weight in children older than 1 year was measured with electronic weighing machine. Children were standing without shoes in straight posture on the weighing machine and weight was recorded.

2. Assessment of height
   a. Height of neonates and infants was measured by infantometer. Infant was placed with the top of the head against the fixed head board of the measurement device and with the eye-ear plane perpendicular to the base of the device. Child's knees must be flat against the table and the foot boards moved until the soles, of the feet, are against it, with the toes pointing up.
   b. Height in children older than 2 years was measured with stediometer. Children were being measured without shoes while standing against the vertical plane to which the measuring tape is attached. The Childs heels buttocks, shoulder, and back of the head was touching the wall. The eye-ear plane was perpendicular to the wall and the feet, including the heels, was be flat on the floor. With the child in this position, the right angle device was lowered until it touches the top of the head, and the height is recorded.

Observation and Result

Table 1 - Statistical analysis of weight gain in male children after 1 year

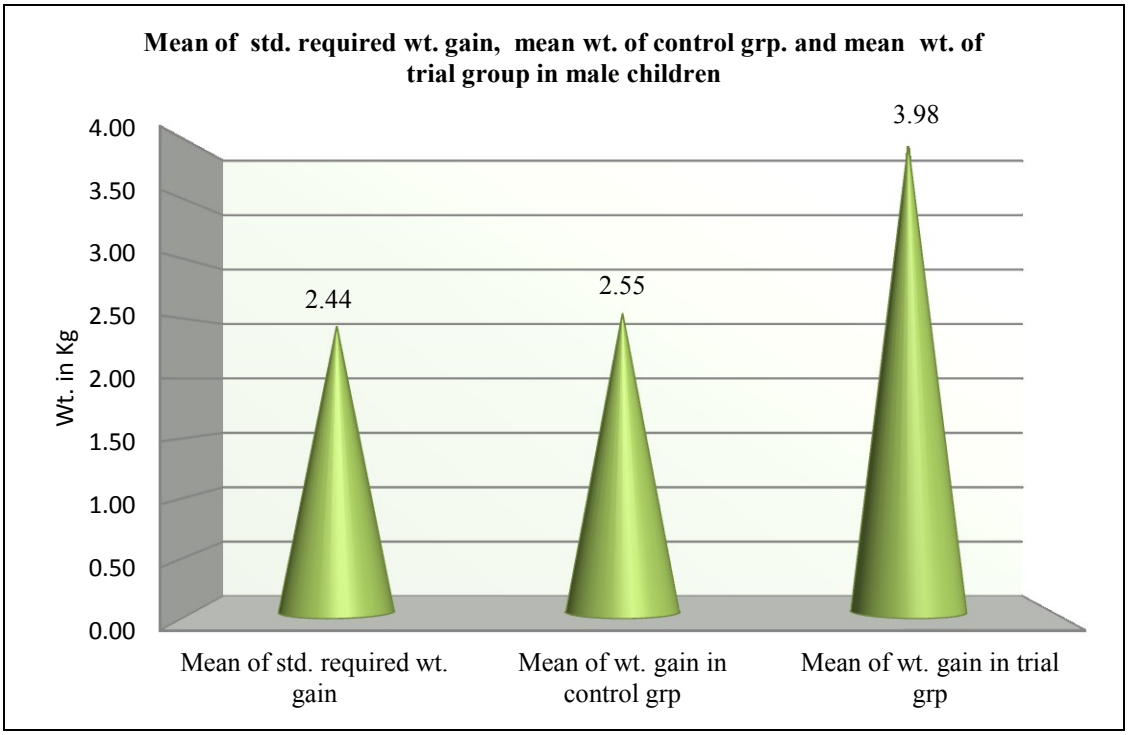
	Average 1	SD	SE	T	p value
Trial group	3.98	1.49	0.27	14.57	$p<0.05$
Control group	2.55	1.09	0.20	12.83	$p<0.05$
Standard group	2.44	1.19	0.22	11.18	$p<0.05$

Weight gain in male children in of trial group and control group are significant ($p<0.05$). analyzed by pair t- test (Table 1).

