ORIGINAL RESEARCH PAPER

Ayurveda

CONCEPT OF ANTHROPOMETRY IN AYURVEDA

KEY WORDS:
Anthropometry, Shadang Shareera

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ABSTRACT

Ayurveda, being a medical science, dealt with the human body. The pioneers of this ancient were well versed of the human body, both in its external and internal form. The concept of anthropometry has its roots in the concept of Shadang Shareera described by Ayurvedic Samhitas giving origin to the regional anatomy. The use of various indices in modern anthropometry for inter measure comparison are well known. A similar methodology can be adopted for the measurements described in our Samhitas for the derivation of new Ayurevadic indices to mathematically represent the grade to which the individual is Sama or Vishama Pramana, thus indirectly indicating his longevity. The best example in this regard will be the adoption of Relative Span Index or Span Stature Index. Thus concept of anthropometry was well developed in Samhita period. The words 'Pramana' and 'metry' are related to measurement. Thus, anthropometry (measurements related to human body) is the same as Praman Sharir described in Ayurvedic Samhitas. The vast description and elaborate commentaries and their description in context of clinical examination (Aatura Pariksha) show that the concept of anthropometry was well developed during the period when Samhitas were written. The concepts of cosmetology, forensic science etc. are present in Samhitas which are needed to be elaborated further. Thus, even though modern anthropometry is of recent origin, the concept was present long ago, which will be elaborated while paper presentation.

INTRODUCTION

Anatomy is the branch of medical science which deals with the study of structural basis of the human form and thus to explain the structural basis of the functioning of the human body in health and in disease. The functioning of the body is closely interrelated with the structure and hence their study is inseparable. It is with this conscience that scholars of *Ayurveda*, in ancient India coined the word *Shareera,* literally meaning 'related to the *Shareera* or human body' which includes the structure of the body and the function associated with it.

The knowledge of anatomical basis of human body is imperative for clinical practice. That is why *Acharya Sushrutha*, considered to be the best in *Shareera* remarked,

शरीरे चैव शास्त्रे च दृष्टार्थः स्यादविशारदः | | दृष्टश्रुताभ्यां संदेहमवापोह्याचरेत् क्रिया | | *(Su.Sh.5/6)*

Anthropometry is the branch of anatomy dealing with the measurements related to the human form. Anthropos means human and metry means measurement. Anthropometry is defined as the branch of anatomy dealing with the measurements related to the human form. 'Anthropos' means human and 'metry' means measurement. Anthropometry is defined as the measurement of human individual for the purpose of understanding human physical variation. It deals with the study of physical dimensions of the human form to define normal from abnormal quantitatively. Thus anthropometry has its role in clinical medicine, forensic science, criminology, ergonomics, paleontology etc. related to medical science and also in other fields such as industry, construction and design, clothing industry etc. In clinical medicine, it also helps to study conditions of variance in human form, for example as in obesity and malnutrition, chromosomal disorders, developmental abnormalities etc and to express them quantitatively.

The concept of anthropometry had its importance even during the period when the classics of *Ayurveda* were written. This is evident from the references regarding the *Pramaanas* of various *Angas* mentioned in contexts of *Athura Pareeksha* and *Marma*. It is clear that *Acharyas* had idea of the structure of the human body and the proportions of the human form. Detailed description is available in all *Samhithas* regarding the proportions of human body and since these are told in the context of *Athura Pareeksha*, it is described in relation to clinical medicine. The measurements in general are explained in relation to the breadth of the fingers of the person being measured. The *Samhitas* have explained *Pramana Sharira* in their respective contexts of *Athura Pareeksha* , and as *Acharya Sushruta* explained,

"अथ पुनरायुषो विज्ञानार्थमङ्गप्रत्यङ्गप्रमाणसारानुपदेक्ष्यामः |..." *(Su.Su.35/12)*

i.e., the aim of anthropometry was basically to determine the longevity of the individual.

AIM OF STUDY:

1. To explore the concepts related to anthropometry in *Ayurvedic Samhithas*.
2. To compare the data available in this regard from various *Samhithas*.
3. To establish relation between modern anthropometric findings and descriptions available in the *Samhithas*.

MATERIALS AND METHODS:

1. Reviewing of *Ayurvedic* classics including relevant commentaries regarding the concept of anthropometry.
2. Review of all available literature related to modern anthropometry.
3. Reviewing of internet materials, journals, periodicals and previous research papers related to this subject.

Need Of Study:

The concept of anthropometry is described in great detail in the *Samhithas*. But till date, no scientific verification of this data or its analysis has been done. This study would be a base for further detailed studies to be done in this regard. Anthropometry has undergone much development in modern era and has wide clinical application. A few examples include the various body indices such as cephalic index (used in criminology, paleontology, forensic science etc.), pelvimetry (useful in obstetrics) to limb length measurements useful in orthopedics. Thus this field has wide spread application and thus it is relevant to bring out the related concepts described in *Ayurveda* in this regard.

