Chapter III: Methodology

Chapter III

METHODOLOGY

In this chapter, the procedures followed towards the selection of subjects, experimental design and procedure, selection of variables, selection of tests, instrument reliability, orientation of testing personnel, calibration of instruments, description of psychological tools, test administration of physiological variables, orientation of subjects, administration of questionnaire, training programme, collection of data and statistical techniques have been explained.

Selection of Subjects

In the current study, sixty male subjects were selected at simple random sampling technique; from Dharm Samaj inter college Aligarh, which is located in the District Aligarh Uttar-Pradesh India. 30 subjects were assigned as experimental group and another 30 male subjects were assigned as control group during the academic year 2016-2017. They were the students of 11th and 12th academic Course and their age ranged between 14 to 18 years. All the subjects were assembled in lawn and multipurpose hall of the school to seek their cheerful compliance, to act as subjects. The researcher explained to them the purpose, importance and nature, of the experiment and the process to be employed to collect their psychological data. Next the role of the students for the duration of the experimentation and the testing physiological procedure were also explained in detail. The physiological variables of the students were measured by an Indian Red Cross Society expert and all the students were well-conditioned. Investigator requested to subjects to co-operate and participate actively for alike.

Selection of Variables

The Selection of subjects for the present study was randomly divided into two groups called control group and experimental group, consisting of 30 male students in each group. Three months of yogic practices (yogasanas, pranayama and yoga nidra) were given to the experimental group only and the control group was not allowed to involve you in any of the training programme, except their daily routine and physical education classes.
Measurements for the psychological and physiological variables were taken at the beginning (pre-test) from both groups, after twelve weeks of training programme post-test data were collected for all the Psycho-physiological variables from both control group as well as experimental groups, for six days. During data collection period the subjects were not allowed to participate in any training programme.

In the present study, the researcher referred variant relevant literature and consulted with experts in Yoga, psychology and physiology to identify suitable variables. The selected variables are given below.

**Dependent variables**
1. Psychological variables
2. Physiological Variables

**Independent variable**
1. Yogic practices (Asanas, Pranayamas, Yoga nidra)

**Criterion measures**

**Psychological variables**
1. Mental Health – Mental Health Battery
2. Personality – Eysenck’s Personality Inventory (revised)
3. Self Concept – Mukta Rani Rastogi Inventory

**Physiological variables**
1. Blood Pressure (systolic and diastolic) stethoscope and sphygmomanometer
2. Respiratory rate –stop watch
3. Vital capacity (Peak expiratory flow) Wet Spirometer
4. Pulse rate – stop watch
5. Breath Holding time–stop watch

**Selection of Tests**

The test used to quantify the psychological and physiological variables are given in table 1.
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**Table: 3.1**

Test for Psychological and Physiological Variable

<table>
<thead>
<tr>
<th>SL NO.</th>
<th>VARIABLES</th>
<th>METOD/EQUIPMENT/TOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Psychological variables</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Mental Health</td>
<td>Mental Health Battery (Arun Kumar Singh)</td>
</tr>
<tr>
<td>2.</td>
<td>Personality</td>
<td>Eyesnck’s Personality Inventory (revised)</td>
</tr>
<tr>
<td>3.</td>
<td>Self Concept</td>
<td>Mukta Rani Rastogi Inventory</td>
</tr>
<tr>
<td>b.</td>
<td>Physiological variables</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Systolic blood pressure</td>
<td>Stethoscope and Sphygmomanometer</td>
</tr>
<tr>
<td>1.1</td>
<td>Diastolic blood pressure</td>
<td>-do-</td>
</tr>
<tr>
<td>2.</td>
<td>Respiratory rate</td>
<td>Stop watch</td>
</tr>
<tr>
<td>3.</td>
<td>Vital capacity</td>
<td>Wet Spirometer</td>
</tr>
<tr>
<td>4.</td>
<td>Pulse rate</td>
<td>Stop watch</td>
</tr>
<tr>
<td>5.</td>
<td>Breath Holding time</td>
<td>Stop watch</td>
</tr>
</tbody>
</table>

**Instrument Reliability**

The instruments like Stethoscope and sphygmomanometer, Stop Watch, Nose Clip, Weighing Machine and other instruments used for physiological variables testing were all manufactured by standard companies. The investigator conducted his research work in the Red Cross Society health service centre; located at the Dharm Samaj Inter College Aligarh the instruments were reliable and standardized.

**Reliability of data**

Establishing the instrument reliability and tester’s competency ensured the reliability of data.