Table 2 - Statistical analysis of weight gain in male children of trial group and control group with standard group after 1 year

	Average 1	Average 2	SD 1	SD 2	SE	T	p value
Trial group & Standard group	3.98	2.44	1.49	1.19	0.35	4.42	$p<0.05$
Control group & Standard group	2.55	2.44	1.09	1.19	0.30	0.37	$p>0.05$

When trial group and control group of male analyzed with standard group; it is observed that weight gain in trail group is significant ($p<0.05$) while weight gain in male control group is not significant ($p>0.05$) analyzed by unpair t- test (Table 2).



Graph 1 - Average weight gain of weight gain in male children of trial group and control group with standard group after 1 year

Table 3 - Statistical analysis of weight gain in female children after 1 year

	Average 1	SD	SE	T	p value
Trial group	6.37	1.55	0.283	22.50	P<0.05
Control group	4.28	1.12	0.21	20.87	P<0.05
Standard group	3.89	1.70	0.31	12.50	P<0.05

Weight gain in female children in one year in trial group and control group are significant ($p<0.05$) analyzed by pair t- test. (Table 3)

Table 4 - Statistical analysis of weight gain in female children of trial group and control group with standard group after 1 year

	Average 1	Average 2	SD 1	SD 2	SE	T	p value
Trial group & Standard group	6.37	3.89	1.55	1.70	0.42	5.907	P<0.05
Control group & Standard group	4.28	3.89	1.12	1.7	0.37	1.05	P>0.05

When trial group and control group of female analyzed with standard group; it is observed that weight gain in trail group is significant ($p<0.05$) while weight gain in female control group is not significant ($p>0.05$) analyzed by unpair t- test. (Table 4)

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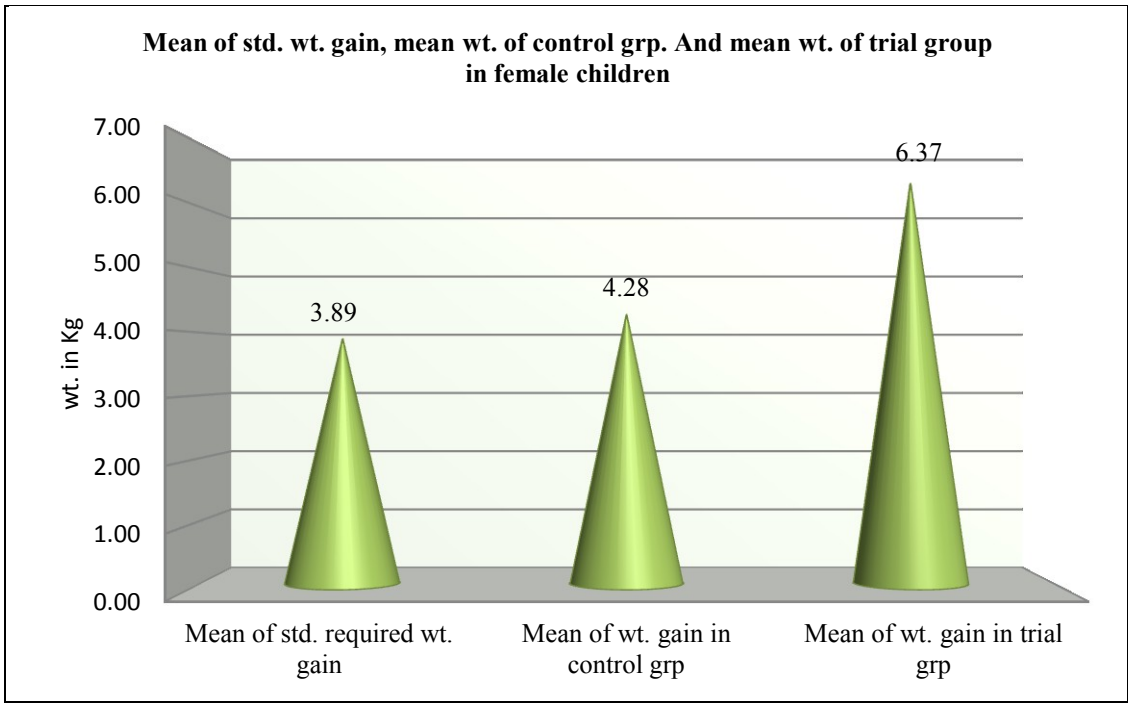


