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Research Article

### EFFECT OF SARVAANGABASHPASWEDANA (STEAM BATH) ON PHYSICAL, HAEMATOLOGICAL AND BIOCHEMICAL PARAMETERS

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#### ABSTRACT

**Background:** *Bashpaswedana*, popularised globally as steam bath is a well-established ayurvedic procedure. It is a modified form of *ushmasweda* in which patient is made to perspire, by setting his body below the neck inside a specially designed horizontal or vertical steam chamber. *Bashpaswedana* relieves stiffness, heaviness, coldness and induces sweating.

**Objectives:** To evaluate the effect of *Sarvangabashpaswedana* (SBS) on physical (Blood pressure, pulse rate, body temperature and average time taken to get *samyakswinnalakshana* (SSL) according to *prakriti* (constitution), haematological (CBP, ESR) and biochemical parameters (Serum electrolytes, serum urea, serum uric acid, serum creatinine and random blood sugar)

**Materials and Methods:** The study was conducted during June 2012 to March 2013 at Government Ayurveda hospital, Hyderabad. The study design was open labelled, comparing the baseline variables with values after *bashpasweda*. The subjects (n=50) chosen gave an informed consent. *Sarvangabashpaswedana* was preceded by *Abhyanga* – whole body massage. The subject was made to sit in the vertical steam chamber till the attainment of *samyakswinnalakshana* like relieving from coldness and heaviness, likes to take cold things and sweating on forehead and blood sample was taken before and after half an hour of procedure. Student's paired "t" test was applied to the means  $\pm$  SE of the variables to calculate statistical significance.

**Results:** The biochemical parameters have shown significant value of 'p'. Red blood cell count, white blood cell count and platelets were elevated. The Parameters- Random Blood Sugar, Erythrocyte Sedimentation Rate have decreased significantly. The Parameters- Blood Pressure, Pulse Rate have shown insignificant changes. Time taken to attain *samyakswinnalakshana* is highest in *kaphavata prakriti* patients (27.3min), in *kaphapitta* (20.89min) and least in *vata-pitta* (12.76min).

**Conclusion:** The parameters were increased or decreased significantly. But the significance is for changes within normal range, increased or decreased showing that *bashpaswedana* has got no influence on the levels of electrolytes, serum urea, uric acid and creatinine. *samyaksweda* leads to increased metabolism by improved *agni*, specially *raktadhatvagni* and maintains the homeostasis in circulating body fluids by eliminating the *dhatukittamsas* without causing dehydration and cardiovascular complications.

**Keywords:** Ayurveda, Blood Profile, *Prakriti*, *Samyaksweda*, *Sarvangabashpaswedana*.

#### INTRODUCTION

Analysis of every therapeutic intervention should be in two angles, since it acts in two ways – 1. Action of the procedure per se and 2. Action of the drugs/medium used for it. Conventionally, the majority have forgotten the procedure as such, which is more important and are behind the drugs, which have, mostly a secondary role.

*Bashpasweda* is a *sagni*, *sarvanga*, *snigdha* and *ushma* type of *sweda*. *Swedana* is a method which brings out *sweda*<sup>1</sup> and opens pores of the body cell membranes. Sweat is secreted

from the eccrine glands which are distributed throughout the skin<sup>2</sup>. Sweat is less viscous and contains the same constituents as the blood, but in lower concentration<sup>3</sup>. Thus "*pittamtuswedarakatayo*"<sup>4</sup> which denotes *sweda*, *rakta* as seat of *pitta* and are inter-related. So, any factor which affects the composition of blood may also alter the composition of sweat. Hence *sweda* has got much relation with *raktadhatu*.

During this procedure some amount of fluid is lost in the form of sweat along with vitiated *malas* from the body; In Ayurveda, no references are found about the impairment of body fluids after *samyakswedana karma*. But in

*Atiyogalakshana* of *Swedana karma*, some symptoms like, *Kaphakshayaja vikara*, *Murcha*, *Trishna*<sup>5</sup> etc. are mentioned which are similar to fluid loss symptoms. So to assess the actual loss of fluids during *Swedana karma* present or not is the subject of interest. During the *Swedana*, the body temperature rises which increases the basal metabolic rate by inducing many metabolic reactions, these releases various ions, metabolites into the blood, some of them are excreted through sweat.

