

## EVALUATION OF THE EFFICACY OF ASHWAGANDHA KSHEER PAK AND ABHAYANGA IN PREVENTION OF SPORTS INJURIES IN SPORTS PERSONNEL: AN EXPLORATORY CLINICAL STUDY

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### ABSTRACT

**Background:** Sport medicine, a multidisciplinary field, can be correlated with the concept of *Vyayama* mentioned in the ancient texts of Ayurveda. The sports injuries mainly involve injuries, those that affect the musculoskeletal system. *Abhyanga* and *Ashwagandha Ksheer Pak* would be helpful Prevention of Sports Injuries in Sports Personnel. **Objectives:** To compare the efficacy of *Ashwagandha-Ksheer Pak* and *Abhyanga* in prevention of sports injuries in sports persons. **Methods:** The present study was a Three – Arms, Open labeled, randomized, parallel design, prospective controlled exploratory clinical study conducted at Sri Ganganagar Ayurvedic medical college and Hospital Sriganganagar, Rajasthan. 30 male athletes & sports persons within the age of 18-45 years visiting OPD of the study center for routine checkup were selected for the study after their written informed consent. Participants enrolled in Group A were advised to take *Ashwagandha Ksheer Pak* for continuous 45 days, participants enrolled in Group B were advised to do *Abhyanga* with *Tila-Taila* for continuous 45 days whereas Participants enrolled in Group C were advised to do both - *Ashwagandha Ksheer Pak* and *Abhyanga* for continuous 45 days. Criteria have been selected for assessment of efficacy were 100 meters shorts running, 800 meters long running and Long jump. The data generated through study were subjected to appropriate statistical tests to derive unbiased inferences. **Results:** After analysing the data of 30 athletes for 45 days of *Ashwagandha Khseer-Pak* and *Abhyanga*, it was found that *Ashwagandha Khseer-Pak* and *Abhyanga* not only helps in recovery but also enhances the strength and endurance in the body. 100 meters short run, 800 meters long run and long jump tests showed positive changes which further verified the improvement in stamina and endurance of the participants. **Conclusion:** Combined use of *Ashwagandha Khseer-Pak* and *Abhyanga* enhances *Bala* in the active athletes. In total endurance, strength, flexibility and recovery of the athlete can have a positive impact on the performance of the individual.

### 1. INTRODUCTION

Sports medicine is a multidisciplinary field involving physicians, physical therapists, athletic trainers, and other health care professional trained in diagnosis, treatment, research education and prevention of athletic injuries.<sup>[1]</sup> Important facts of sports medicine are the pre-participation physical education of athletes, coaches, and parents in conditioning techniques to prevent injuries and help athletes of all levels to reach their full potential.<sup>[2]</sup> Sports medicine can be correlated with the concept *Vyayama* given in an elaborative form in the ancient texts of Ayurveda.<sup>[3-4]</sup>

The term “sports injury” refers to the kinds of injuries that most commonly occur during sports or exercise, but they are not limited to athletes. Ultimately “sports injuries” refers to those that occur in active individuals.

The sports injuries mainly involve injuries, those that affect the musculoskeletal system. The musculoskeletal system is the network of muscles, tendons, ligaments, bones, and other tissues that provides the body with stability and enables movement.<sup>[5]</sup> A rehabilitation program that includes exercise and other types of therapy is usually recommended before resuming the sport or activity that caused the injury.<sup>[5]</sup>

*Abhyanga* is one of the routine procedures of daily regimen (*Dinacharya*) as well as the preliminary procedure (*Purvakarma*) of the *Panchakarma* therapy.<sup>[6]</sup> It is also said that regular practice of *Abhayanga* makes body so strong that can bear any kinds of over loading of exercise or physical activity.<sup>[6]</sup> This thing is essential for sports persons as they must develop their body in such a way that can tolerate the load of training sessions and

actual game. *Abhyanga* is also said anti-fatigue.<sup>[7]</sup> It reduces exhaustion, relaxes muscle tissues, and improves blood circulation to peripheral tissue.

Ashwagandha (*Withania somnifera*, fam. Solanaceae) is one of the most important herbs of Ayurveda (the traditional system of medicine in India) used for millennia as a *Rasayana* for its wide-ranging health benefits. *Ashwagandha* is considered a potent adaptogen and anti-stress agent that could have potential to improve physical performance.<sup>[8]</sup> *Ashwagandha* is also a well-known *Rasayana* drug which clears all channels of the body, provides optimum nutrients to cells of the body and to maintain health of all the tissues/ systems, sense organs, physiological functions of the body.<sup>[8]</sup> Thus, combined use of *Abhyanga* and *Ashwagandha* on regular basis would be helpful for sports persons.

