

<b>CHAPTER 5</b>		
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## **5.0 METHODS**

### **5.1 FBS, EPI CORRELATIONAL STUDY**

#### **SUBJECTS**

Two hundred participants from various Yoga camps in the rural areas of Bengaluru and Arogyadham (a residential health centre) at Swami Vivekananda University, Bengaluru, India were scrutinized. Out of these 102 subjects were selected for the study. The drop outs were on account of defects in the image and/or the biochemical (FBS) reports were not available. Out of the selected, 42 participants were in the category of no health problem (NHP). It comprised of 29 normal and 13 pre diabetes subjects. Further 60 participants were in the category of diabetes irrespective whether the diabetes was under control or uncontrolled (Table1). The three groups were designated as; normal, pre diabetes and diabetes. Out of 42 (mean age  $46.5 \pm 11.7$  years) in the non diabetes group, 17 were males (mean age  $48.47 \pm 13.26$  years) and 25 females (mean age  $45.2 \pm 10.6$  years). Normal consisted of 29 (mean age  $44 \pm 11$  years), pre diabetes consisted of 13 (mean age  $51.2 \pm 12.3$  years). In the diabetes group of 60 (mean age  $54 \pm 9.6$  years), there were 35 males (mean age  $56.83 \pm 8.72$  years) and 25 females (mean age  $50 \pm 9.4$  years). Participants in the age range of 18 to 75 years, male or female and willing were included in the study.

#### **EXCLUSION CRITERIA**

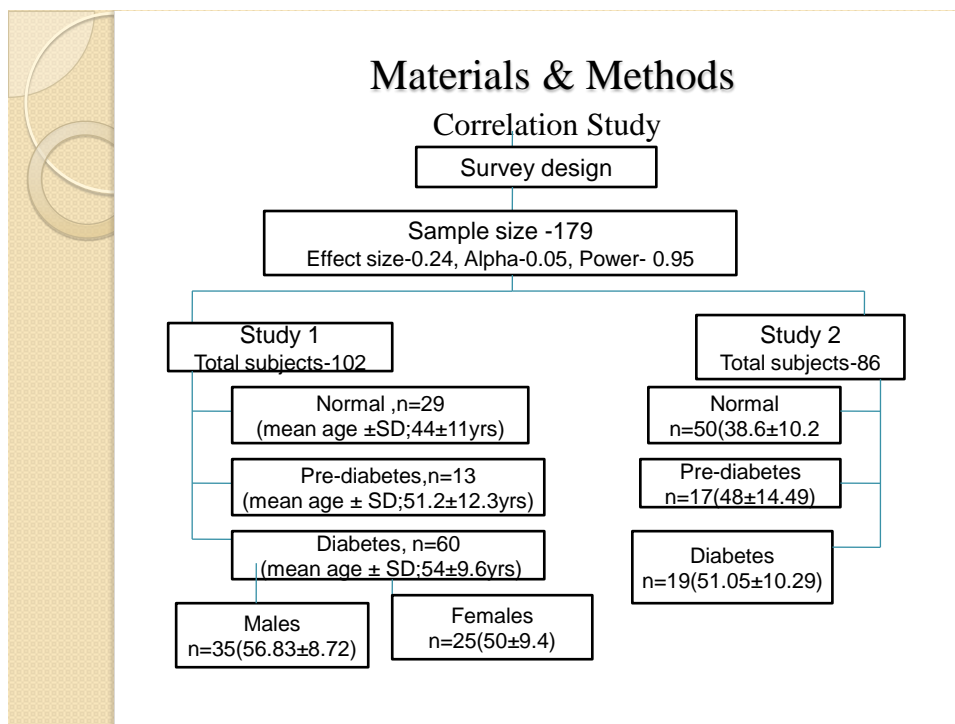
The following subjects were excluded from the study: Participants with co-morbidity and taking any medicine in the case of normal and pre diabetes participants; diabetes participants taking medicines apart from diabetes medications; participants suffering from any infectious or contagious diseases; physically handicapped persons with

missing fingers and females having menstruation or pregnancy on the day of measurement.

## **5.2 HbA1c, EPI CORRELATIONAL STUDY**

### **SUBJECTS**

Eighty six subjects were selected after scrutiny of 150 participants from various Stop Diabetes Movement camps and Arogyadam. The rejections were due to improper finger prints or/and non availability of biochemical test HbA1c. The selected subjects were categorized into three groups: a) normal, b) pre diabetes and c) diabetes (Table 1). Normal comprised of 50 subjects (mean age  $38.6 \pm 10.2$ years). Out of these 25 were males (mean age  $37.2 \pm 9.74$ years) and 25 were females (mean age  $40 \pm 10.7$ years). Pre diabetes comprised of 17 subjects (mean age  $48 \pm 14.49$ years). Out of these 14 were females (mean age  $48 \pm 14.49$ years) and rest were males (mean age  $61 \pm 18.52$ years). The diabetes group of 19 subjects (mean age  $51.05 \pm 10.29$ years) comprised of 13 females (mean age  $49.31 \pm 10.96$ years) and 06 males (mean age  $54.83 \pm 8.23$ years). Participants in the age range of 18 to 75 years, male or female, willing for the study and trials were included. HbA1c reports of all the volunteers were available.



