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Importance of *Swa Anguli Pramana* in Health Assessment: Insights from Cross-Sectional Study on *Aayama* Relationship

Research Article

Akhil Babu T[1*], Rupali R Bawa[2], Nitin Chandurkar[3], Pavan R Gulhane[4]

1. PG Scholar, 2. Associate Professor, 3. Professor and HOD, 4. Assistant Professor, Department of Rachana Sharir, Dr. D. Y. Patil College of Ayurved and Research Centre, Pimpri, Pune – 411018, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune (Deemed to be University). India.

Abstract

Introduction: The anthropometry techniques used today share similarities with the method described in *Ayurveda* by the *acharyas*. *Ayurvedic* science adopts a more personalized approach to measurement, taking into account individual variations in the body proportions for a greater precision in assessing each body part. In contrast to the modern approach, which relies on a generalized view, *ayurvedic* science offers significant advantages. Method: Survey conducted among 400 individuals to determine the correlation between *swa anguli pramana* (measurement of the width of the proximal phalanx of the middle finger in the palmar aspect) and *aayama* (height). Result: The study found that there was a change in the average *swa anguli pramana* values, which caused a noteworthy difference in the *aayama* of the individuals. The study clearly indicates that, *swa anguli pramana* is positively associated with height of individual. Discussion: However, the study does not invalidate the *swa anguli pramana* measurement technique or elevate the contemporary day standard metric system above it. The existing metric system has limitations, such as variations with changes in gender, race, and area, whereas *swa anguli* standards are individualistic and not impacted by these aspects. The study suggests that revalidation of the *pramanas* is required, but considering it as a standard system of measurement remains relevant.

Keywords: *Anthropometry, Ayu pareeksha, Cross sectional survey, Pramana sharira, Validation*.

Introduction

The significance of *pramana*, one of the ten-fold patient evaluation technique employed by ancient *ayurvedic* seers, endures even in the modern era (1). The anthropometry techniques explained in the modern era are similar to the method explained by *acharyas* in *ayurveda*, but a more specific individualistic approach for measuring each and every part of the body for an accurate knowledge of the measurements has been demonstrated in *ayurvedic* science, which, in contrast to the modern approach of generalised view, holds great benefits.

In this study, a survey with informed consent was conducted among 400 healthy individuals to determine their *swa anguli pramana* and height, aiming to establish a corelation between the two variables and draw a conclusion about the validity of *swa anguli pramana* explained by *acharays* in *samhita.* The study focuses on noting *pramana sharira's* relevance in this era and analysing if there is a need to revalidate the theory described by *acharya* in the present period of time since the life cycle has changed variably from the ancient period. *Anguli pramana,* as a tool for *ayu pareeksha,* sheds emphasis on the need of appropriate measurements of various bodily parts in order to live a wholesome, healthy, and long life. The doctrines of *pramanas* were explained by *acharyas* when the average lifespan was recorded to be around 100 years and above (2). However, the sedentary lifestyle and adoption of cultures which are foreign to the individual, which are not in keeping with the nature surrounding specific populations, have led to significant changes in individual health. Over the past few decades, this has resulted in a decline in both health and longevity across different populations. To obtain a comprehensive understanding of the extent of variation that has transpired from the ancient times to the present, it is essential to verify the *pramanas* outlined in the ancient texts.

Survey was carried out on a general population, comprising individuals within the age bracket of 25 to 45 years, to measure their height and *swa anguli*. The survey was not restricted to any particular gender, race or religion. To determine the *swa anguli* of each individual, the width of the proximal phalanx of their middle finger palmar aspect was measured in centimetres using a standardized vernier calliper. To minimize error, three measurements were taken and then averaged.

The height of each individual was measured in centimetres using measuring tape while standing with

*** Corresponding Author:**
Akhil Babu T
PG Scholar, Department of Rachana Sharir, Dr. D. Y. Patil College of Ayurved and Research Centre, Pimpri, Pune – 411018, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune (Deemed to be University). India.
Email Id: 1.akhil.93@gmail.com

their feet together against a wall in Frankfurt plane. The recorded averaged *swa anguli* measurement, also in centimetres was used to calculate the height in *anguli* measurement by dividing the obtained height by the *swa anguli* measurement.