Graph 2 - Average weight gain in female children of trial group and control group with standard group after 1 year

Table 5 - Statistical analysis of height gain in male children after 1 year

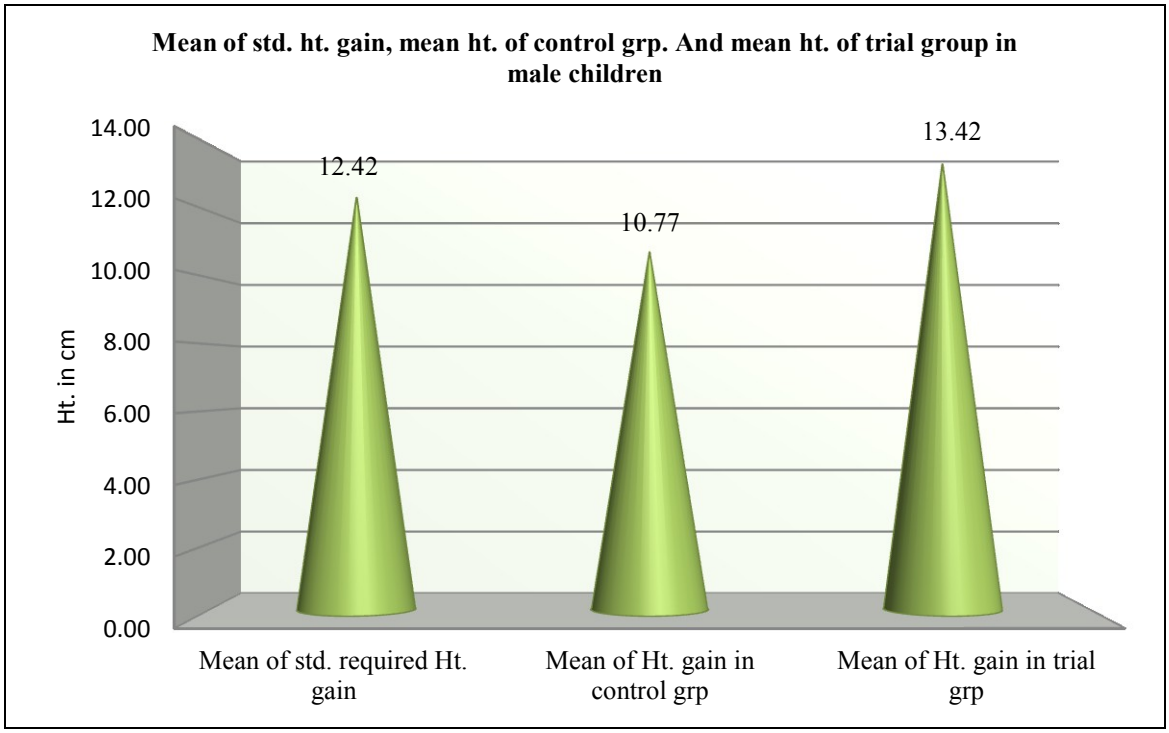
	Average 1	SD	SE	T	p value
Trial group	13.42	6.05	1.11	12.14	P<0.05
Control group	10.77	4.63	0.85	12.72	P<0.05
Standard group	12.42	3.83	0.70	17.75	P<0.05

