CHAPTER 5
METHODS

5. METHODS

5.1 SUBJECTS

The subjects for *Tridoṣa* and Diabetes studies were recruited from yoga camps conducted by S-VYASA. The yoga camps were conducted in various cities of Karnataka, Andhra Pradesh and Gujarat states in India. The yoga camps were conducted for one week and the participants have been explained the benefits of the camp. The participants of yoga camps include individuals with non diabetes, diabetes and pre diabetes.

The subjects for Obesity study were recruited from *Arogyadhama* (a residential center of S-VYASA). The participants were from various cities of India.

5.1.1 Tridoṣa Study

A total of 90 participants were recruited for the study. The health of the participants was assessed in the camp by an *āyurvedic* doctor by interviewing the participants on their health status.

5.1.1.1 *Inclusion and Exclusion Criteria*

All men and women above 40 years were included in the study.

Participants not having any disease at the time of camp were included in the study.

Participants not willing to participate in the study were excluded.

5.1.2 Diabetes Study

A total of 192 participants (non diabetes – 104, diabetes – 88) were recruited for the study. The medical history of the participants was examined by an *āyurvedic* doctor.

5.1.2.1 *Inclusion and Exclusion Criteria*

All men and women above 20 years were included in the study.

The participants not having any diseases at the time of camp were included in non diabetes group.

The participants with pre diagnosed diabetes were included in diabetes group.

The participants who were not willing to participate in the study were excluded.

5.1.3 Obesity Study

A total of 18 participants (7 young adults and 11 older adults) were considered for the study. The young adults were obese and in the older adults 6 were obese and 5 were non obese.

5.1.3.1 *Inclusion and Exclusion Criteria*

All men and women below 80 years were considered for the study.

Participants suffering from cardio vascular diseases were excluded from the study.

Participants who were not willing to participate in the study were excluded.

5.2 ETHICAL CONSIDERATIONS

The study was approved by Institutional Ethics Committee of S-VYASA University. The study was explained to all the participants and the written informed consent was obtained from all the participants.

5.3 DESIGN OF THE STUDY

5.3.1 Tridoṣa Study

This is a cross sectional study and aim of the study was to investigate the significant variations in arterial stiffness across *vāta*, *pitta* and *kapha* locations on the radial artery. The pulse data acquired from *Nāḍī Taraṅgiṇi* consists of the data from three sensors aligned to *Tridoṣa* locations. As part of the design, three groups were created based on the pulse location and the groups were named as *vāta*, *pitta* and *kapha* groups. The *prakṛti* of the person was not assessed and groups were not formed based on *prakṛti* of the person but based on the location of the pulse. The pulse data acquired from *vāta* location of the participant was entered into *vāta* group and similarly for the other two pulse locations.

5.3.1.1 *Variables Studied*

The pulse parameters stiffness index (SI), reflection index (RI), age, height, body mass index (BMI), systolic blood pressure (SBP), and diastolic blood pressure (DBP) of the participants were considered for the study.

5.3.2 Diabetes Study

This is a cross sectional study and the aim of the study was to investigate the variations in arterial stiffness measured from *Tridoṣas* across diabetes and non diabetes groups. The participants were divided into two groups based on fasting plasma glucose (FPG) levels as per criteria defined by American Diabetes Association. The participants with FPG < 126 mg/dl were included in non-diabetes group and the participants with FPG ≥ 126 mg/dl were included in diabetes group. As part of the study, participants with normal glucose level (FPG < 100) and impaired fasting glucose (100 ≤ FPG < 126) were included into non-diabetes group.

5.3.2.1 *Variables Studied*

The pulse parameters stiffness index (SI), reflection index (RI), age, height, body mass index (BMI), systolic blood pressure (SBP), and diastolic blood pressure (DBP) of the participants were considered for the study. The SI and RI were computed for each of the *vāta*, *pitta* and *kapha* pulses from the systolic and diastolic peaks. The SI of *vāta* pulse from diabetes group was compared with SI of *vāta* pulse from non-diabetes group and similar analysis was done for *pitta* and *kapha* pulses also.

5.3.3 Obesity Study

This is a pre post study with one week Integrated Approach of Yoga Therapy (IAYT) as an intervention. The aim of the study was to investigate the effect of one week IAYT on arterial stiffness across young and older adults with obesity. The excess body weight is associated to arterial stiffness in older adults and recent studies have shown similar

association in younger adults also (Wildman et al., 2003). It is also observed that the weight change is associated to change in arterial stiffness especially in young adults (Wildman et al., 2005). In this study the effect of one week IAYT program on arterial stiffness was studied across young and older adults with obesity. The participants were divided into three groups based on their age and body mass index (BMI). Participants with BMI < 25 kg/m^2 were considered as normal and BMI in the range of 25 – 30 kg/m^2 were considered as overweight and BMI ≥ 30 kg/m^2 were considered as obese. Participants with BMI < 25 kg/ m^2 were included in Group1, participants less than 50 years and with BMI ≥ 25 kg/ m^2 were included into Group2 and participants above 50 years with BMI ≥ 25 kg/ m^2 were included in Group3. The participants in Group1 were non-obese, participants in Group2 were young adults with obesity, participants in Group3 were older adults with obesity and some of the participants in Group1 and Group3 were having osteo-arthritis as co-morbidity. Both overweight and obese participants were included into obesity group.

5.3.3.1 *Variables Studied*

The pulse parameters stiffness index (SI), reflection index (RI), age, height, body mass index (BMI), systolic blood pressure (SBP), and diastolic blood pressure (DBP) of the participants were considered for the study.

5.3.3.2 *Intervention*

A one week IAYT program was given as an intervention for the study. The details of yoga practices for all the three groups are explained in **Table A5.1** and **Table A5.2** respectively. The program starts in the morning at 6AM and ends at 7PM. The yoga

practices were rigorous for participants in Group2 when compared to the participants in Group1 and 3. The yoga practices were carried out every day and *kriyā* were done once in a week. There were two sessions of loosening exercises and *āsana* at 6AM and 4PM for one hour duration, *Prāṇāyāma* was for one hour at 10AM, meditation and advanced yoga techniques were also for one hour at 3PM. There will be lectures on yogic philosophy for one hour at 12PM and *bhajans* for one hour at 6PM. Apart from yoga practices IAYT program includes other therapies based on the concepts of *Āyurveda* and naturopathy consisting of *valuka sveda*, *patrapinda sveda*, *shiro abhyangan*, mustard pack, steam bath, sauna bath, mud bath, neutral underwater bath, hot hip bath, circular jet bath. The participants were given 3 days of therapies in *Āyurveda* followed by 3 days of naturopathic therapies and the type of therapies was decided by the doctor based on the medical condition of the participants.