*Bashpaswedana* is a modified form of *ushmasweda* in which perspiration is brought about by hot medicated vapours. It is a common and old practice in India similar to steam bath and finish sauna. Its clinical symptoms like reduction in pain, stiffness and heaviness are being observed by clinicians. Though they have been many M.D dissertations and few research papers on this, till now no satisfactory contributions have been made to evaluate its effect on physical, haematological and biochemical parameters. So, this study has been undertaken, where it gives the proper knowledge on both Ayurvedic sciences in the lines of modern science and technology.

## MATERIALS AND METHODS

### PLAN OF STUDY

#### Selection of subjects:

All the subjects were selected randomly from outpatient and inpatient of P.G. Department of *Panchakarma*, Govt. Ayurvedic Hospital; Hyderabad. A special *prakriti* questionnaire is prepared along with special case sheet. For the study, the *prakriti* of each subject was assessed using the validated questionnaire (TNMC *Prakriti* 2004). The sample size for the study was 50 patients (28 males and 22 females), of which 15 are evaluated as *vata* *prakriti*, 17 as *kapha* *prakriti* and 18 as *kapha* *prakriti*.

#### Inclusion criteria:

Patients who are indicated for *Swedana karma* as per classics and patients of age group between 20-60 years.

#### Exclusion criteria:

Patients who are contraindicated for *Swedana karma* as per classics with age group less than 20 years or more than 60 years, Patients having fatal complications or any serious illness, Pregnant women and lactating mothers, Patients with malignancies, tuberculosis and disorders of blood.

Counselling: Proper counselling was given to each patient and whole procedure including do's and don'ts was explained to each patient in his own language.

#### PROCEDURE OF SWEDANA KARMA

**Time of procedure:** In between 9.00am-11am

Morning times after the evacuation of the bowel and bladder, brushing the teeth, the patient is subjected to *Swedana* procedure.

Intake of food and water:

Food should be given 2 hours before the *Swedana karma*, if *Swedana* is done immediately after taking food it may affect the digestion of food in the *kosta* and may lead to *Aama* condition. It is said in classics that *Swedana* should be performed after the digestion of the food <sup>6</sup>(*Cakradatta*, *Yogaratanakara*) and even *kshuda* is contraindicated for *Swedana*<sup>7</sup>. Patient should not have thirst as *trishna* is contra indicated for *Swedana*<sup>8</sup>, and at the same time he should not be made to drink water after collection of first sample till the collection of second sample.

To begin with, the therapist chants the *swasthivachana* (hymn or prayer). After this the patient is undressed to minimum clothes. *Abhyanga* was done for 30 minutes with *dhanvantaram* oil of nagarjuna pharmacy. Then patient is set inside the vertical steam chamber, where he is exposed to vapours of decoction of *Nirgundi* (*Vitex negundo*) till the attainment of SSL for single sitting.

Application of parameters

Blood samples were taken half an hour before and after *Swedana* procedure. Blood Pressure, Pulse Rate, Body Temperature were also recorded at the same time.