Height gain in male children in one year in trial group and control group are significant (p<0.05) analyzed by pair t- test. (Table 5)

Table 6 - Statistical analysis of height gain in male children of trial group and control group with standard group after 1 year

	Average 1	Average 2	SD 1	SD 2	SE	T	p value
Trial group & Standard group	13.42	12.42	6.05	3.83	1.31	0.765	P>0.05
Control group & Standard group	10.77	12.42	4.63	3.83	1.10	1.504	P>0.05

Trial group and control group of male analyzed with standard group; it is observed that height gain in both group is not significant (p>0.05) analyzed by unpair t- test. (Table 6)



Graph 3 - Average height gain in male children of trial group and control group with standard group after 1 year

Average height gain in male trial group is observed slightly more as compared to the standard group while average height gain in male control group observed much less than standard group. (Graph 3)

Table 7 - Statistical analysis of height gain in female children after 1 year

	Average 1	SD	SE	T	p value
Trial group	15.87	3.11	0.57	27.91	P<0.05
Control group	11.43	3.50	0.64	17.86	P<0.05
Standard group	13.64	5.69	1.04	13.11	P<0.05

Height gain in female children in one year in trial group and control group are significant (p<0.05) analyzed by pair t- test. (Table 7)

Table 8 - Statistical analysis of height gain in female children of trial group and control group with standard group after 1 year

	Average 1	Average 2	SD 1	SD 2	SE	t	p value
Trial group & Standard group	15.87	13.64	3.11	5.69	1.18	1.88	P>0.05
Control group & Standard group	11.43	13.64	3.5	5.69	1.22	1.81	P>0.05

Trial group and control group of female analyzed with standard group; it is observed that height gain in both group is not significant (p>0.05) analyzed by unpair t- test. (Table 8)

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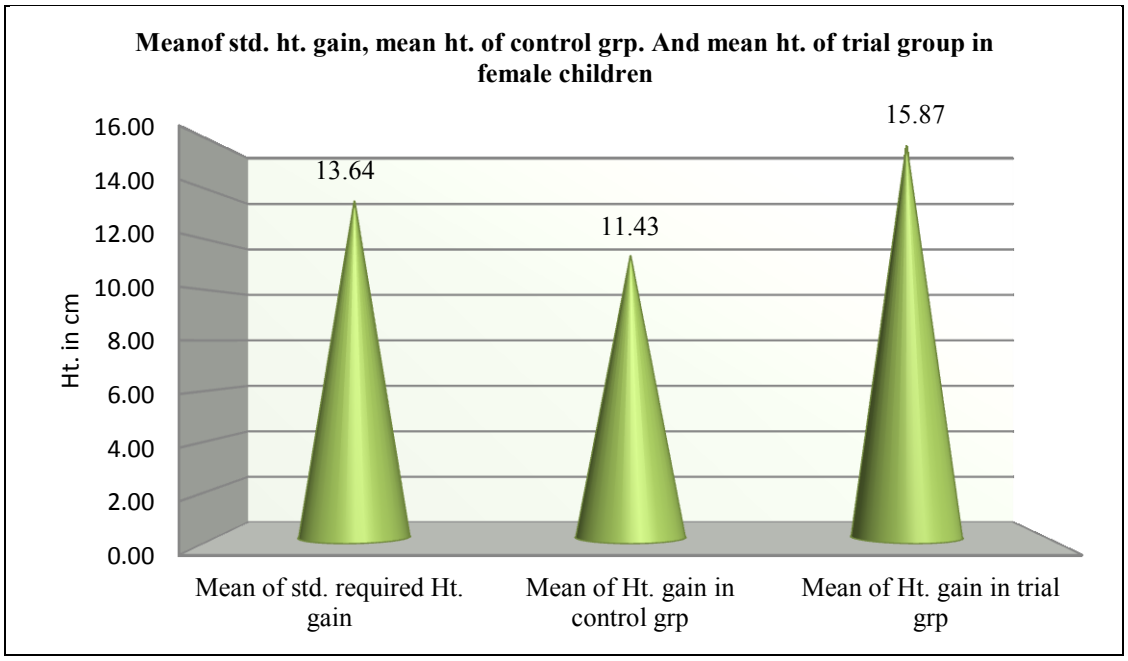