By keeping all above views in mind, the clinical study entitled "Evaluation the Efficacy of *Ashwagandha Ksheer Pak* and *Abhyanga* in Prevention of Sports Injuries in Sports Personnel: An Exploratory Clinical Study" with 30 sportspersons suffering from sports injuries and the results obtained are discussed.

## 2. MATERIALS AND METHODS

**Study design, sites:** The present study was a Three – Arms, Open labeled, randomized, parallel design, prospective controlled exploratory clinical study conducted at OPD of Sri Ganganagar Ayurvedic medical college & Hospital Sriganganagar, Rajasthan.

**Ethical considerations:** Ethical approvals from Institutional ethics committee of the study centre were obtained.

**Enrolment of participants:** 30 male athletes & sports persons within the age of 18-45 years visiting OPD of the study center for routine checkup were selected for the study after their written informed consent.

**Study duration and Visits:** The treatment was advised for the period of 45 days and reviewed after every 15 days, i. e. Day 15, Day 30 and Day 45. The athletes / sports persons were given a detailed *Pathya-Apathya* chart to follow in the study period.

**Primary and secondary Outcomes:** the primary outcome was to compare the efficacy of *Ashwagandha-Ksheer Pak* and *Abhyanga* in prevention of sports injuries in sports persons. Secondary outcomes were to study the concept of sports medicine in Ayurveda and to evaluate the efficacy of *Ashwagandha-Ksheer Pak* and *Abhyanga* in prevention of sports injuries. Safety and tolerability of study drug were assessed by any occurrence of adverse events (AEs) and adverse drug reactions.

### Selection of Study Participants

**Inclusion criteria:** The male athletes/ sports persons between the age group of 18-45 years were selected irrespective of religion, caste, socio economic status, education status etc. The participants who were ready to give informed consent and ready to abide to study procedures were enrolled in the study.

**Exclusion Criteria:** The individuals having history of any systemic illness, showing signs and symptoms of arthritis, individuals with acute joint trauma, individuals with complete loss of articular cartilage, pregnant ladies and lactating mothers were excluded from the study.

**Sample Size:** Total 30 athletes & sports persons (10 individuals in each group).

**Sampling Technique:** Purposive Sampling technique (non-probability sampling technique) was applied.

**Plan of action:** 30 male athletes & sports persons within the age of 18-45 years visiting OPD of the study center for routine checkup were selected for the study after their written informed consent. They were divided into 3 groups namely Group A, Group B and Group C of 10 patients each. Participants enrolled in Group A were advised to take *Ashwagandha Ksheer Pak* for continuous 45 days, participants enrolled in Group B were advised to do *Abhyanga* with *Tila-Taila* for continuous 45 days whereas Participants enrolled in Group C were advised to do both - *Ashwagandha Ksheer Pak* and *Abhyanga* for continuous 45 days.

**Assessment of Efficacy Parameters:** Assessment of efficacy parameters were done by observing the improvements in the performance of athlete's/ sports persons before and after the administration of *Ashwagandha Ksheer Pak* and *Abhyanga*.

### Criteria for the assessment of Bala

Following objective criteria have been selected for assessment of efficacy:

1. 100 meters. shorts running
2. 800 meters. long running
3. Long jump

100 and 800 meters running each athlete was allowed two attempts and at the end, the best recorded time was recorded with an accuracy of 0.10 seconds. Speed tests were measured with the Microgate Witty timing system instrument.<sup>[10]</sup>

Long jump performance after the speed tests, the athletes performed the long jump performance. The testing was carried out in the special arena for the long jump in the "Sokollana"-Kumanovo athletics stadium. Each athlete had the right to take maximum momentum from 40 meters, while the long jump technique was the squat technique. With the help of the measuring tape in meters, the performance of the athletes was recorded.<sup>[11]</sup>

All the above three criteria internationally accepted marking procedure in terms of ranking points were incorporated. For this purpose, ranking table / scoring table of athletics was used. In this table, the performance of individual persons is recorded in terms of minutes and seconds who was then converted into points using this internationally accepted raking table.

### Subjective parameters

The overall assessment of the athletes was made based on the points achieved in the performance as average good, better, and best.