**Orientation of the Subjects**

The researcher was present together with the subjects of control and experimental group throughout the experimentation of both pre test and post test. The testing procedure for (psycho-physiological) conducting the tests and the tools and technique of scoring were particularly demonstrated as well as explained by the researcher to improve in quality the tester’s consistency. The Psychological and
physiological variables were measured in D.S.I.C Aligarh which is situated at Uttar-Pradesh India.

**Calibration of Instruments**

All equipments and tools were purchased from standardized companies and they were calibrated daily and maintained in good condition.

The Psychological questionnaire was filled in the D.S.I.C Aligarh. Further the physiological variables were tested in the Red Cross society first aids centre in Dharm Samaj Inter College Aligarh. Physiological variables were used to assess with advanced and automated equipments.

**Test Administration of Psychological Variables**

1. **Eysenck’s Personality Questionnaire for Personality Dimensions**

   Eysenck’s Personality Questionnaire (EPQ) revised was administered to all the subjects to measure the personality dimensions.

   **Test Administration**

   The Eysenck’s personality Questionnaire was designed to give rough and ready measure of three important personality dimensions such as Psychoticism, extraversion, and neuroticism of psychological behaviour. These two dimensions were extroversion, Introversion (E – Scale) and Neuroticism stability (N- Scale). The inventory consists of 90 Yes or No responses with a scale Test – retest reliabilities ranged from .80 to .90.

   Age of subjects ranged from 14 to 18 years.

   **Scoring**

   Scoring of responses was carried out with the help of provided scoring stencils. Each right response was assigned a score of 1 for each dimension. The cumulative scores were tabulated for the purpose of statistical analysis.

2. **MENTAL HEALTH BATTERY FOR MENTAL HEALTH**

   **Description**

   The Mental health battery was devised by Arun Kumar Singh and Alpna Sen Gupta and it was used to assess mental health of the subjects. The Mental health
battery contains 130 statements and these statements were categorized into 6 sub-areas such as Emotional stability (15), Over-all Adjustment (40), Autonomy (15) security-Insecurity (15) Self-Concept (15) Intelligence (30). In Mental Health Battery there was containing 130 statements to assess the mental health. These statements were given in a jumbled order and they include some positive and negative, some A&B, and some Right & Wrong, and some multiple objective type statements. These 130 statements were selected 6 arias and these statements constituted the Mental Health Battery (MHB) for the purpose of this investigation.

The reliability of the Mental Health Battery by the test-retest method was found to be 0.816. Since the reliability value was high, the Battery in its original form was made use of in this investigation.

**Scoring**

In this Battery there was containing 130 statements to assess the mental health. These statements were given in a jumbled order and categorised in six arias and they include some positive and negative, some A & B, and some Right & Wrong, and some multiple objective type statements. For each right response awarded 1 point.

The Mental Health Battery yielded a maximum score of 90 and a minimum score of 29. A high score indicates a relatively high mental health.

**3-Mukta Rani Rastogi Inventory for Self-Concept Description of the scale**

The self-concept scale which was invented and standardized by Dr. (Miss) Mukta Rani Rastogi was used to evaluate the self concept of the subjects. It consisted of 51 statements and these statements were given in a mix-up way and they included both positive and negative statements.

The positive statements are 1, 2, 4, 6, 7, 8, 9, 18, 20, 22, 25, 27, 34, 36, 37, 40, 42, 43, 44, 46, 47, 48, 49 and the negative statements are 3, 5, 10, 11, 12, 13, 14, 15, 16, 17, 19, 21, 23, 24, 26, 28, 29, 30, 31, 32, 33, 35, 38, 39, 41, 45, 49, 50, 51. Each statement has five responses namely ‘Strongly agree’, ‘Agree’, ‘Undecided’, ‘Disagree’, ‘Strongly Disagree’.

Example: - I think I have an attractive personality. So subject had to put a tick mark (✓) for any of the five responses like ‘Strongly agree’, ‘Agree’, ‘Undecided’,
‘Disagree’, ‘Strongly Disagree’. Whichever fits them best there were no right or wrong response. Reliability of the test was computed by using test and retest method. The reliability obtained was 0.85. High level of self concept was indicated by high score, low level of self concept was indicated by low score. Hence, the test in its original form was made use of in this study.

**Method of Scoring**

In this inventory for the positive statements, the five responses were given a weight age of 5, 4, 3, 2, 1 respectively for the ‘Strongly Agree’, ‘Agree’, ‘Undecided’, ‘Disagree’, ‘Strongly Disagree’. And for the negative statements, the reverse order was followed 1 to 5 which was given below.