#### Instruments and Assays:

Parameter	Method	Normal range
Blood pressure (BP)	Mercury sphygmomanometer	90-119/60-79mmHg
Pulse rate (PR)	Radial pulse count	70-80/minute
Oral temperature	Mercury glass thermometer	36.5-37.5 °C (97.7-99.5 °F)
Serum electrolytes	Colorimetric test	Serum Sodium: 135- 155 mmol/L Serum Chloride: 97-107 mEq/L Serum Potassium: 3.5 – 5.5 mmol / L
Serum urea	Enzymatic method	10 – 40 mg/dl
Serum creatinine	Jaffe's method	0.9 – 1.5 mg/dl
Serum uric acid	Enzymatic uricase method	3.4 – 7.0 mg/dl
R.B.C, W.B.C and Platelet count	Cell count method	R.B.C:Male: 4.7 to 6.1 m/cmm Female: 4.2 to 5.4 m/cmm W.B.C:4, 000 to 11,000cells/cmm Platelet count:1, 50,000-4, 00,000 cells/cmm
Erythrocyte sedimentation rate (ESR)	Westergen's method	Males: 0- 5 mm at the end of 1 <sup>st</sup> hour Females:0-7 mm at the end of 1 <sup>st</sup> hour
Random blood sugar (RBS)	Tinder's method	70-110mg/dl

**Criteria for assessment of results:**

A chart for recording Body Temperature, Blood Pressure, and Pulse Rate was prepared.

Time was noted when the patient entered and came out of the steam box respectively, accordingly to which average time taken for *samyakswinnalakshana* to appear was calculated according to the *Prakriti* in observations.

Though there are many *samyakswinnalakshana* described in classics, the lakshana which were practically observed like *Seetoparama* (relieves coldness), *Swedapradurbhava* (induction of sweating), *Seetasevanescha* (likes to take cold things), *Lalatasweda* (sweat on fore head) are considered as the *samyak yoga lakshana*<sup>9</sup> which can be assessed to stop the *Swedana* procedure, the other *lakshana* appear with course of time.

Perspiration is not the ultimate aim of *swedana*, but it is an indicator that body has reached the threshold for heat and is responding positively. It is a success sign (*samyaklakshana*) or an indicator to stop the procedure.

**Grouping of the results of parameters were made as follows –**

- a. Parameter values remained same.
- b. Parameter values increased within normal range.
- c. Parameter values decreased within normal range.
- d. Parameter values increased above the normal range.
- e. Parameter values decreased below the normal range.

**Statistical analysis:**

Student’s paired “t” test was applied to the basal and follow-up mean± SE values of the group.

**RESULTS**

**Changes in physical parameters (Table1):**

Significant increase from the baseline level in pulse rate was observed immediately after *bashpaswedana*, while it returned to the baseline level after half an hour. Hence, there is no significant sustained effect of *SarvangaBashpaSweda* on pulse rate.

Systolic blood pressure and diastolic blood pressure showed significant decrease immediately after *bashpaswedana*, which returned to base line after half an hour, thus, there is no significant sustained effect of *SarvangaBashpaSweda* on blood pressure.

The Average Time taken to attain *SamyakswinnaLakshana* in Male and Females of 3 *Prakritis* is as follows (figure-1):

The patients of both genders of *kaphavata prakriti* have taken more time (27.3min), than *pitta kapha prakriti* (20.89) patients and least in *vatapitta prakriti* (12.76) patients.

**Changes in oral temperature**

A significant increase in the oral temperature was observed immediately after *bashpaswedana*, and the increase from the

base line was 2.2 °F±1.1 °F. It returned to baseline values after half an hour.

**Changes in haematological parameters (Table 2):**

Erythrocyte count, white blood cell count and platelet count were significantly elevated after *bashpaswedana*. (p<0.001). Erythrocyte sedimentation rate was highly significantly (p<0.001) reduced both after first and second hour.

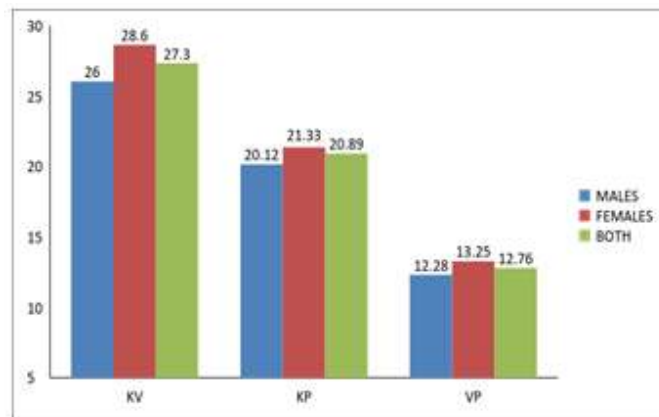


Figure 1: The average Time taken to attain *SamyakswinnaLakshana* in Male and Females of 3 *Prakritis* is as follows:

**Changes in biochemical parameters (Table 3)**

Out of 50 patients, the serum sodium levels in 15 patients (30%) were observed an increase, with a mean 1.8 mmol/L and in 35 patients (70%) were observed with a decrease mean of 2.88mmol/L. The serum potassium levels in 31 patients (62%) were observed to be an increase with a mean 0.168 mmol/L and 19 patients (38%) were observed with a decreased mean of 0.237mmol/L. The serum chloride levels in 17 patients (34%) were observed an increase mean - 2.00mE/L and 33 patients (66%) were observed with a decrease mean of 1.61 mE/L. The serum urea levels in 10 patients (20%) were observed increase mean of -2.20 mg/dl, 34 patients (68%) were observed a decrease mean of 1.91mg/dl and remained same in 6 patients (12%) before and after *Swedana*. The serum creatinine levels in 13 patients (26%) were observed with increase mean of -0.10 mg/dl, 28 patients (56%) were observed with a decreased mean of 0.143 mg/dl and remained same in 9 patients (18%) before and after *Swedana*. The serum uric acid levels in 6 patients (12%) were observed with increase mean of 0.5 mg/dl, 41 patients (82%) were observed with a decrease mean of 0.41 mg/dl and remained same in 3 patients (6%) before and after *Swedana*. The Random Blood Sugar in 50 patients (100%) was observed a decrease with a mean of 9.10mg/dl.

**Table 1: Effect of *SarvangaBashpaSwedana* on changes in physical parameters**

Parameter	Mean score		S.D		p value
	BT	AT	BT	AT	
Pulse rate in beats/min	73.79	73.32	5.94	5.46	1.00
SBP(systolic blood pressure in mm/Hg)	113.6	113.5	7.47	7.56	0.78
DBP (diastolic blood pressure in mm/Hg)	75.05	74.71	5.88	5.46	0.302

**Table 2: Effect of SarvangabashpaSwedana on changes in haematological parameters**

Changes in parameter	No. of patients	Mean score in mil/cmm		S.D		p value
		BT	AT	BT	AT	
R.B.C levels increased	44	4.35	4.55	.473	.405	<.001
R.B.C levels decreased	6	4.30	4.10	0.56	0.52	<.001
W.B.C levels increased	50	6492	6894	1081.78	1070.07	<.01
Platelet levels increased	50	246,420	285,440	45.87	53.83	<.001
E.S.R levels 1sthr in mm/hr	50	22.62	9.84	29.6	4.12	<.001
E.S.R levels 2ndhr in mm/hr	50	26.24	13.82	11.8	4.86	<.001

**Table 3: Effect of SarvangabashpaSwedana on biochemical parameters**

changes in parameter	No. of patients	Mean score in mmol/L		S.D		p value
		BT	AT	BT	AT	
Sodium Level increased	15	140.07	141.87	2.91	2.92	<.001
Sodium level decreased	35	142.69	139.80	2.31	1.97	<.001
Potassium Level increased	31	4.20	4.03	0.38	0.38	<.001
Potassium level decreased	19	4.28	4.05	0.37	0.39	<.001
Chloride Level increased	17	100.12	102.12	1.80	1.62	<.001
chloride level decreased	33	101.67	100.06	2.15	1.92	<.001
Urea levels increased	10	24.9	27.1	2.38	4.46	<.01
Urea levels decreased	34	101.67	100.06	2.15	1.92	<.001
Creatinine levels increased	13	0.75	0.86	.139	.139	<.001
Creatinine levels decreased	28	0.829	0.686	.161	.241	<.001
Uric acid levels increased	6	4.18	4.68	.950	1.05	<.01
Uric acid levels decreased	41	4.24	3.83	0.15	0.144	<.001
R.B.S levels Decreased in mg/dl	50	109.08	99.98	10.08	9.56	<.001