**Investigations:** Weight, height, Fasting Blood Glucose.

**Plan for statistical analysis:** All baseline and demographic data were summarized descriptively. All continuous variables were summarized using mean, standard deviation, and standard error of mean and median. All categorical variables were summarized using frequency and percentages. GraphPad InStat Version 3.6 (www.graphpad.com) software was used for statistical

analysis of data. All efficacy parameters were analyzed by applying appropriate statistical methods. All *P* values were reported based on two-sided significance test and all the statistical tests were interpreted at least up to 5% level of significance.

### 3. RESULTS

30 male athletes & sports persons within the age of 18-45 years were selected for the study and divided into 3 groups of 10 patients each. Participants enrolled in Group A were advised to take *Ashwagandha Ksheer Pak* for continuous 45 days, participants enrolled in Group B were advised to do *Abhyanga* with *Tila-Taila* for continuous 45 days whereas Participants enrolled in Group C were advised to do both - *Ashwagandha Ksheer Pak* and *Abhyanga* for continuous 45 days. The average age of study participants enrolled in Group A, Group B and Group C were  $19.40 \pm 1.84$  years,  $19.60 \pm 1.07$  years and  $19.00 \pm 0.82$  years respectively with insignificant statistical difference.

#### 1. Assessment of Body Weights in Study Participants in Three Groups

**Table 1: Assessment of Body Weights in Study Participants in Three Groups.**

	Group A		Group B		Group C	
	BT	BT	BT	BT	BT	AT
Sample Size (n)	10	10	10	10	10	10
Mean $\pm$ SD	$63.66 \pm 6.50$	$63.85 \pm 6.36$	$64.60 \pm 7.85$	$64.87 \pm 7.92$	$65.12 \pm 7.04$	$65.55 \pm 6.88$
SEM	2.06	2.01	2.48	2.51	2.23	2.18
Intra-Group Comparison	Paired t test		Paired t test		Paired t test	
t Value	1.230		2.535		2.403	
P Value	0.2500, not significant		0.0320, not significant		0.0397, significant	
Inter-Group Comparison	One-way Analysis of Variance (ANOVA)					
	The P value is 0.8649, considered not significant.					
	t Value			P Value		
Group A vs Group C	0.5367			> 0.05, not significant		
Group A vs Group B	0.3220			> 0.05, not significant		
Group B vs Group C	0.2147			> 0.05, not significant		

The difference in weights of study participants in Group A and Group B after treatment were not statistically significant ( $p > 0.05$ ) whereas it was statistically

significant in Group C ( $p < 0.05$ ). The difference in weights among three groups was not significant ( $p = 0.8649$ ).

#### 2. Assessment of BMI in Study Participants in Three Groups

**Table 2: Assessment of BMI in Study Participants in Three Groups.**

	Group A		Group B		Group C	
	BT	BT	BT	BT	BT	AT
Sample Size (n)	10	10	10	10	10	10
Mean $\pm$ SD	$22.10 \pm 1.56$	$22.15 \pm 1.59$	$22.19 \pm 1.49$	$22.29 \pm 1.47$	$22.44 \pm 1.44$	$22.60 \pm 1.38$
SEM	0.49	0.50	0.47	0.46	0.45	0.44
Intra-Group Comparison	Paired t test		Paired t test		Paired t test	
t Value	0.8899		2.739		2.489	
P Value	0.3967, not significant		0.0229, not significant		0.0345, significant	
Inter-Group Comparison	One-way Analysis of Variance (ANOVA)					
	The P value is 0.7887, considered not significant.					
	t Value			P Value		
Group A vs Group C	0.6751			> 0.05, not significant		

<b>Group A vs Group B</b>	0.2054	> 0.05, not significant
<b>Group B vs Group C</b>	0.4697	> 0.05, not significant

The difference in BMI of study participants in Group A and Group B after treatment were not statistically significant ( $p > 0.05$ ) whereas it was statistically

significant in Group C ( $p < 0.05$ ). The difference in weights among three groups was not significant ( $p = 0.7887$ ).