<table>
<thead>
<tr>
<th>Category</th>
<th>Positive statement</th>
<th>Negative statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Undecided</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

**Test Administration of Physiological Variables**

**BLOOD PRESSURE**

**Purpose:** To assess the systolic blood pressure (SBP), diastolic blood pressure (DBP), of the subjects.

**Equipment used:** A standardized manual sphygmomanometer and a stethoscope to measure blood pressure.

**Procedure:** The subjects were asked to sit in comfortable position on the chair before the measurement was taken. The cuff of the sphygmomanometer snugly wrapped around the arm evenly with the lower edge approximately one inch above the antecubital fossa (crease of the arm). It was made sure that the stethoscope was making in fixed contact with the skin. The cuff was raised until the artery was
completely collapsed to the extent that no arterial pulse could be heard. The cuff pressure was released slowly as the researcher watched the reading. When sound of the blood flow (Korotkoff) became audible the reading in millimetres of mercury (mm of Hg) at that on the spot was recorded as the systolic pressure. Further that pressure was released gradually as the sound of the pulse changed in intensity and quality. The measurement of the diastolic pressure was note down in mm of Hg, when the heart beat sound completely ceased.

**Scoring:** Systolic pressure was applied by means of the pumping ball, and palpating the pulse with the left hand, the pressure was continued for about a further 8-10mmHg, above the point of pulse disappearance. The stethoscope was applied to the brachial artery and release air pressure from the cuff at a moderate rate and evenly by means of slight movement of the release screw of the control value; care was taken to listen with the stethoscope intently for the blood flow sounds and simultaneously observe the sphygmomanometer.

**Diastolic Pressure (DP):** The pressure on the brachial artery was gradually release and the sound of the heart beat finally disappeared in a faint murmur was recorded as diastolic pressure.

**RESTING RESPIRATORY RATE**

**Purpose:** To assessment of the respiratory rate of the subjects.

**Equipment:** Stopwatch and mat.

**Procedure:** The subjects were asked to lie down comfortably on the mat in Shavasana, refraining from any tension or activity. While measuring the Resting respiratory rate the left hand of the subject was to be kept on the abdomen and then the subject was asked to breathe normally for one minute. Researcher carefully watching the moment of the abdomen and resting respiratory rate was recorded by rate of respiration in unit counts per minute. The resting respiratory rate of each of the subject was recorded between 08:00 to 09:00 am in the morning. The researcher recorded his rate of respiration in unit counts per minute by observing carefully the movement of the subject’s abdomen. The total number of respiratory movements per minute was final score.
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VITAL CAPACITY

**Purpose:** To assess the Forced Vital Capacity.

**Equipment used:** Wet spirometer, Water, Disposable cardboard mouth pieces, sprit and cotton.

**Procedure:** The investigator was given the instruction to the subjects to sit comfortably on the chair and to inhale maximum outside from the spirometer. Then subject was asked to grasp the cardboard mouthpiece between the lips to make a good seal and expire the air in wet spirometer as much and as possible for as long as possible until no breath was left in the lungs, once again researcher was asked to student to grasp the mouthpiece between the lips to create a good seal and inhale and exhale 2-3 times. Then breathe in maximum capacity, expire breathe as much possible and as long as possible until no breath was left in the lungs.

The researcher encouraged to the subjects continuously to ensure the best effort. For an acceptable test, the effort should be performed efficiently and cough free and exhalation time at least seven seconds. Each attempt had to be performed thrice and the value best of the three was noted. Before going to the next performer, the disposable mouth piece was to be changed. When the performer was ready to blow out the breath, the unit had to be recalibrate wet spirometer

**Scoring:** Forced vital capacity was to be immediately observed from Wet spirometer. Forced vital capacity values from the best of three similar readings were then taken.

PULSE RATE

**Purpose:** To measure the pulse rate of subject.

**Equipment:** Stopwatch and mat.

**Procedure:** The subjects were asked to lie down comfortably on the mat for 5 minute in Shavasana, refraining from any tension or activity. While measuring the Pulse rate from the right hand of the subject the subject was asked to breathe normally. Researcher carefully feels (assessing) the moment of the radial artery; pulse rate was recorded in unit counts per minute. The pulse rate of each of the subject was recorded between 08:00 to 09:00 am in the morning. The total number of pulse rate movements per minute was final score.
BREATH HOLDING CAPACITY

Purpose: To assessment of the breath holding capacity (BHC) of the subjects.