It is common observation in case of all sciences in ancient india was practically oriented. Thus it is not surprising that the

tools for measurements used were also on the basis of their utmost practicablity and simplicity. In case of length measurements, for measuring lengths from small, medium to large magnitudes, various modalities were used, most simple of which involved the plain hand. Starting from the small measures measurable with the finger to medium breadths involving palm or distance between tip of thumb and little finger to length from the tip of middle finger to elbow for slightly higher measurements to length of the arm.

References Of Praman Sharira :

Acharya Sushruta has described *Pramana Sharira* in context of *Aatura Pareeksha* in 35th chapter of *Sutrasthana* i.e., *Aaturopakramaniya Adhayaya*.

The refrences are as follows :

" अथ पुनरायुषो विज्ञानार्थम.....

सविंशमङ्गुलशतं

पुरुषायाम इति |" (Su.Su.35/12)

Aacharya Carak has given his description of *Pramaan Sharira* in the 8th chapter of *Viman Sthana* i.e., *Rogbhishakjitiya Adhyaya* .

प्रमाणतश्चेति शरीरप्रमाणं.....हीनेऽधिके वा ||

(C.Vi.8/117)

Vagbhatta has described *Pramana Sharira* in *Sharira Sthan* 8th Chapter.

प्रमाणंपुनः स्वाङ्गुलैः |.....हीनमअधिकं वा ||

(A.S.Sh.8/37)

In the commentaries on references in *Sushruta Samhita* :

Dalhana-Nibandhasamgraha teeka:

यदपेक्षया ललाटादीनां..... पुरुषस्य दैर्ध्यम् ||

Haranchandra-Susrutarthsandeepani Teeka:

अथेत्यदि.....दीर्घायुत्वमुपेयमिति तात्पर्यम् |

Bhanumati Teeka by *Cakrapani*:

अत्र ललाटादीनां .....इत्यादीनां प्रमाणभेद उक्त: ||

Commentaries on references in *Carak Samhita*:

Cakrapani :

प्रमाणतश्चेत्यादिना प्रशस्तं.....अधिके इति अधिक प्रमाणे ||

Acharya Gangadhara-Jalpakalpataru Teeka:

अथ प्रमाणतः

परीक्षामाह.....चतुरशीतिपर्व्वमितमिति भावः||

Commentaries on *Vagbhatta*:

Shashilekha Vyakhya Indukrit:

अनन्तरं शरीरावयवानामङ्गुलादिना.....हीनाधिक प्रमाणावयवमनिष्टम् ||

Importance Of Examination Of *Praman* And *Sara*:

The expert physician succeeds in his work if he proceeds after examining the lifespan particularly on the basis of measuerements of parts and sub parts of the body and essential predominance of *Dhatus* etc.

विशेषतोऽङ्गप्रत्यङ्गप्रमाणादथ सारतः |

परीक्ष्यायु: सुनिपुणो भिषक् सिध्यति कर्मसु ||

(*Su.Su.35/17*)

On direct observation to the references of *Pramana Sharira*, the astute observation of our *Aacharyas* regarding the proportions of the human body are self evident. But the fact that is generally missed during the analysis is that even though the individual measures given are in proportion to the fundamental unit which is *Anguli Praman* here, there is also a possibility of inter measure comparision to derive new proportions. Thus, for example, when we say that chibuka is two angula in length and *Asya* is four *Angula*, the indirect indication is that the length of *Asya* is twice of *Chibuka*. Similarly, when we say " चतुरङ्गुलानि मेहनवदनान्तरनासाकर्णललाटग्रीवोच्छायहृष्टयन्तराणि", even though the direct interpretation is that lengths of *Mehanvadanantar*, *Nasa*, *Karna*, *Lalata*, *Greeva* etc are four *Angula*, it indirectly also means that the length of these measurements are equal to one another, i.e. length of *Nasa* is equal to length of *Karna* which is equal to length of *Lalata* etc. This analysis may be done in case of all measurements given in *Samhitas*. Thus ideal facial anthropometry of human is when these lengths are in a proportion which are mentioned.

Aacharya Sushrut has described *Anguli Pramaan* primarily for the assessment or estimation of the longevity or lifespan of the individual and also to assess the status of the individual, especially the economic status like those who are *Sama Pramaan* , i.e. those who have normal body proportions should possess a long life and wealth where as those who have *Madhyam Pramaan* , i.e. moderate *Sharir Pramaan* possess moderate lifespan and wealth and those having *Heen Pramaan* have short lifespan and poor economic status.