## DISCUSSION

### Effect of sarvangabashpaswedana on physical parameters:

Effect of *BashpaSwedana* on Pulse Rate-In the study it was observed that there was no significant change in pulse rate before and after half hour of *Swedana* with a mean of 0.47. But there was an increase in pulse rate immediately after *Swedana* with a mean of 10.67. The probable explanation would be Heart rate increases by 10 beats per minute for 1° F rise in temperature<sup>10</sup>. Increase in blood temperature and reflex stimulation of adrenergic cardiac beta-receptors is the likely mechanism of heart rate increase and increased metabolic rate also increases heart rate. But when the temperature is returned to normal level after half an hour, the pulse rate reaches to baseline level as before *Swedana*. Effect of *BashpaSwedana* on Blood pressure-It is observed in the study that B.P has fallen immediately after *Swedana* with a mean of 7.94 in systolic blood pressure and 9.75 in diastolic blood pressure and was normalised gradually after half an hour though there is a rise in heart rate which reached to base line level after half an hour. During *Swedana*, there is temperature rise and so heart rate increases. So this should cause a rise in cardiac output and stroke volume leading to increase in blood pressure. BUT Heat reduces viscosity of blood<sup>11</sup>. So BP decreases. Viscosity decreases about 2% for each 1°C rise in temperature<sup>12</sup>. Reduced blood viscosity in turn reduces the peripheral resistance<sup>13</sup>, which is also reducing by vasodilatation<sup>14</sup>, leading to a fall in blood pressure. Due to sudden application of hot vapours on the body, due to increased *ushnaguna* and

*dravagunas*, they counter act on the *seetala* and *rukshagunas* of *vyanavata*, there is reduction in the functions of *vyanavata* resulting in fall of *peedana* in the blood (BP) and after half an hour, on the withdrawal of *Sweda karma*, *vyanavata* regains its normal function and restores normal blood pressure and heart rate. A decrease in Blood Pressure indicates the effect of *Swedana* on *vyanavata*. Hence, *BashpaSweda* can be administered safely in controlled hypertensive patients up to attainment of *samyakswinnalakshana*. Effect of *BashpaSwedana* on Body temperature (oral)-Oral temperature noted immediately after *Swedana* has shown a rise in temperature between 99.2°F to 101.4°F, which reached to baseline level after half an hour as before *Swedana* showing that there has been increase in body temperature due to hot vapours which was normalised after vapours have been removed. Patients of *kaphavataprakriti* have taken more time (27.3min), than *pitta kaphaprakriti* (20.89) patients and least in *vatapittaprakriti* (12.76) patients. While discussing the characteristic features of *prakriti*, our *acharyas* mentioned that *kaphaprakriti* people are intolerant to humid weather and are more tolerant to heat application with moderate sweating<sup>15</sup> whereas *pitta prakriti* people are intolerant to warm weather and heat application by their nature and have profuse sweating<sup>16</sup> and *vataprakriti* people are intolerant to cold weather and good tolerant to heat application and have scanty sweating<sup>17</sup>. In the study, it was observed that females have taken more time with an average of 21.3 minutes than males with an average of 16.13 minutes and temperature to attain *samyakswinnalakshana*. The difference may be due to *gurutva*

and *medhodhatubahulyata* of *strisareera* as mentioned by *susrutha*.

#### Effect of sarvangabashpaswedana on haematological parameters:

Effect of *BashpaSwedana* on R.B.C, W.B.C and Platelet Count-In the study it was observed that red cells were increased with a mean of 0.2 in 88% patients and W.B.C & platelets increased in 100% patients with a mean of 402 and 39,020 respectively. This increase might be due to ignition of *raktadhatwagni*. However, this effect may be a temporary effect due to sudden sprout in *deeptagni* condition. Further study is required to know the sustained effect which is not in preview of this study.