Equipments: Stop watch and a nose clip.

Procedure: The subjects were asked to sit comfortably on the chair, while measuring the breath holding time. The left hand of the subject was to be kept on the right side of the chest and then the subject was asked to take a deep breath (Inhale deeply) and the nose clip was applied snugly on the nose and lips were tightly closed and there should not be any leakage of air from the mouth and nose (breathe in or breathe out). The subject was told to maintain the breath holding continue without changing as long as he could. If subject felt it difficult to maintain the breath holding, immediately he was asked to bring the left hand from the chest. The breath holding time in seconds up to which the subject breathes time was taken for Consideration.

Scoring: Breath holding capacity was immediately recorded with the help of a stop watch three times for each subject. The measurements were taken from the best timing for three similar readings.

Orientation of Subjects

Before administering the psychological questionnaire, the investigator briefly explained the purpose of the study and their role in data collection to all the subjects. All the subjects were motivated to give relevant personal data and to co-operate to complete the psychological questionnaire.

Administration of Questionnaire

The investigator met the principal of Dharm Samaj inter college, Aligarh region and obtained permission to collect data from the students. As per the instruction given by the principal, the investigator met the physical education teacher and the students fixed the date and time and for data collection. The investigator distributed the questionnaire to the subjects along with black pen for marking the responses. The subjects went through the instructions, read each statement carefully and indicated their responses. All the questionnaires were administered by the researcher in person in a face to face relationship. Data was collected as per the programme fixed. All the filled in questionnaires were collected from the subjects and
scored according to the scoring key. The total scores obtained were tabulated and statistically treated to arrive at meaningful conclusions.

Table: 3.3

Yogic Training Programme

Yogic Practices schedule for Three Months

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Name of the Yogic activity</th>
<th>1st Month Time in Minute</th>
<th>2nd Month Time in Minute</th>
<th>3rd Month Time in Minute</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prayer and Loosening exercises</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>Tadasana</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Trikonasana</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Vrikshasasana</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Ardhamatsyendrasana</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Kandharasana</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Vipreetkarni</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Dhanurasana</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Yogamudrasana</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Suptavajrasana</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Pashimottanasana</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>Anulom-vilom pranayama</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>Bhramari Pranayama</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>Bhatrika, Pranayama</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>Yoganiydra</td>
<td>5</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Total time in Minutes</td>
<td>52 Minutes</td>
<td>55 Minutes</td>
<td>65 Minutes</td>
</tr>
</tbody>
</table>

*Relaxation asanas (Shavasana & Makrasana) were performed in supine and prone position after each asana to bringing in normal state.

Yogic training Programme

Intervention of three months (5 days in a week) of yogic practices including asana, pranayama and yoga nidra exercises, which were previously selected by the researcher in consultation with supervisor and expert of the area. Subjects of the study were divided into two groups, i.e. yogic practices group and control group. The experimental groups participated in their respective yogic practices for a period of three months, five days per week. The training schedule timing was from 8:00 a.m. to
9:00 a.m. every day per week, during the 5 September to 5 November 2016, excluding data collection. During the training session, the Yogic practices group were instructed to perform selected yogic practices for specific time which was determined by the researcher as per schedule. Thereafter yogic practices group would be relieved and the control group did not participate in any specific training however, they performed regular physical activities. This intervention was delivered in the morning under the observation of the researcher who himself had adequate level of training and knowledge of yogic practices. The entire activity was assisted by the physical education teacher who were properly trained and orientated for the intervention.

The subject is performing the Shavasana

Collection of Data

The pre test data on Psychological and physiological variables from both control and experimental groups were collected as per the method prescribed above. The three months of selected Yogic practices (yogasanas, pranayama and yoga nidra) training programme were given in a systematic way only for the experimental group. The control group was not allowed to participate in any of the training programme. Much care was taken to administer during the Psychological and physiological variables. The identical conditions were kept by using the same apparatus, testing personnel and testing procedures. Psychological data were collected by using the psychological questionnaire. Pre test data were collected one day before the training programme and the post test data one day after the training programme in two batches for three days in the morning.
Subject: Performing Asana Pranayama and Yoga Nidra
Statistical Technique

The data collected from the two groups on the selected Psychological, and Physiological variables will be used for the statistical treatment to find out whether or not there will be any significant difference between the two groups by the (Paired sample t-test) method. The level of significance will be fixed at 0.05 level of confidence.