### 3. Assessment of time duration for 100 m short running in Study Participants in Three Groups

**Table 3: Assessment of time duration for 100 m short running in Study Participants in Three Group.**

	Group A		Group B		Group C	
	BT	BT	BT	BT	BT	AT
<b>Sample Size (n)</b>	10	10	10	10	10	10
<b>Mean <math>\pm</math> SD</b>	14.02 $\pm$ 0.51	13.69 $\pm$ 0.38	13.96 $\pm$ 0.25	13.40 $\pm$ 0.44	14.13 $\pm$ 0.37	13.09 $\pm$ 0.44
<b>SEM</b>	0.16	0.12	0.08	0.14	0.12	0.14
<b>Intra-Group Comparison</b>	Paired t test		Paired t test		Paired t test	
<b>t Value</b>	3.973		4.070		6.091	
<b>P Value</b>	0.0032, considered very significant		0.0028, considered very significant		0.0002, considered extremely significant	
<b>Inter-Group Comparison</b>	One-way Analysis of Variance (ANOVA)					
	The P value is 0.0129, considered significant.					
	t Value			P Value		
<b>Group A vs Group B</b>	1.548			> 0.05, not significant		
<b>Group A vs Group C</b>	3.203			< 0.05, significant		
<b>Group B vs Group C</b>	1.655			> 0.05, not significant		

The difference in time duration in seconds for 100 meters long run of study participants in Group A, Group B and Group C after treatment were statistically significant ( $p <$

0.05). The difference in time duration in seconds for 100 meters long run of study participants among three groups in statistically significant ( $p = 0.0129$ ).

### 4. Assessment of time duration for 800 m long running in Study Participants in Three Groups

**Table 4: Assessment of time duration for 800 m short running in Study Participants in Three Group.**

	Group A		Group B		Group C	
	BT	BT	BT	BT	BT	AT
<b>Sample Size (n)</b>	10	10	10	10	10	10
<b>Mean <math>\pm</math> SD</b>	114.02 $\pm$ 4.74	112.31 $\pm$ 4.24	114.41 $\pm$ 4.00	112.51 $\pm$ 3.64	114.43 $\pm$ 4.38	107.78 $\pm$ 3.24
<b>SEM</b>	1.50	1.34	1.26	1.15	1.38	1.03
<b>Intra-Group Comparison</b>	Paired t test		Paired t test		Paired t test	
<b>t Value</b>	2.603		4.111		4.307	
<b>P Value</b>	0.0286, considered significant		0.0026, considered very significant		0.0020, considered very significant	
<b>Inter-Group Comparison</b>	One-way Analysis of Variance (ANOVA)					
	The P value is 0.0127, considered significant.					
	t Value			P Value		
<b>Group A vs Group B</b>	0.1200			> 0.05, not significant		
<b>Group A vs Group C</b>	2.718			< 0.05, significant		
<b>Group B vs Group C</b>	2.838			< 0.05, significant		

The difference in time duration in seconds for 800 meters long run of study participants in Group A, Group B and Group C after treatment were statistically significant ( $p < 0.05$ ). The difference in time duration in seconds for 800 meters long run of study participants among three groups in statistically significant ( $p = 0.0127$ ).

### 5. Assessment of distance covered (in meters) on Long Jump in Study Participants in Three Groups:

**Table 5: Assessment of distance covered (in meters) on Long Jump in Study Participants in Three Group.**

	Group A		Group B		Group C	
	BT	BT	BT	BT	BT	AT
Sample Size (n)	10	10	10	10	10	10
Mean ± SD	229.8 ± 8.80	235.4 ± 6.95	227.9 ± 7.70	230.5 ± 9.20	227.5 ± 6.12	242.3 ± 6.45
SEM	2.78	2.20	2.43	2.91	1.93	2.04
Intra-Group Comparison	Paired t test		Paired t test		Paired t test	
t Value	4.583		1.135		7.467	
P Value	0.0013, considered very significant		0.2856, considered not significant		< 0.0001, considered extremely significant	
Inter-Group Comparison	One-way Analysis of Variance (ANOVA)					
	The P value is 0.0028, considered very significant.					
	t Value			P Value		
Group A vs Group B	1.607			> 0.05, not significant		
Group A vs Group C	2.218			> 0.05, not significant		
Group B vs Group C	3.825			< 0.01, very significant		

The difference in time duration in seconds for 800 meters long run of study participants in Group A and Group C after treatment were statistically significant ( $p < 0.05$ ) whereas it was statistically not significant in Group B ( $p$

$> 0.05$ ). The difference in time duration in seconds for 800 meters long run of study participants among three groups in statistically significant ( $p = 0.0127$ ).