Effect of *BashpaSwedana* on E.S.R-Usually ESR rises in pyogenic infections, Rheumatoid arthritis, Nephrosis, which is conditions of *samarakta*, since *samatva* is in red blood cells leading to more sedimentation<sup>18</sup>. In the study it was observed that ESR was significantly reduced both in 1<sup>st</sup> and 2<sup>nd</sup> hour with a mean decrease of 16.23 and 20.03 respectively in all patients. This may be due to *deeptaraktaagni*, the *gurutva* in the *raktadhatu* (red blood cells) gets *pachana* and attain *laghutva*, so that they float on the serum and less sedimentation of RBC is resulting in decrease in ESR levels. Also due to increased body temperature during *Swedana*, the morbid factors or toxins in the body are excreted out through sweat, thus resulting a decrease in E.S.R.

#### Effect of sarvangabashpaswedana on biochemical parameters:

Effect of *BashpaSwedana* on Serum electrolytes: Fluid Fate – according to *Ayurveda*: The body is primarily made of *jaleeyadhatu*, so is accepted in the present science too. *Dehamrasajoambubhavo*<sup>19</sup> by *charaka* gave a message that major constitution of the body is *Ambu-jaleeyadhatu* (water). The modern science explains around 60% of the bodily content is fluid. There are two sources of fluid for the body, one is *ahara* (food) i.e; one among the *chaturvidhaahara* is *jala* (water). The second one is *kleda* (moisture), formed inside the body during the process of digestion and metabolism. All the essentials of the *shareeradhatu* are carried by the *dravadhatu* continuously by *vyana*, there by maintaining the normal function of each and every tissue<sup>20</sup>.

In the study it was observed that in major cases ((70%) were observed a decrease in sodium level with a mean of 2.88mmol/L and 66% decrease in chloride level with a mean of 1.61 mmol/L and a corresponding (62%) increase in potassium level with a mean 0.168 mmol/L was observed.

As sodium and chloride are major cation and anion of extra cellular fluid respectively<sup>21</sup>, when there is heat stress or any conditions leading to fluid loss is associated with their loss<sup>22</sup>. To compensate this loss of sodium and chloride, potassium, which is major cation of intracellular fluid, moves in to extra cellular fluid to maintain homeostasis. This may be the reason for decrease of sodium and chloride with a corresponding increase in potassium levels, however, the changed values are within the normal range. It can also be observed that, if *Swedana* is continued even after attaining *samyakswinnalakshana*, it would lead to more decrease of electrolytes causing dehydration, which is *atiyoga* of *Swedana* where *atiswinnalakshana* may exhibit.

Thus *Swedana* done up to the attainment of *samyaklakshana* does not cause any pathological variations in the serum electrolytes levels but regulates the pathological variation and maintains the physiological balance of electrolytes, thus it is noted that in certain cases, certain electrolytes are decreased and increased, indicating that excessive is eliminated and the lesser is preserved. It further reveals that by *Bashpaswedana* morbid factors (*dushtaamsas*) might be eliminated and required are increased to preserve *dhatwagniamsas*, which is the ultimate aim of *Bashpaswedana* administration.

Effect of *BashpaSwedana* on Serum urea, uric acid and creatinine: It was observed in the study that urea was decreased in 68% patient with a mean of 1.91mg/dl with a mean of 1.91mg/dl, creatinine decrease in 56% with a mean of 0.14mg/dl and uric acid is decreased in 82% patients with a mean of 0.41mg/dl. The decrease observed may be due to excretion of circulating metabolites as there is profuse sweating during *Swedana*, though the major route of excretion of these metabolites is through kidneys but by *Swedana* the load on kidneys is decreased. Urea, uric acid and creatinine are the end products of metabolism, which are to be considered as *dhatukittabhagas*. All of these are to be considered as *dhatukittamshas* in the circulation. Increase in *kittamshas* results out of *dhatuagnimandhyata*. *Sweda* is considered as one of the *trimalas*, which mostly eliminates the *malamsas* from the *rakta* directly. *Sweda karma* is considered as a procedure to increase the sweat through which excess *malas* are eliminated efficiently without putting load on kidneys. Apart from this, application of heat on the body through *BashpaSweda* liquifies the *Aama* (morbid) factors in the circulation and in tissues, thus facilitates to move out of the body through *sweda*. And also ignites the *dhatvaagni* which in turn removes the *amatva* in the tissues and further facilitates to move freely by removing adhesions (*srotopratibandhakatvas*).

