

CHAPTER 5.0

5.0 MATERIAL AND METHODS

5.1 PARTICIPANTS

5.1.1 SAMPLE SIZE

Two varieties of participants were recruited for the current study viz., participants for autonomic and respiratory variables and participants for cognitive variables.

5.1.1.1 PARTICIPANTS FOR AUTONOMIC AND RESPIRATORY VARIABLES

Forty novices male, age ranging from 20 to 25 years (group mean age \pm SD, 21.3 ± 3.8) participated in their search trial. As Autonomic balance changes during menstruation, the study was restricted to males only (Wineman, 1971). The sample size of this particular trial was decided based on the previous study carried out by Pradhan and Derle in 2012, fixing α of the study as 0.05 and power of the study as 0.8.

5.1.1.2 PARTICIPANTS FOR COGNITIVE VARIABLES

Thirty-five novices, age between 20 and 45 years (group age Mean and SD = 25.2 ± 6.01) participated in this trial. All participants were undergoing Yoga training at a residential yoga institution, *Bengaluru*, South of India. All of them were oriented to chant 108 rounds of Mahāmṛtyunjaya *Mantra* in 10 minutes and every individual was asked to recite a round of *Mantra* per breath during exhalation. Sample size for this trial was also decided based on the research trial carried out by Pradhan and Derle in 2012.

5.1.2 SELECTION AND SOURCE OF PARTICIPANTS

All participants were undergoing Yoga training at a residential yoga centre in the south of India and had a minimal experience of practicing Vedic recitation one hour a day for 4 days in a week, for three years.

5.1.3 INCLUSION CRITERIA

Following criteria were followed to include the subjects in the current study.

- All the participants were recruited in the current study based on a clinical examination.

- Participants for autonomic and respiratory variables were males only and both the genders for cognitive variables.
- Participants who had the experience of recitation of spiritual hymns.

5.1.4 EXCLUSION CRITERIA

Following criteria were considered to exclude the participants

- Participants having history of smoking or consuming alcohol or caffeinated beverages.
- Female participants in the first part of the study.
- Participants recorded with extra systole during ECG recording.
- Female participants during menstruation during second part of the study.
- Participants with prior exposure to Yoga
- Participants consuming any neurological and psychiatric drugs.

5.1.5 ETHICAL CONSIDERATION

The current study was approved by the Institution's Ethical Committee and an informed consent was obtained from all the participants after explaining trial of the research.

5.2 DESIGN OF THE STUDY

5.2.1 DESIGN FOR THE AUTONOMIC AND RESPIRATORY VARIABLES

All participants in the study were assessed on four separate sessions in the laboratory. The order of the session was randomized using a random number table. One of the day participants were asked to mentally repeat a *Mantra* (a phrase or syllables) for 18 rounds, another day, to recite the *Mantra* loudly, another day, whispering the *Mantra* and the fourth session was sitting silently, observing the spontaneous thoughts. Each session lasted for half an hour and divided into three stages viz., Prerecording, during and post-recording and each of the recording lasted for ten minutes. Participants were asked to report the laboratory at 9.30 am and recording for every session was getting started at 9.45 am following the preparation with regard to hooking up the sensors from various parts of the body. The

acoustic of the laboratory was kept at 85 dB and the room temperature during recording was 25°C.

5.2.2 DESIGN FOR COGNITIVE VARIABLES

The study was conceptualized as “self as -control trial”. All the participants recruited in the research trail were assessed with the variables of attention, mindfulness and memory following an orientation for ten days and a washout period of another seven days. Hence the base line recording was done after fourteen days of the commencement of orientation. Following the baseline recording, all the participants were recorded for their Baseline recording (BL) on day 1 following an orientation of 17 days including a washout period of seven days, and the post recordings were done in every seven days subsequently viz., Loud chanting (LC), Lips movement (LM), Silent chanting (SC), Audio listening (AL) and Silent sitting (SS). For the post assessment, recordings were done after 20 minutes of the intervention and each session lasted for 20 minutes.

5.3 VARIABLES STUDIED

5.3.1 AUTONOMIC AND RESPIRATORY VARIABLES

All the participants were assessed in a soundproof room, seated on a chair, in a relaxed state. Autonomic and respiratory variables were acquired using a sixteen-channel polygraph (Finapres Medical Systems, USA). The ECG was recorded using Ag/AgCl electrodes with conducting gel and recording was made using standard limb lead II configuration. Data were acquired at the sampling rate of 1KHz and were analyzed offline. Noise-free data were included for analysis. The R waves were detected to obtain a point event series of successive response-response intervals, from which the beat-to-beat heart series was computed. The respiration was recorded using a volumetric pressure transducer fixed around the trunk about 8 cm below the lower costal margin when the participants stood erect. The heart rate was recorded using the R waves of QRS complex in the ECG.