The survey aimed to compare the average height of the individuals with the height described in ancient texts by *acharyas*. By comparing the obtained values with the height described in ancient texts, the survey could determine whether there were any variations from the height explained by *acharyas* in the classics (3).

Materials and Methods

For the present study, 400 healthy volunteers were selected

1. Descriptive Cross Sectional Survey Study: One time data collection from the respondents was recorded and interpreted statistically.
2. Present study was conducted among 400 healthy individuals.

Materials

Instruments used: -

- Measuring tape
- Vernier calliper

Criteria for selection: -

Inclusion criteria: -

- Normal healthy Individual.
- Age group- 25 to 40 years
- Both genders

Exclusion criteria: -

- Traumatic, Surgical and Accidental deformities.
- Congenital deformities.
- Auto immune diseases.

Methods

After consideration of the inclusion and exclusion criteria, each subject was assessed using a case record form. The *anguli* was measured using a standardised vernier calliper at the proximal interphalangeal joint of the middle finger in the palmar aspect of the right hand while holding the palm on a flat horizontal surface. Three measurements of *swa anguli* were obtained in the same method, and the mean measurement was taken to decrease error. The mean value of *swa anguli* in centimetres is then taken as the individual's one *anguli pramana*. Individual height was measured using a measuring tape with the subject standing against the wall facing forward in anatomical stance with feet held close together and head in Frankfurt plane. The observed height in centimetres was converted to *anguli* measurement by dividing the value by the measured *swa anguli* value. To get a conclusion, statistical data were analysed.

Precautions

While taking measurement of *anguli* for *anguli pramana*

- Rings and other ornaments were removed from the fingers.
- The vernier calliper was not pressed too tight nor left too loose.
- The hand was kept on the flat surface.
- The vernier calliper was held perpendicular to the long axis of the finger.

While taking measurement for height of individual

- The volunteer was asked to remove his/her footwear and socks.
- The head of the volunteer was kept in Frankfurt's plane.
- The volunteer was asked to inhale deeply and maintain full erect position while taking measurement.
- It was assured that the volunteer's heels were not elevated while deep breathing.

Results

Table 1

Swanguli Pramana	Frequency	Percentage
1.41-1.50 cm	40	10.00%
1.51-1.60 cm	105	26.25%
1.61-1.70 cm	134	33.50%
1.71-1.80 cm	77	19.25%
1.81-1.90 cm	27	6.75%
>1.90 cm	17	4.25%
TOTAL	400	100.00%

Table 1 represents the distribution of the measurement *swa anguli pramana* for a sample of 400 individuals.

According to the data 33.5% of individuals have a *swa anguli pramana* value between 1.61 – 1.70 cm, which is the most common range. 26.25% of individuals have a value between 1.51 – 1.60 cm, and 19.25% have a value between 1.71 – 1.80 cm. 10% of individuals have a value between 1.41 – 1.50 cm, 6.75% have a value between 1.81 – 1.90 cm, and 4.25% have a value greater than 1.90cm.

Graph 1: Bar diagram showing frequency distribution of *swa anguli pramana* in the study group

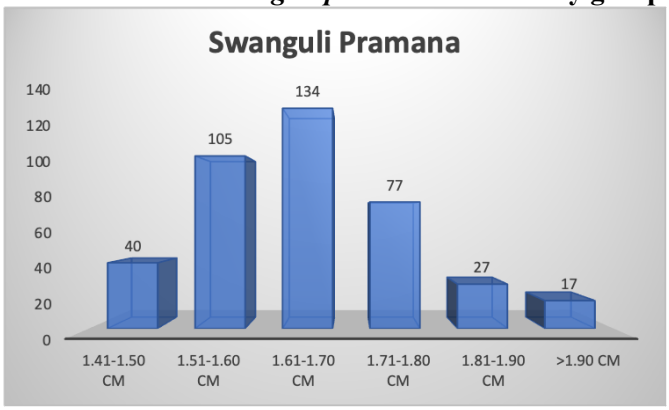

Table 2

	N	Mean	SD	Median	SE
Swa anguli Pramana	400	1.67	0.13	1.65	0.00634

Provides summary for the measurement of variable *swa anguli pramana* for a sample of 400

individuals. The measure of central tendency and dispersion are given for this sample.

The mean, or average, is 1.67, and the standard deviation (SD) is 0.13. The median, or the middle value, is 1.65. The standard error (SE) is 0.00634, which represents the degree of error associated with the estimate of the mean.

