INTRODUCTION

Anthropometry is the science which deals with the measurement of the size, weight and proportions of the human body. This concept of measurement are discussed in Ayurveda as pramana sharir. Pramana sharir is included in dashavidh pariksha, in vimanshan 8th chapter of charaka Samhita, in sutrasthan 35th chapter of susruta samhita and in Astanga sangraha sharir sithan 8th chapter. Pramana sharir emphasized mainly Anguli and Anjali pramana. Anguli pramana is a morphometric measurement while Anjali pramana related to liquid tissue measurement. Angulipramana which is based upon swa-anguli.e. measurement of ones own finger. It is the unit for measurement of the different body structure specially external components. Here, the structures are measuring in terms of utsedha (height), Aayama (length), parikshepa or parinaha (circumference) and Vistara(width). It is emphasized that Sama purusha i.e equal Aayama and Vistara associated with longevity of life, physical and mental strength, immunity and happiness while absence of these measurement either increase or decrease may create adverse effect. Classics especially Sarangadhara concept can be highlighted in this aspect. In mana paribhasa regarding the measurement of drava-dravya Sarangadhara cited the references. Commentary here Adhmalla clearfies this 3 places as

1. Nakha tala bhaga of angustha
2. Madhyama parva of madhyama angul

Key Words: Swa-anguli, Standardization, AayamaVistara, Vernier caliper.
3. Chaturanguli

This is an indirect reference which has been taken as a parameter for this work.

Present work wants to standardized the Anguli pramana to evaluate most accurate area for measurement.

Aims and objective

Standardization of selection of site for measurement of Anguli.

MATERIALS AND METHODS

For the present study, 100 healthy volunteers were selected from Govt. Ayurvedic College & Hospital, Jalukbari, Guwahati- 14 and study carried out in the Department of Sharir Rachana.

Criteria for selection

Inclusion Criteria

1. Healthy volunteers having proportionate body parts.
2. Age group between 25-75 yrs.

Exclusion criteria

1. Individuals with musculoskeletal or neurological diseases.
2. Individuals with physical disabilities along with amputation.
3. Congenital abnormality related to limbs.

Assessment of Anguli praman

Vernier caliper has used to measure the measurement of swa-anguli pramana of an individual which are recorded in centimeter. Aayama and Vistara of an individual has taken by measuring tape which are recorded in centimeter and then reading has been recorded with dividing it by swa-anguli to convert it in Anguli pramana.

Measurement of swa-anguli has done in following places of Anguli with the help of Vernier caliper.

1. Nakha tala bhaga of Angustha (mean medio-lateral site at nail bed of thumb finger of both hands).
2. Madhyama parva of madhyama anguli (mean medio-lateral measurement at proximal interphalangeal joint of middle finger of both hands).
3. Measurement of chaturanguli (four fingers together) has done in following levels in ventral and dorsal aspect of hand.
   a. Near the metacarpo phalangeal joint of both hands.
   b. Proximal interphalangeal joint of index finger of both hands.
   c. Proximal interphalangeal joint of little finger of both hands.

Data received in each level is divided by 8. This result again divided by 3 and the calculated average will show dimension of 1 finger at chatur anguli ventral level. Same procedure is also carried out for chatur anguli dorsal level.

Instrument Used

- Vernier caliper
- Measuring tape
- Nakha tala bhaga of Angustha (mean medio-lateral site at nail bed of thumb finger of right hand).
- Madhyama parva of madhyama anguli (mean medio-lateral measurement at proximal interphalangeal joint of middle finger of right hand).
Measurement of Aayama and Vistara

For Aayama, patient’s height is taken in centimeter with the help of measuring tape. Now, following way Aayama is calculated. For eg.

\[ \text{Aayama} = \frac{H}{S} \times 100 \]

Here ‘H’ = height in centimeter.

‘S’ stand for calculated swa-anguli (by Vernier caliper) in centimeter.

For vistara, in standing position maximum distension measured between tip of middle finger of right and lefthand and face looked straight. It is measured by measuring tape. Now, following way Vistara is calculated. For eg.

\[ \text{Vistara} = \frac{M}{S} \times 100 \]

Here ‘M’ is (maximum distance between tip of middle finger) And ‘S’ is considered as swa-anguli in centimeter.