Pt.1: Picture showing the Laboratory set up for the recordings of Autonomic and Respiratory variables



5.3.2 COGNITIVE VARIABLES

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The following variables recorded during the trial.

5.3.2.1 SIX LETTER CANCELLATION TEST (SLCT)

The six-letter cancellation test (SLCT) consists of a sheet of 22rows × 14 columns of randomly arranged letters of the alphabet. The top of each sheet names six target letters. Subjects were given the choice of two possible strategies to cancel target letters (1) all six letters at once or (2) selecting a target letter at a time. It was also suggested that according to their own choice, they follow horizontal, vertical, or random paths on the test sheet. They were told to cancel as many target letters as possible in the test time of 90 seconds (Agarwal at al., 2002). Five sets of questionnaires were replicated using the original one and all of them were validated by the experts.

5.3.2.2 WECHSLER MEMORY SCALE (WMS)

The Wechsler memory scale is a neuropsychological test designed to measure different memory function in the person. Digit forward, Digit backward and Association learning (easy and hard) sections of the WMS were used in this study.

There were different sections that were selected for recordings viz., Digit span forward and backward, verbal paired associate learning (easy and hard) with 10 items each. The verbal

paired associate learning task involved the presentation of ten pairs of unrelated words as three trails. After the three trails, the examinee was presented with the first word in each pair and he or she was asked to provide the second word. Out of the 10 pairs, six pairs were semantically simple to recollect (e.g., table-chair). Where such associations existed, it was described as associate learning, hard (Luna-Lario, Pena and Ojeda, 2017). Like SLCT, the same procedure was followed to replicate five sets of questionnaires of WMS.

5.3.2.3 MINDFULNESS ATTENTION AND AWARENESS SCALE (MASS)

The MASS is a 5 – item scale designed to assess the short-term or current expression of a core characteristics of mindfulness, attention and awareness. A reliable and validated tool to assess state mindfulness was administered to the subjects. The questionnaire contains 5 questions to be answered on a scale of 1 (not at all) to 6 (very much); Cronbach’s alpha= 0.92 (Brown and Ryan, 2003).

Pt.2: Picture showing the administration of Paper pencil test during the research trial



5.4 INTERVENTIONS

5.4.1 FOR AUTONOMIC AND RESPIRATORY VARIABLES

Japa or *Mantra* involves repetition of a chosen word, phrase or set of syllables while passively disregarding any internal or external distractions. Though the different phrase is used for meditation or concentration, but the intention is the same in research. The mental repetition or Silent chanting (SC) is very powerful, termed *Mānasika Japa*. The verbal or loud repetition or loud chanting (LC) is called *Vaiḥāri Japa* and this japa puts out all worldly sounds without giving any pause. Repetition in a whisper or humming or Lips movement (LM) is termed *Upānsu Japa* (Sivananda, 2005). In addition to all these above-mentioned interventions, participants were asked to sit quietly observing the spontaneous thoughts called as No chanting (NC) session. Four varieties of interventions that were introduced in the trial were *Mānasika Japa*, where the subjects were asked to recite the *Mahāmrutyunjaya Mantra*, ten minutes for 18 rounds silently, *Vaiḥāri Japa* (verbal repetition), *Upānsu Japa* (humming or whispering) and silent sitting and watching the spontaneous thoughts for ten minutes.

5.4.2 FOR COGNITIVE VARIABLES

Japa or *Mantra* involves repetition of a chosen word, phrase or set of syllables while passively disregarding any internal or external distractions. Though different phrase is used for meditation or concentration but the intention is same in research. The mental repetition is very powerful, termed *Mānasika Japa*. The verbal or loud repetition is called *Vaiḥāri Japa* and this *Japa* puts out all worldly sounds without giving any pause. Repetition in a whisper or humming is termed as *Upānsu Japa* (Sivananda, 2005). Five varieties of interventions that were introduced in this trial were *Mānasika Japa*, where the subjects were asked to recite the *Mahāmrutyunjaya Mantra* (MMM) mentally for twenty minutes, *Vaiḥāri Japa* (verbal repetition) or loud chanting (LC), Audio listening (AL), and silent sitting (SS) to watch the spontaneous thoughts for twenty minutes. During the chanting

they were asked to sit comfortably with closed eyes and also, they were asked to chant with full of devotion. This particular *Mantra* was given during orientation and various styles of recitation as it is said to be beneficial for mental, emotional and physical health and bestows longevity and immortality.