Table 3

Height	Frequency	Percentage
140-150 cm	16	4.00%
150-160 cm	153	38.25%
160-170 cm	178	44.50%
170-180 cm	52	13.00%
>180 cm	1	0.25%
Total	400	100.00%

Table 3 represents the distribution of height for a sample of 400 individuals. The height range is given in centimetres and frequency is the number of people in that height range. The percentage is the proportion of individuals in that height range with respect to total sample size of 400.

According to the data, the majority of individuals (82.75%) have a height in the range of 150- 170 cm, with 38.35% of individuals having a height between 150 – 160 cm and 44.5% of individuals having a height between 160 – 170 cm. only 4% of individuals have a height between 140 – 150 cm, 13% have a height between 170 – 180 cm, and only 0.25% of individuals have a height greater than 180cm.

Graph 2: Bar diagram showing the frequency distribution of number of individuals falling in specific group

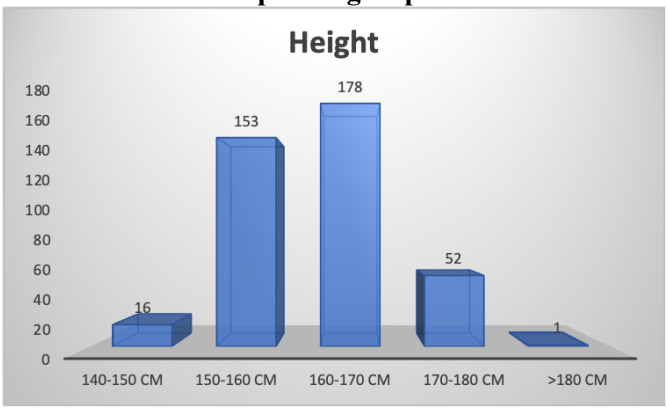

Table 4

		Height					Total
		140-150	150-160	160-170	170-180	>180	
Swa Anguli	1.41-1.50	2	24	14	0	0	40
	1.51-1.60	6	52	38	9	0	105
	1.61-1.70	5	49	68	12	0	134
	1.71-1.80	2	24	40	11	0	77
	1.81-1.90	1	4	13	9	0	27
	>1.90 cm	0	0	5	11	1	17
Total		16	153	178	52	1	400

Table 4 shows that, 16 individuals were having height between 140-150 cm out of it, 2 were having *swa anguli pramana* between 1.41-1.50 cm, 6 were having *swa anguli pramana* between 1.51-1.60 cm, 5 were having *swa anguli pramana* between 1.61 to 1.70, 2 were having *swa anguli pramana* between 1.71 to 1.80 cm, 1 was having *swa anguli pramana* between 1.81 to 1.90 cm and 0 were having *swa anguli pramana* more than 1.90 cm.

Above table shows that, 153 individuals were having height between 150-160 cm out of it, 24 were having *swa anguli pramana* between 1.41-1.50 cm, 52 were having *swa anguli pramana* between 1.51-1.60 cm, 49 were having *swa anguli pramana* between 1.61 to 1.70, 24 were having *swa anguli pramana* between 1.71 to 1.80 cm, 4 were having *swa anguli pramana* between 1.81 to 1.90 cm and 0 were having *swa anguli pramana* more than 1.90 cm.

Above table shows that, 178 individuals were having height between 160-170 cm out of it, 14 were having *swa anguli pramana* between 1.41-1.50 cm, 38 were having *swa anguli pramana* between 1.51-1.60 cm, 68 were having *swa anguli pramana* between 1.61 to 1.70, 40 were having *swa anguli pramana* between 1.71 to 1.80 cm, 13 were having *swa anguli pramana* between 1.81 to 1.90 cm and 5 were having *swa anguli pramana* more than 1.90 cm.

Above table shows that, 52 individuals were having height between 170-180 cm out of it, 0 were having *swa anguli pramana* between 1.41-1.50 cm, 9 were having *swa anguli pramana* between 1.51-1.60 cm, 12 were having *swa anguli pramana* between 1.61 to 1.70, 11 were having *swa anguli pramana* between 1.71 to 1.80 cm, 9 were having *swa anguli pramana* between 1.81 to 1.90 cm and 11 were having *swa anguli pramana* more than 1.90 cm.

