



Standardization of Ayurvedic gargle (Kavala) based on volume and time of holding with special reference to its immediate effect

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ABSTRACT

Traditional medical systems like Ayurveda always give importance for preservation and restoration of health. Gandoosha and Kavala are two therapeutic and preventive measures described in Ayurveda for oral health. In the classical texts, the exact volume of kavala dravya and time duration for kavala procedure is not mentioned, where the measurements are made according to the capacity of the individual. The objective of this study is to standardize the amount of kavala dravya and time taken for kavala in healthy volunteers. In this study, kavala dravya was prepared and was given to 30 voluntary participants, in the dose of half of their maximum oral capacity, and the time for attaining samyak lakshana was noted. By statistical techniques, the mean amount of kavala dravya and mean time taken for samyak lakshana were found out and were respectively 50 ± 3.3 ml and 120 ± 10 seconds. Along with this, the majority of the participants had showed positive effects of Kavala like the feeling of cleanliness, increased salivation, feeling of freshness and aroma to the oral cavity. As the sample follows the standard normal distribution, the means on volume and time taken for Kavala can be extrapolated to other population. This may help to assess the reliability and comparability of future research on Kavala.



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INTRODUCTION

Ayurveda is the science of life. This ancient medical system encompasses the essential theory and practice, which leads individual and society from morbidity to well being and is meant for all living beings. Two powerful methods suggested by

Ayurveda for maintaining a perfect healthy state of mind and body are Dinacharya (Daily regimen) and Rthucharya (seasonal regimen). Under the broad umbrella of Dinacharya, procedures like 'Kavala and Gandoosha' are suggested for oral hygiene, which also take care of associated faculties like eyes, ears, tongue, teeth, gum, and parts of respiratory and digestive systems.

Mouth is the gate way of the whole body. This determines the importance of oral health in overall health. Various oral hygiene measures are available for different conditions of the oral cavity. As per The *Global Burden of Disease Study 2017*, reveals that nearly 3.5 billion people are affected by oral diseases, including oral cancers (James, 2017). This shows the existing oral hygiene measures are not effective up to the desired level. Here comes the relevance of Ayurvedic oral cleansing techniques like Kavala and gandoosha. Holding a large quantity of

liquid inside the oral cavity to a maximum time until the secretion of tears from the nose, eyes and the mouth get filled with Kapha (mucous) and spitting it out is termed as gandoosha (Dutta and Karakousis, 2014). Holding a comparatively small quantity of medicated medium in the oral cavity and performing swishing movement in the mouth and then spitting out when it turns turbid is Kavala, which is similar to gargling (Dutta and Karakousis, 2014). If oral hygiene is the target, then Kavala is more beneficial than gandoosha because of the mechanical pressure created by the swishing movement of the medicated medium.

There is no strict classical reference is found for the dose of medicated liquid medium and time of holding. This is in accordance with the capacity of the mouth of each individual and their ability to withhold. But when this procedure is utilized in clinical research, a standardized amount and time is required for the conduction of these therapies. This study aimed to fill this gap in the existing literature by standardizing the volume of the liquid medium and the holding time required for Kavala. The immediate effects obtained after Kavala were also analyzed along with this.

MATERIALS AND METHODS

The study was approved by the Ethical Committee of the Institute of Medical Sciences, Banaras Hindu University.

Study setting

Faculty of Ayurveda, Banaras Hindu University

Study population

Volunteers between the age of 20-60 years, including both sexes, were included. Members from the Ayurveda faculty who know the procedure and benefits of Kavala were selected. This approach of purposive sampling helped in the easy convincing of the procedure and benefits of Kavala to the participants.

Inclusion criteria

1. Willingness to participate
2. Age between 20-60 years

Exclusion criteria

1. Age below 20years and above 60 years
2. Diseases of the oral cavity

Sample size-30

Sampling technique

Purposive non-random sampling

Data collection

Data gathered from each sample using a pre-designed questionnaire.

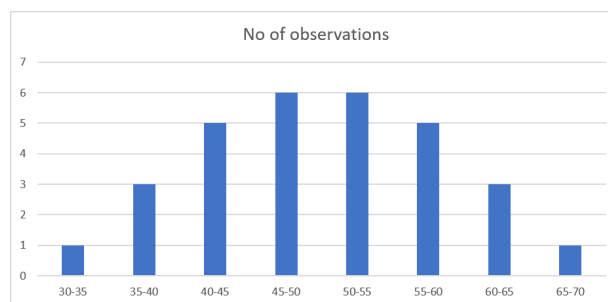
Procedure

30 volunteering participants satisfying the inclusion criteria were selected, and baseline data were collected by using a predesigned questionnaire. Fine powder of five Ayurvedic herbal drugs was taken in the proportion of 4:4:2:1:1 are given in Table 1. 120 g of this powder was mixed in 2 litre of lukewarm water, and this was used for the study.