Graph 4 - Average height gain in female children of trial group and control group with standard group after 1 year

Average height gain in female trial group is observed slightly more as compared to the standard group while average height gain in female control group observed less than standard group. (Graph 4)

Discussion

Children were assessed properly for weight and height in the beginning of the study then subsequently examined on every twenty seventh day and record was documented properly. At the end of observation total gain was calculated and compared with standard gain according to age.

Pair t – test is used to show significant weight and height gain in trial group, control group and standard group of male and female in duration of one year as $p<0.05$ (Table 1, 3, 5 and 7) means there is increase in weight and height of children of each group.

Unpair t – test is used to analyze effective weight and height gain among these three groups. It is found that weight gain in trial groups of male and female is significant as compared to control and standard groups. (Table 2 and 4) While it is observed that there is no significant effect on height parameter of male and female trial group in comparison with standard group. (Table 6 and 8)

Properly made *swarna bhasma* is *sheet* (cold) in *virya*, *madhura* (sweet) in *vipak* and *madhur* (sweet), *tikta* (bitter), *kashaya* (astringent) in rasa. It provides *bala* (strength) to the body. It shows *brumhana karma* (bulk promoting action), which is expected here, with the help of *madhur* rasa and *madhur vipaka* increase in the *rasadi dhatu* is possible and occurs gradually, thus increase in rasa leads to increase in *rakta*, *mansadi* next *dhatu* may lead to increase in weight of male and female children of the trial group. (8)

Modern research shows that gold particles having anti-oxidant property and T – lymphocyte activation and thus involve in regulation of antigen specific immune response.(9) This effect of *swarna* may decrease the frequency of illness in children and helps to grow healthily. It also shows cognitive effect of increase in dhi (intellect), *dhriti* (restrain) and *smriti*

(memory or recalling capacity). Honey and ghee acts as a vehicle for the *swarna bhasma vacha* and *kustha* powder. (10)

SP was proven more effective in gaining weight rather than height. Weight and height of child depends upon various factors like maternal, paternal, environmental, genetic constitution and diet. So this study involves the control group as well to shows the specific effect of *swarna bhasma*. Besides all these, general health of the children is also an important factor. The study result showed that SP maintained general health by increasing immunity level of the body.

SP also improves digestion and metabolism of the body which keep the *Tridoshas* in balance state. Thus the child is free from seasonal variances and shows effective growth in their physical parameters.

This study has some lacuna like sample size should be more, frequency of SP doses should be more either it is weekly or biweekly instead of per 27th day, study should be conducted in different geographical areas like *jangal, anoop* and *sadharan desha* and study should start with different *bala kala* (seasons) like *avar, madhyam, uttam.* Approach of this study was limited to local area hence it is possible to vary result according to region, age and many more. Also more research is needed in this direction to evaluate the *netrya*, *hrudya* effects of the *swarna bhasma.* It is also needed to highlight the *bhruhanadi* karma in scientific way with special reference to effects on needed *rasa*, *raktadi dhatu*.

Conclusion

SP is Ayurvedic *lehana* medicine. It shows increase in weight of male and female children more than other normal growing children. SP also shows the slight effect on growth parameter height, but it is not significant. Thus we can use SP as effective medicine to maintain general health of children in order to promote weight gain.

Acknowledgement

Acknowledge for general support by head of institute Dr. Maneesha Kothekar. The authors express heartfelt thanks for support and guidance by Dr. Vijay Ukhalkar, Dr. Vinod Ramteke, Dr. Shriramji Jotishi for their invaluable support.

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