Above table shows that, 1 individual was having height greater than 180 cm, *swa anguli pramana* in that individual was greater than 1.90 cm.

This clearly indicates that, *swa anguli pramana* is positively associated with height of individual.

Table 5

Chi-Square Tests			
	Value	df	P-Value
Pearson Chi-Square	102.056	20	0.000
N of Valid Cases	400		

Chi-Square Test is carried out to test association between height and *swa anguli*. From above table we can observe that, P-Value is less than 0.05. Hence, we can conclude that, there is significant association between height and *swa anguli*.

Table 6

	N	Mean	SD	Median	SE
Height	400	164.75	7.771	164	0.3886

This table provides summary for the measurement of height for a sample of 400 individuals. The measure of central tendency and dispersion are given for this sample.

The mean height is 164.75 cm, and the standard deviation (SD) is 7.771 cm. The median height is 164 cm, and the standard error (SE) of the mean is 0.3886

cm. In conclusion, the data provides information on the height of the sample of 400 individuals with the average height being 164.75 cm and the majority of the heights being around 164 cm. the standard deviation of 7.771 cm indicates moderate variability in the heights, and the standard error of 0.3886 cm suggests that the mean estimate has a relatively low degree of error.

The conversion from centimetres to *anguli* is done by dividing the height measurement in centimetres by the mean *anguli* measurement. The average height of the sample in centimetres is 164.75 cm, and dividing it by the mean *swa anguli* measurement (1.67 cm) gives us an average height in *anguli* measurement of 98.65 *anguli*. This value represents the average height of the sample expressed in the unit of *anguli*.

Discussion

The study of 400 healthy individuals found that the average *swa anguli pramana* was 1.67cm and the average height was 164.75cm. this resulted in an average height in *anguli* of 98.65, which is higher than *acharya charaka's* suggested average of 84 *anguli*. The difference in *aayama* could be due to a decrease in *swa anguli pramana* values. To better understand the health standards set by acharya in earlier times, it is important to evaluate the context in which he presented average measurements. Acharya's guidelines for a healthy life of 100 years were established based on the life expectancy during that era, which is significantly higher than the current life expectancy. This, however, does not prove that *swa anguli pramana* is invalid, nor does it elevate the contemporary day standard metric system above it. The existing metric system seems to have a limitation in that it varies with changes in gender, race and area, among other things, whereas *swa anguli* standards are not impacted by these previously mentioned aspects since they are individualistic. As a result, revalidation of the *pramanas* is required for the time being, as changes have been noted; however, considering it as a standard system of measurement remains relevant in these times as well.

The body grows at different rates and stops growing at a certain stage. While the average measurements of the body are fixed, variations can occur during growth. Anthropometry has many uses in science, art, and commerce, but *ayurveda* notions are unique in that they may predict not just disease prognosis but also an individual's longevity. It becomes even more significant when it is noted that even if a cut digit of the individual is acquired, a scientific calculation of all his body measures may be generated indirectly based on data collected from the examination of references related to *pramana sharira*.

The field of forensic medicine relies on the regression equation to estimate stature, but this presents a challenge because these equations cannot be applied universally to all population groups. As a result, it is necessary to develop region specific and population specific regression equation to accurately estimate stature from the skeletal remains. In contrast, *ayurveda* utilises a personalised and universal tool of measurement *anguli*, which can be used in any population or region, as it is an individualised technique. In this study, only total heights are compared to *swa anguli* readings. Similarly, using the concept of inter measure comparison, any measures of the body may be inferred even from a single known measurement. This is especially useful for estimating body sizes in a disfigured or dismembered body (4).

Conclusion

Study revealed that there are discrepancies in the values of *aayama* and *swa anguli* measurements as per the prescriptions of *acharyas*. However, the study also emphasizes that the *swa anguli pramana* is superior to the metric system due to its personalized approach, leading to greater accuracy. This study underlines the immense potential of *pramana sharira* in advancing the field of *vyavahara ayurveda*, which requires further exploration.

The study also emphasizes the importance of having a deep and genuine understanding of our *samhitas*, which can lead to significant advancements in knowledge within the field. By closely studying the teachings of the *acharyas*, practitioners can gain a deeper insight into the principles of *vyavahara ayurveda* and refine their techniques accordingly. This, in turn, can lead to better patient outcomes and a more effective approach to healthcare.

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