Precaution

Measurement for taking Swa-anguli

1. Ornaments were removed from the fingers.
2. The vernier caliper was neither pressed too high nor to loose. It was assured that there was no space between the caliper and the finger.
3. Measurement taken in seating posture with hands kept on flat surface when the arm remains on the site of thorax.
4. The vernier caliper was held perpendicular to the long axis of the finger.

In measurement for taking Aayama and Vistara

1. The volunteer was asked to remove his/ her food wear and socks.
2. Data has taken in frankfurt’s plane.
RESULT AND DISCUSSION

The present study carried out in 100 volunteers in the age group of 25 to 75. Dimensions of Anguli at different site has tabularized and calculated below:

Table 1 Age and sex wise distribution of 100 patients

<table>
<thead>
<tr>
<th>Age group</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-35</td>
<td>12</td>
<td>4</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>&gt;35-45</td>
<td>12</td>
<td>20</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>&gt;45-55</td>
<td>12</td>
<td>16</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>&gt;55-65</td>
<td>18</td>
<td>5</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>&gt;65-75</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>75-100</td>
<td>55</td>
<td>45</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Maximum patient has found in the age group of 35-45yrs, where 12 are male and 20 are female. Only 1 patient remains in the age group of 65-75 years. (Table 1)

At madhyama anguli Aayama and Vistara are more close to 84 angula with mean 85.01 and 85.95 respectively in Aayama and Vistara. Result placed in the range 83.52-86.68 and 83.80-88.11 for Aayama and Vistara when analysed at 95% of CI. In ventral aspect the results are much higher where mean Aayama has recorded 87.21 and Vistara 88.02 respectively. In 95% CI Aayama is recorded in the range 85.91-88.54 while Vistara has recorded in the range of 86.28-89.77. (Table 2)

Table 2 Measurement in different level

<table>
<thead>
<tr>
<th>Level</th>
<th>Mean</th>
<th>SD</th>
<th>SE</th>
<th>95% of CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nakhatala Bhaga</td>
<td>85.77</td>
<td>7.14</td>
<td>7.61</td>
<td>84.36-87.17</td>
</tr>
<tr>
<td>Madhyama anguli</td>
<td>85.01</td>
<td>7.90</td>
<td>8.09</td>
<td>83.52-86.68</td>
</tr>
<tr>
<td>Chaturanguli</td>
<td>87.21</td>
<td>8.90</td>
<td>9.09</td>
<td>85.91-88.54</td>
</tr>
<tr>
<td>Chaturanguli (Dorsal aspect)</td>
<td>85.77</td>
<td>6.55</td>
<td>6.66</td>
<td>84.58-86.41</td>
</tr>
</tbody>
</table>

Table 3 SamaAayama and Vistara

<table>
<thead>
<tr>
<th>Cases</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
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<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
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<td>91.93</td>
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<td>82.01</td>
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<td>83.58</td>
<td>83.58</td>
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<td>8</td>
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<td>84.38</td>
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Table 4 Above 84 angula in Aayama & Vistara

<table>
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<tr>
<th>Level</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nakhatala Bhaga</td>
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<td>87.84-91.13</td>
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<tr>
<td>Madhyama anguli</td>
<td>84.54-93.43</td>
<td>89.45-94.33</td>
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<tr>
<td>Chatur anguli (Ventral aspect)</td>
<td>88.44-92.33</td>
<td>89.12-92.05</td>
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<tr>
<td>Chatur anguli (Dorsal aspect)</td>
<td>88.56-90.35</td>
<td>87.79-89.67</td>
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</table>

Table 5 Below 84 angula in Aayama & Vistara

<table>
<thead>
<tr>
<th>Level</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
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<th>Vistara</th>
<th>Aayama</th>
<th>Vistara</th>
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</thead>
<tbody>
<tr>
<td>Nakhatala Bhaga</td>
<td>78.57-80.51</td>
<td>80.83-82.71</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Madhyama anguli</td>
<td>76.44-78.36</td>
<td>78.73-80.79</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Chatur anguli (Ventral aspect)</td>
<td>76.91-78.98</td>
<td>80.15-82.05</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Chatur anguli (Dorsal aspect)</td>
<td>78.19-79.81</td>
<td>79.99-81.80</td>
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</tbody>
</table>
DISCUSSION

Dashavdihda rogi pariksha is performed to assess the doses of therapy which have to be prescribed. 10 factors are considered here, where pramana placed in 5th position. Susruta also stressed pramana in consideration of knowledge of Aayu which he categorized as Dirgha, Madhya and Alpa.