### 6. Assessment of Fasting Blood Glucose in Three Groups.

**Table 6: Assessment of Fasting Blood Glucose in Study Participants in Three Group.**

	Group A		Group B		Group C	
	Pre	Post	Pre	Post	Pre	Post
Mean	89.14	90.38	86.4	87.7	87.2	88.1
SD	3.28	2.78	3.95	3.77	4.66	4.23
SEM	1.04	0.88	1.25	1.19	1.48	1.34
Intra-Group Comparison	Paired t test		Paired t test		Paired t test	
t value	1.235		0.9871		0.7965	
p value	0.2177, considered not significant		0.3494, considered not significant		0.4462, considered not significant.	
Inter-Group Comparison	One-way Analysis of Variance (ANOVA)					
	The P value is 0.2259, considered not significant.					
	t value			p value		
Group A vs Group B	1.644			> 0.05		
Group A vs Group C	1.399			> 0.05		
Group B vs Group C	0.2454			> 0.05		

The difference in Fasting Blood Glucose Levels of study participants in Group A, Group B and Group C after treatment was not statistically significant ( $p > 0.05$ ). The difference in Fasting Blood Glucose levels among three groups was not significant too ( $p = 0.2259$ ).

The interventions were well tolerated by the study participants and no major or minor adverse events observed in any of the participants.

## 4. DISCUSSION

Currently in sport there are nutritionists, physiotherapists and conditioning experts helping them in performance and sports rehab and post habitation with a reductionist scientific approach. Here with *Swasthavritta*, we can offer a more comprehensive and complete mechanism to combat the modern needs of body recovering and

performance enhancement in sportsmen and sports women. This will not only ensure a successful career but also healthy life after active sporting career. Athletes currently go with the easy methods of performance enhancement. They have immense side effects on the athletic individuals and give a very negative image for the society who follows them as their role models.

Sports medicine has two goals to achieve - fitness of the sportsperson and treating the sporting injuries of the sportsperson. The fitness of the sportsman is not merely his healthy condition but it is a state his healthy condition but it is a state of physical and mental endurance to extreme stress. Even though the injuries of any other kind do not distinctly vary from those of sports, the aetiology and line of treatment may have to be considered with different view.

The present study intended to identify the possible contributions Ayurveda can make to this field of sports medicine. Obviously, there is hardly any direct reference in our classics to this effect, though measures like *Vyayama* (exercise), *Abhyanga* (Massage) and such others are prescribed for healthy living. This is an attempt to explore the concept of Ayurveda based sports medicine.

In present research study, 30 male athletes having active life style were enrolled. There is a substantial increase in *Vata Dosha* in each athlete due to their *Dinacharya*. As a simple logic to solution, we had *Ashwagandha Khseer-Pak* and *Abhyanga* to offer as a method to pacify that *Vata Dosha* in the body and mind. After analysing the data of 30 athletes for 45 days of *Ashwagandha Khseer-Pak* and *Abhyanga*, it was found that *Ashwagandha Khseer-Pak* and *Abhyanga* not only helps in recovery but also enhances the strength and endurance in the body. 100 meters short run, 800 meters long run and long jump tests showed positive changes which further verified the improvement in stamina and endurance of the participants.

Due to *Abhyanga*, the skin becomes beautiful, *Vata* disorders are relieved, and tolerance to hardship and physical strain is enhanced. *Abhyanga* is said to be very much beneficial for stability of body. Rasayana herbs like *Ashwagandha* holds the most prominent place. *Ashwagandha* is considered a potent adaptogen and anti-stress agent that could have potential to improve physical performance. Thus, combined use of *Abhyanga* and *Ashwagandha* on regular basis would be helpful for sports persons.

Limitations of the study were no women athlete enrolled, number of athletes could be more. Athletes from various sports could have been involved. Marker test for reduction in oxidative stress could have been of choice. Performances in the actual games should have been compared both objectively and subjectively. Application of *Ashwagandha Khseer-Pak* and *Abhyanga* for athletes comes under the scope of *Swasthavritta* and in sports medicines. *Ashwagandha Khseer-Pak* and *Abhyanga* in athletes have shown some encouraging results. Taking the research further we should study the *Ashwagandha Khseer-Pak* and *Abhyanga* for much longer time duration like 90 days or 180 days. It should be used in female athletic populations for further confirming the study. It should be used in different sports like football, tennis, badminton etc.

## 5. CONCLUSION

We can conclude that combined use of *Ashwagandha Khseer-Pak* and *Abhyanga* enhances *Bala* in the active athletes. In total endurance, strength, flexibility and recovery of the athlete can have a positive impact on the performance of the individual. The above factor plays a very important role in a career of an athlete. With a simple method like *Ashwagandha Khseer-Pak* and

*Abhyanga*, it is possible to enhance the performance of the athletes.

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