CHAPTER 6

DATA COLLECTION AND ANALYSIS

6. DATA COLLECTION AND ANALYSIS

Nāḍī Taraṅgiṇi, a simple, cost effective and non-invasive pulse acquisition system, was used for collecting pulse data which has three linearly placed pressure transducers, a 16-bit multifunction data acquisition card NI USB-6210 (National Instruments, TX, USA) and LABVIEW, a data acquisition software. The pulse data was sampled at 500Hz and LABVIEW was used for acquiring the sensor data and storing it in personal computer. The pulse data collection was done in two sessions 6am to 1pm and 1pm to 4pm. The pulse data was collected for one minute by placing the sensors on *vāta, pitta and kapha doṣa* locations on the wrist. Initially the pulse was sensed with fingers to identify the exact *vāta, pitta and kapha* locations and then the sensors were placed by closely aligning it with the sensed locations. The pulse data consists of time and amplitudes of the pulse at *vāta, pitta and kapha* locations. As the pulse data gets corrupted due to the noise induced by electrical and electronic sources, it was cleaned using wavelet transformation. The pulse data with clear systolic and diastolic peaks was considered for the study and remaining data was discarded. It is observed that only some individuals had proper systolic and diastolic peaks in all the three locations and in others peaks were not proper in one or other locations. The stiffness index SI and reflection index RI were computed for each of the *vāta, pitta and kapha* pulses from these proper systolic and diastolic peaks. The age, height, body mass index (BMI), systolic blood pressure (SBP), and diastolic blood pressure (DBP) of the participants were measured. All the measurements were done at the beginning of the yoga program. Blood pressure was measured using

Sphygmomanometer. In Obesity study the pulse parameters, BMI, systolic and diastolic blood pressure were recorded before and after the intervention.

6.1 PULSE PARAMETERS

The pulse data acquired by *Nāḍī Taraṅgiṇi* was a continuous wave and **Fig 6.1** corresponds to single pulse wave isolated from stream of pulse waves. The stiffness indices are computes as follows.

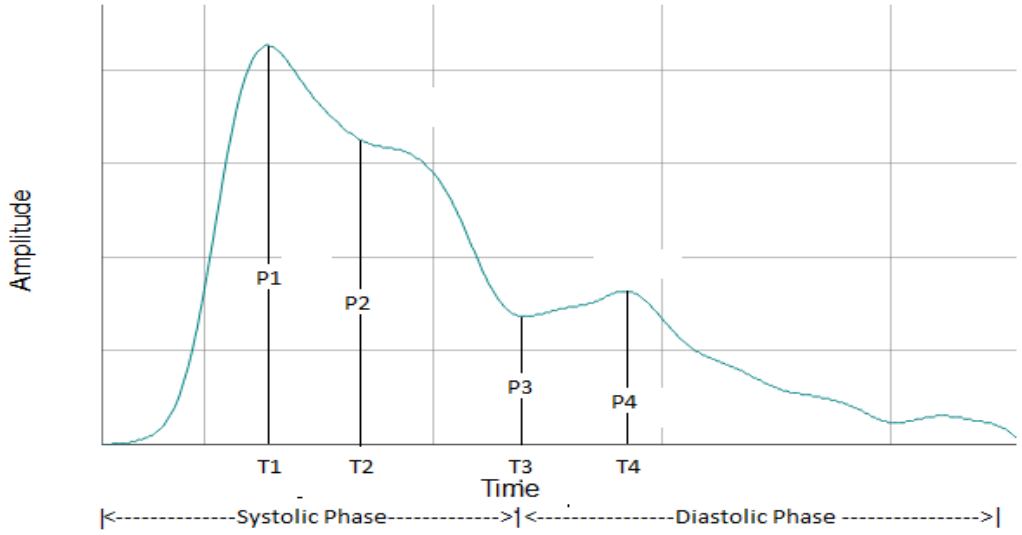

Fig 6.1 Pulse wave acquired using *Nāḍī Taraṅgiṇi*

The pulse amplitudes P1, P2, P3 and P4 are measured from the base of the pulse wave

- *P1 = pulse amplitude at systolic peak*
- *P2 = pulse amplitude at inflection point*
- *P3 = pulse amplitude at dicrotic notch*
- *P4 = pulse amplitude at Diastolic Peak*

Time periods T1, T2, T3, T4 are measured from start of the systolic phase.

- *T1 = time period at systolic peak*
- *T2 = time period at inflection point*
- *T3 = time period at dicrotic notch*
- *T4 = time period at diastolic peak*

The pulse data acquired by *Nāḍī Taraṅgiṇi* was a continuous wave and **Fig 6.1** corresponds to single pulse wave isolated from stream of pulse waves. The stiffness indices are computed as follows

- stiffness index (SI) = height of the person / (T4 – T1)
- reflection index (RI) = diastolic peak / systolic peak (P4/P1)

6.2 STATISTICAL ANALYSIS

6.2.1 Tridoṣa Study

The data were analyzed using SPSS Statistics Version 10. The data was presented as mean ± standard deviation. The data was assessed for normality using Kolmogorov-Smirnov test and stiffness indices (SI and RI) were found to be normally distributed. The equality of variance was tested for *vāta, pitta and kapha* groups using Levene's test of homogeneity of variances. The variances were not equal across *vāta*, *pitta* and *kapha* groups. The mean values of stiffness parameters (SI and RI) measured from *vāta, pitta and kapha doṣa* locations were analyzed using one-way ANOVA. As variances were not equal post hoc analysis was performed using Tamhane's T2 test. The significance of SI

and RI across males and females was assessed using independent samples t test. The effect size was computed using Cohen's d formula (difference in mean / pooled standard deviation of the two groups) for analyzing the results of independent samples t test. For ANOVA the effect size (n^2) was computed as the ratio of sum of squares between groups to total sum of squares. The A two tailed P value < 0.05 is considered statistically significant for all comparisons and the data were reported to three significant figures.

6.2.2 Diabetes Study

The data were analyzed using SPSS Statistics Version 10. The data was presented as mean ± standard deviation. The data was assessed for normality using Kolmogorov-Smirnov test and stiffness indices (SI) was found to be normally distributed and RI was not normal. The mean values of SI and RI at *Tridoṣa* locations across diabetes and non-diabetes groups were tested using independent samples t test. The Cohen's d effect size was computed for assessing the difference in stiffness parameters across diabetes and non-diabetes groups. Pearson's correlation coefficient was used to study the relationship between FPG and stiffness indices measured from pulse data. A two tailed p value < 0.05 is considered statistically significant for all comparisons. Data were reported to three significant figures.

6.2.3 Obesity Study

The data were analyzed using SPSS Statistics Version 10. The data was presented as mean ± standard deviation. The pulse data was assessed for normality using Kolmogorov-Smirnov test and the stiffness parameters SI and RI were found to be normal. The mean values of stiffness parameters (SI and RI) from the pre and post IAYT

were analyzed using paired samples t test in all the three groups. The Pearson's correlation coefficient was used to study the relationship between stiffness indices measured from pulse data and age, BMI. The A two tailed *P* value <0.05 is considered statistically significant for all comparisons and the data were reported to three significant figures.