In Brihatrayee, the procedure of measurement of swa-anguli is not found, where later Sarangadhara puts a glim of this aspect. In this context 3 references are found i.e. Nakha, Madhyama and Chaturanguli.

84 anguli ascertained as Aayama i.e. height and Vistara i.e. expanded full arm length which is the distension between apex of middle finger of both hands. Individual bearing equal height (Aayama) and breadth (Vistara) expected to endowed with health happiness, strength, power, virtue and foremost longevity. Increase or decreased of this measurement will associate morbidity. Charaka mentioned different length for body structure mostly part of extremities, part of thorax, abdomen, pelvis, and head & neck.

Few research work has done in this aspect where determination of places for anguli is carried out. Dr. S.K. et.al, Dr. UdayBhoir have done clinical study on anguli pramana.

In this present study measurement has taken in 4 places i.e. mean medio- lateral dimension at nail bed of thumb finger of both hands, mean medio- lateral dimensions of proximal interphalangeal joint of middle finger of both hands, Chaturanguli ventral and Chaturanguli Dorsal (mean dimension of metacarpo phalangeal joint, proximal inter phalangeal joint of index finger of both hands, proximal interphalangeal joint of little finger of both hands) Data shows mean Aayama in all these 4 site collectively has found in Aayama 85.94(95% of CI 85.03 -- 86.84) where mean Vistara is 86.71(95% CI 85.82-87.66) which is slightly higher than 84 angula. However to ascertain this site 4 places showed different levels.

Here maximum proximate to 84 angula is found 85.01 in Aayama (95%CI 83.52-86.68) at the level of proximal interphalangeal joint of middle finger where vistara is 85.95 (95%CI 83.80-88.11)

Aayama and Vistara is found maximum at chaturanguli ventral i.e. 87.21 (95%CI 85.91-88.54) and 88.02 (95% CI 86.28 – 89.77) respectively. 47 cases are found below 84 angula and 53 cases are found above 84 angula.

Nearer to 84 angula i.e.83.5-84.5 is found in Aayama with highest in 14 cases(14%) at Nakha tala bhaga while in Vistara, 11 cases (11%) is found at chaturanguli (dorsal).

Anthropometric measurement has stressed as a governing factor for health and longevity and each exhibition are also found with Sama Aayama and Vistara in 8 cases. Among 8 cases, 2 cases has found at proximal inter phalangeal joint of middle finger i.e. 84.33 and 84.55 while 2 cases has found at chaturanguli (dorsal) i.e 84.41 and 84.38.

Result found in relation to height in male and female is 156.94 centimeter and 149.60 centimeter respectively. However which is less than mean national height of Indian male 164.9 centimeter as well as height of female is 152.6 centimeter respectively. This occurs probably due to geographical distribution of this region.

CONCLUSION

The Anguli pramana is the specific parameter for assessment of height, length, circumference and width which is mentioned as uoshi, aayama, parikshepa and vistara respectively. The Present work has been performed taking the width of the finger (medio- lateral aspect) in selected 4 areas by vernier caliper. The data shows a higher range in all these places. However at proximal interphalangeal joint of middle finger the mean dimension become maximum closer to 84 angula in Aayama i.e.85.10 and in vistara i.e. 85.95 followed by at dorsal aspect in Aayama i.e. 85.77, and in vistara i.e. 86.30 while at Nakha tala bhaga in Aayama i.e.85.77 and in Vistara i.e.86.59 whereas at ventral aspect in Aayama i.e. 87.21and in Vistara i.e. 88.02 has recorded.

Sama Aayama and Vistara is considered as best in classics. In this study this has been found in 8 cases. Thus, the work wants to highlight the proximal interphalangeal joint of middle finger as the premier area for measurement of ones own anguli. This
result definitely needs a further evaluation where reduction of skin fold at this selected site may give the exact measurement.

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