Detailed instructions regarding the procedure were given to each participant. The maximum oral cavity capacity was measured by holding a maximum amount of water in the oral cavity. Half of the full mouth capacity is considered as the shreshtamatra of Kavala (Sooryavanshi and Mardikar, 1994). Hence, medicated medium was given in a dose of half of the maximum oral capacity for each participant for swishing movement. This amount was noted for each participant. The maximum comfortable time for holding the liquid is also noted for each participant based on the samyak lakshana, like beginning of watering from nose, eyes and the mouth get filled with Kapha (mucous). The immediate subjective effects obtained for each individual is also noted.

RESULTS

From the above study, it was observed that 13 adult male and 17 adult females participated in the study. The mean age of the male is 36.0750 ± 3 , whereas the mean age of the female is 36.96 ± 2.3 . Measures of outcome variables were made on a maximum amount of oral capacity, amount of kavala dravya used, and the time taken for attaining samyak lakshana of kavala.



Graph 1: Volume of Kavala dravya

Maximum oral capacity

The maximum oral capacity was estimated by taking the maximum amount of water in the oral cavity. The mean maximum capacity was noted as

Table 1: Ingredients of formulation

Sl No	Ingredients	Botanical Name	Quantity (Out of 6g)
1	Yashtimadhu	Glycyrrhiza glabra	2 g
2	Tila	Sesamum indicum	2 g
3	Amalaki	Emblica officinalis	1 g
4	Haridra	Curcuma longa	500 mg
5	Lavanga	Syzygium aromaticum	500 mg

Table 2: Volume of Kavala dravya

Amount of Kavala dravya	No of observations
30-35	1
35-40	3
40-45	5
45-50	6
50-55	6
55-60	5
60-65	3
65-70	1

Table 3: Time of Kavala

The class interval for a time in sec	No of observations
50-70	1
70-90	3
90-110	6
110-130	10
130-150	6
150-170	3
170-190	1

Table 4: Effect on cleanliness

	Clean feeling	
	Yes	No change
Male	12	1
Female	15	2

Table 5: Effect on salivation

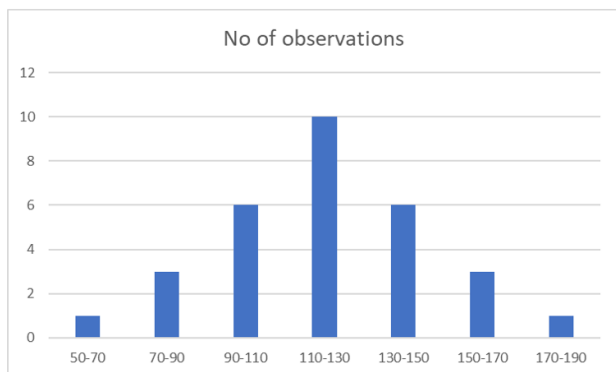
	Effect on salivation	
	Increased salivation	No change
Male	8	5
Female	11	6

Table 6: Effect on freshness

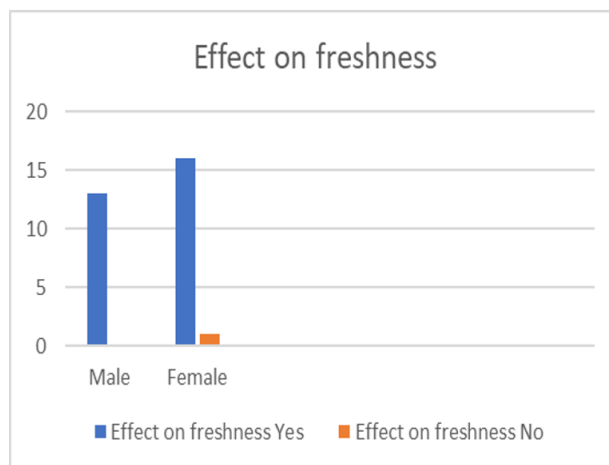
	Effect of freshness	
	yes	No
Male	13	0
Female	16	1