In this study, the observations of decreased *kittamasas* like urea, uric acid and creatinine in circulation after *Bashpaswedana* verifies and consolidates the concept of application of *Bashpaswedana* in eliminating the morbid factors, and also indicates that achieving *samyakswinnalakshana*, the values are within the normal range though decreased. Thus it once again proves that *Sweda karma* done up to *samyak yoga* is good enough to maintain the homeostasis in the body.

Effect of *BashpaSwedana* on Random Blood Sugar: It was observed that The Random Blood Sugar in 50 patients (100%) decreased with a mean of 9.10. This would be due to increased metabolic rate when body temperature is raised due to *Swedana* leading to an increase in enzymatic activities and biological reactions which require ATP for their functioning. However, the decrease is within normal limits. Usually blood sugar rises in heat exhaustion<sup>23</sup> which is not seen in the study proving that *Swedana* does not cause any exhaustion if done properly. This indicates that through *Sweda karma*, *agni* ignites and it raises to *samaagni* condition on *samyakswinna* state. However, the increase or decrease observed in blood chemistry in the present study is within the physiological range. Further, to prove the efficacy of *Bashpaswedana* in pathological condition is the subject of interest for further study.

## CONCLUSION

The parameters - electrolytes, serum urea, uric acid, and creatinine have shown the significant value of 'p'. But the significance is for changes within normal range, increased or decreased showing *samyaksweda* maintains the homeostasis in circulating body fluids by eliminating the excess and retaining the useful and also *samyaksweda* does eliminate the *dhathukittamsas*. The Parameters – Red blood cell count, white blood cell count and platelets have shown significant value of 'p'. But the significance is for increased changes within the normal range showing ignited *raktadhatwagni*, which might be a temporary effect, which requires further study. The Parameters- Random Blood Sugar, Erythrocyte Sedimentation Rate have shown highly significant value of 'p' showing that there is increased metabolism by improved *agni*. The Parameters- Blood Pressure, Pulse Rate have shown insignificant value of 'p' showing that there is no significant sustained effect of *sarvangabashpasweda* on blood pressure though there is immediate fall in B.P and raise in P.R observed immediately after *swedana*. A decrease in Blood Pressure indicates the effect of *swedana* on *vyanavata*. Hence, can be administered safely in controlled hypertensive patients up to attainment of *samyakswinnalakshanas*. The average time taken to attain *samyakswinnalakshanas* is observed to be more in females than males because of their *sareera gurutva* and *medhobahulyata*. *Prakriti* plays an important role in time taken to attain *samyakswinnalakshanas*, where *kaphavataprakriti* patients have taken more time (27.3min), than *pittakapha* (20.89min) and least in *vatapitta* (12.76min). Oral temperature noted immediately after *swedana* has shown a rise in temperature between 99.2°F to 101.4°F, which reached to baseline level after half an hour as before *swedana*.

Basing on the observations made in this study, we can conclude that the *SarvangaBhaspaSwedana karma* until attaining *samyakswinnalakshana* is able to maintain the physiological homeostasis in the body by eliminating the morbid factors and retaining the essentials, it also accelerates the metabolic activities by igniting the *dhatwagnis*, especially in *amapachana* and *deepana* at *raktadhatwagni* level and also controls *vyanavata*. Thus *SarvangaBhaspaSwedana karma* helps in maintenance of health and in relieving the disease.

We feel that there is a need to conduct this study on larger samples, including kidney function tests and in patients with abnormal levels of parameters which can give a better understanding on the role of *swedana* in diseased.

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