Angula Pramaan	Type of sharir (Body)	Rugna Bala (Immunity of patient)	Dosha Bala (Severity of disease)	Aoushadhi yojana (Drug therapy)
Equal to 84 angula	Prakrut (Proportionate)	Pravara bala (Good immunity)	Pravara (Severe)	Tikshna Aoushadhi (Strong drug)
			Madhya (Moderate)	Madhya Aoushadhi (Medium drug)
			Avara (Mild)	Mrudu Aoushadhi (Mild drug)
Less than 84 angula	Heen (Less)	Heena/Avar bala (Poor immunity)	Pravara (Severe)	Mrudu Aoushadhi (Mild drug)
			Madhya (Moderate)	Mrudu Aoushadhi (Mild drug)
			Avara (Mild)	Mrudu Aoushadhi (Mild drug)
More than 84 angula	Adhik (More)	Madhyam bala (Moderate immunity)	Pravara (Severe)	Madhya/ Tikshna Aoushadhi (Moderate/Strong drug)
			Madhya (Moderate)	Madhya Aoushadhi (Moderate drug)
			Avara (Mild)	Mrudu Aoushadhi (Mild drug)

DISCUSSION

From analyses, it has become clear the anthropometric data can be used to evaluate unknown body measurements from known measurements. This is highly significant in developing concepts related to forensic medicine in *Ayurveda*. For

example, if the cut upper limb or any other body part is obtained, the data of *Pramana Sharira* and these proportions of the human body can be used to determine the height and all other body measurements of the individual. It becomes further significant when observed that even a cut digit of the individual is obtained, a scientific estimation of all his body measurements can be indirectly made based on data obtained from the analysis of references related to *Pramaana Sharira*. Thus the estimation of total height from various measurements can be derived as follows. These measurements are given as per reference in *Carak Samhita* because *Acharya Sushruta* described total vertical span rather than the height of the individual.

For example total height of the individual would be-

- 84 times the average width of fingers of upper limb.
- 21 times the length of, vertical length of ear, height of forehead, distance between pupils, height of foot and knee joint and vertical height of neck .

Derivation of new *Ayurvedic* Indices based on *Pramaan Sharira*:

The use of various indices in modern anthropometry for inter measure comparision are well known. A similar methodology can be adopted for the measurements described in our *Samhitas* for derivation of new *Ayurvedic* indices to mathematically represent the grade to which the individual is *Sama* or *Vishama Pramaana*. Thus indirectly indicating longevity.The best example in this regard will be the adoption of Relative Span Index or Span Stature Index, which is the ratio of the span of height vertex multiplied by 100.

A similar *Ayurvedic* index would be as *Vistaar-Aayam Index*, *Bhuja- Purushayam Index*, *Prabahu-Purushaayam Index*, *Uru-Jangha Index*, *Ura-Purushaayam* etc.

CONCLUSION

Beauty is an expression of symmetry and perfect symmetry arises from various parts of the body being in proportion. Thus the study of body proportions as described in the references of *Pramana Sharir* in *Ayurvedic Samhitas* has been studied. " *Concepts of Anthropometry in Ayurveda*" is a primary approach to understand the diverse the scope and applicability of the detailed description of *Pramana Sharir* described in *Ayurvedic Samhitas*. The following conclusion can be arrived.

Anthropometry was well developed in *Samhita* period.
The words *Pramana* and metry are related to measurement. Thus, anthropometry is same as *Pramana Sharir* described in *Ayurveda Samhitas*. The vast description and elaborate commentaries and their description in contexts of clinical examinations(*Aatura Pariksha*) show that the concept of anthropometry was well developed during the period when *Samhitas* were written. Even though modern anthropometry is of recent origin, the concept was present long ago.

Definition of Perfect body proportions-

Perfect body proportions not only signify beauty, but is also a symbol of health. Thus defining perfect proportion is of importance to medical science. It forms a part of anatomy dealing with external anatomy of human body and defines normal body proportions .

- *Anguli Pramana* is a better tool to describe measurements compared to absolute measurements.
- It gave in the first place, a unit of measurement.
- It was personalised as it differs from individual to individual.
- It was standardised because the result measured was not an absolute value but a ratio between the length of the part measured to the *Anguli Maan*.
- It is a cheap and readily available means of measure
- The measurements are easy to measure and express.
- This also shows to the modern scientific world the advanced state of *Ayurvedic* anatomy and thus *Anguli Pramana* can become a proof of what we can contribute to the modern community from what we can learn and comprehend from the study of our ancient literatures.
- Modification of *Pramana Pariksha* and incorporation of objective measurement of *Pramana* into *Ayurvedic* case proforma by means of new derived indices.
- New *Ayurvedic* indices may be discovered, analyzed and incorporated into the *Ayurvedic* clinical examination proforma to improve *Pramaan Pareeksha* and *Aakriti Pareeksha* described in *Dusvidha* and *Ashtvidha Pareeksha* and to give them mathematically representation for objective analysis to replace the current subjective assessment.

Contribution to *Vyavhar Ayurveda*

Anthropometric data can be used to evaluate unknown body measurements from known measurements. This is highly significant in developing concepts related to forensic medicine in *Ayurveda*, a perfect example in this regard being estimation of total height from various known measurements based on references of *Pramaan Shareer*.

Thus, we can see concepts of anthropometry are described in samhitas at places with significant elaboration which shows concept of anthropometry in ayurveda and shows the path for further illustration for better use.

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