Table 7: Effect on aroma

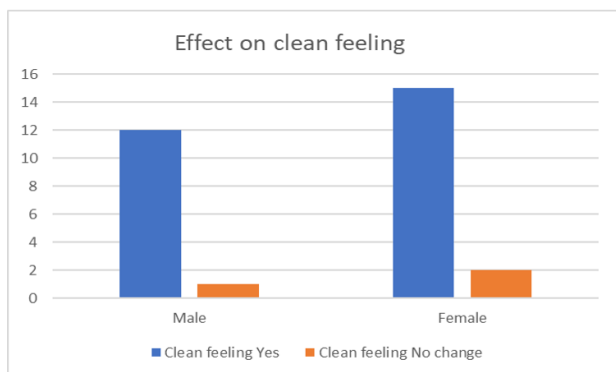
	Aroma	
	yes	No
Male	10	3
Female	14	3



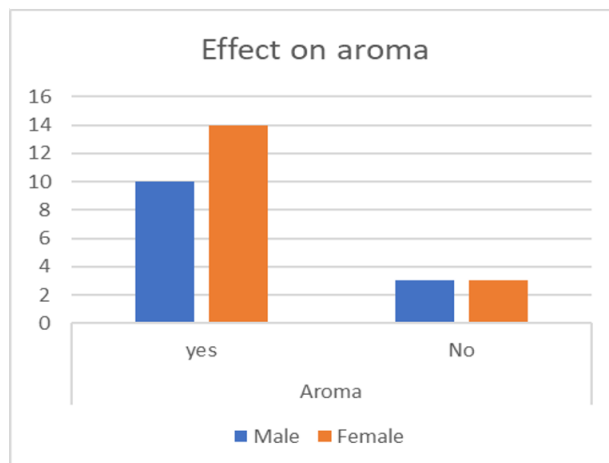
Graph 2: Time of Kavala



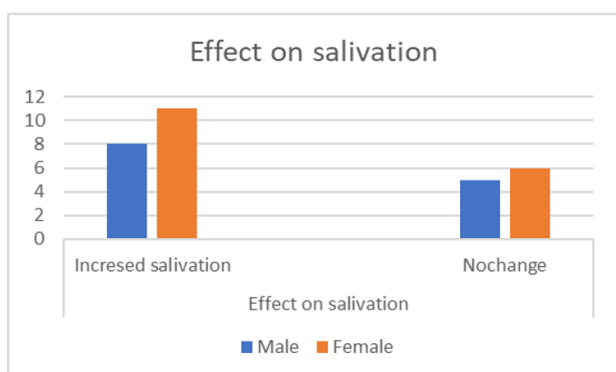
Graph 5: Effect on freshness



Graph 3: Effect on cleanliness



Graph 6: Effect on aroma



Graph 4: Effect on salivation

100±6.49 ml. The maximum oral capacity was found slightly higher for males than females, but that is not statistically significant.

Volume of Kavala dravya

The mean volume of kaval dravya with 95% confidence interval was estimated as 50±3.3 ml. The volume of each sample follows the normal distribution pattern. The details are given in Table 2 and Graph 1.

Time for Kavala

The time taken for kavala was found out for all participants. From this, the meantime was calculated with a 95% confidence interval and was calculated

as 120 ± 10 seconds. The estimated time pattern also follows a normal distribution. The details are presented in Table 3 and Graph 2.

Immediate effects of Kavala

Four immediate observations are reported by the participants, and its details are given below.

Effect on Cleanliness

Out of the 30 participants, 12 male and 15 female participants had the feeling of immediate cleanliness. The details are presented in Table 4 and Graph 3.

Effect on Salivation

Soon after Kavala, increased salivation was observed in 19 participants, whereas 11 participants had no such feeling on salivation. The details are given in Table 5 and Graph 4.

Effect on freshness

The immediate effect of freshness was observed in 13 male and 16 female participants. The details are presented in Table 6 and Graph 5.

Effect on smell or aroma

Soon after Kavala, out of 30, 24 participants had an aroma for the oral cavity, and 6 participants had no such subjective observation. The details are presented in Table 7 and Graph 6.

DISCUSSION

The maximum oral capacity of an adult individual has been found out by simply upholding the maximum volume of water in the oral cavity. The maximum oral capacity for liquids was slightly higher in males than females. This is in accordance with the findings of Xuefang Ding et al., measured by cone-beam computed tomography for measuring oral cavity capacity (Ding, 1234). Recent researchers have found that oral capacity has no influence on age, BMI, height and the number of teeth (Nascimento et al., 2012). The shreshtamatra (ideal quantity) of Kavala is half of the full mouth, whereas $1/3^{rd}$ of mouth comes under madhyamamatra (average quantity), and $1/4^{th}$ of full mouth constitutes the heenamatra (inferior quantity) for Kavala (Sooryavanshi and Mardikar, 1994). Based on the shresh-tamatra, half of the full mouth capacity of the medicated medium was taken for Kavala. Its mean was calculated and was 50 ± 3.3 ml. The standardized value of each observation also followed the standard normal distribution. Hence this measurement can be taken as a standard for future research.

The mean time taken for attaining the samyak lakshana (signs and symptoms of ideal procedure) of

kavala was calculated from the individual observations of time for each participant, and it was found to be 120 ± 10 sec. In short, each person can perform the swishing movement for up to 2 minutes. In classical Ayurvedic texts, the exact timing of kavala is not mentioned; hence this time can be used as a standard one.

The immediate effects noted after Kavala were feeling of freshness, feeling of cleanliness, aroma to the oral cavity and increased salivation. The drugs in the gargling solution may have the capacity to increase the salivary secretion. In addition, the mechanical pressure generated from the swishing movement also may stimulate the salivary glands. In an RCT on hemodialysis patients, the aroma solution was used for gargling (Oh and Cho, 2019). The chief complaint of hemodialysis patients xerostomia was relieved for the first 20 minutes of gargling and decreased xerostomia was observed even at 120 minutes (Oh and Cho, 2019).

All the drugs in this mouthwash have proven their positive actions in various conditions related to oral health. One of the major ingredients in the gargling solution is Glycyrrhiza glabra, also known as Licorice from the Leguminosae family. Active ingredients like Licorice, glycyrrhizin, glycyrrhizic acid, liquilitin, liquiritigenin glabridin, and hispaglabridins are isolated from this and has been reported to have anti-inflammatory and antiallergic properties due to glycyrrhizin (Aly et al., 2005). Glycyrrhizic acid retards the inflammatory process by inhibiting cyclooxygenase activity, prostaglandin formation, and inhibition of platelet aggregation. Liquilitin and liquiritigenin have been reported to have peripheral and central antitussive properties. Glabridin has significant antioxidant and ulcer-healing properties (Agarwal et al., 2009). Licorice is used in preventing post-operative sour throat (Agarwal et al., 2009). The sweet taste of it makes the trial drug combination a palatable one.

The sesame seeds from the plant Sesamum indicum of the Pedaliaceae family has been considered a gift of nature to mankind for its nutritional qualities and desirable health effects (Asokan et al., 2009). It has been used in different forms as tila (seeds) or oils. Both have immense use in humans. Sesame seeds are a good source of healthy fats, protein, B vitamins, minerals, fiber, antioxidants, and other beneficial plant compounds. Sesame Seeds have a high amount of phosphorous, iron, magnesium and calcium by which it preserves the bone around the teeth & gums (Pathak, 2014). They also help slough off plaque while helping to produce tooth enamel. Numerous research articles have published

on the antiplaque action of oil pulling with sesame oil (Naseem, 2017; Asokan *et al.*, 2009). Sesamol present in sesame has anti-cancerous action (Majdalawieh and Mansour, 2019). *Emblica officinalis* or *amalaki* in this combination, is a wide spectrum acting drug. This exhibits antioxidant, anti-cancer, immunomodulator, anti-inflammatory and cyto-protective properties (Yadav, 2017). Another boon from the herbal family is haridra or *Curcuma longa*. The curcumin present in this drug has antimicrobial, antioxidant, astringents and other useful properties and it is quite useful in dentistry also. Other constituents present in this drug shows antiangiogenic, anti-inflammatory, cytotoxic, anticancer, antitumour, choleric, hepatotonic, anti-sarcomic, anti-leukopenic, antiarthritic, antiedemic, antipyretic and calcium channel blocker action. Clove or *Syzygium aromaticum* from Myrtaceae family is one of the most important herbs in traditional medicine. Various phytoconstituents like monoterpenes, sesquiterpenes, phenolics and hydrocarbon compounds are present in this. The major phytochemicals found in clove oil is eugenol (70-85%), followed by eugenyl acetate (15%) and β -caryophyllene (5-12%). It has a wide spectrum of biological activity such as antibacterial, antifungal, insecticidal, antioxidant, anticarcinogenic capacities. Worldwide it is used as a food flavoring agent and has also been employed for centuries as a topical analgesic in dentistry (Mittal *et al.*, 2014). Clove helps to refresh our breath and also removes halitosis, and provides an aroma to the oral cavity. It has also antiplaque and antigingivitis action (Kothiwale *et al.*, 2014).

The combined action of these five wonderful herbal drugs constitutes the positive immediate effect of the Kavala. This combination has a wider application in long usage both in preventive and curative aspects, which are not considered under this study is a major limitation.

CONCLUSIONS

The maximum mouth capacity varies from person to person. Here an attempt has made to find out the mean of maximum oral capacity by simple administration of water. From the maximum oral volumes for each participant, comfortable oral volumes of Kavala for each participant were found by taking half of the maximum oral capacity. The mean value for kavala dravya and time for kavala were also found. These two items followed a normal distribution in the study participants. This was understood after finding the Z value for each observation. Hence, the mean volume of kavala dravya and meantime for

kavala can be extrapolated to the population also. This may help future research scholars in determining the volume of Kavala dravya and will result reliability and comparability in the outcome. The medicated medium also provide some immediate effects like increased salivary secretion, feeling of cleanliness, feeling of freshness and aroma to the oral cavity. In addition to this, the qualities of the medicines specific to different areas may also have an action on regular usage. So, this combination can be studied in human volunteers for longer duration protective benefits.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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