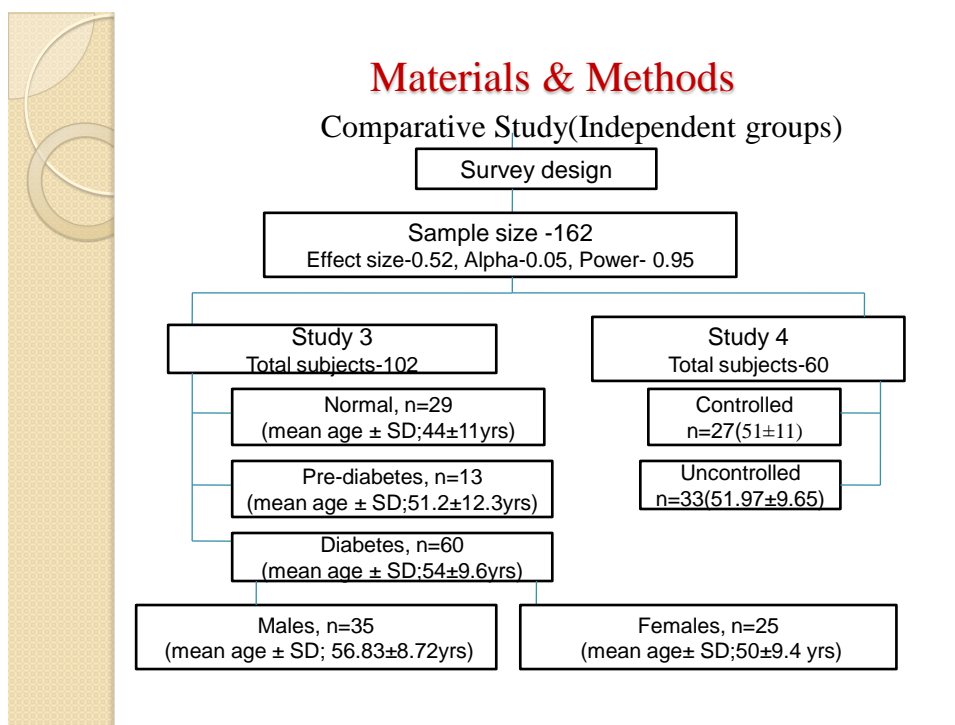
### EXCLUSION

The following subjects were excluded from the study: Participants with co-morbidity (e.g., hypertension, dyslipidemia, fatty liver disease) and taking any medicine in the case of normal and pre diabetes participants; diabetes participants taking medicines apart from diabetes medications; participants suffering from any infectious or contagious diseases; physically handicapped persons with missing fingers and females having menstruation or pregnancy on the day of measurement.

### 5.3 COMPARATIVE STUDY OF DIABETES THROUGH EPI

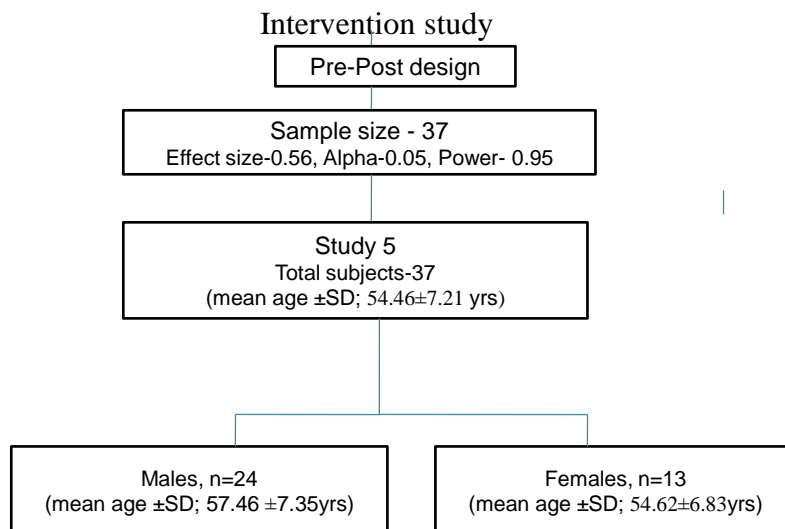
The study was conducted on the participants of the yoga camps held in connection with Stop diabetes movement (SDM) campaign and Arogyadham (a residential health centre) of S-VYASA Yoga University. After the scrutiny of 250 participants following number of subjects were selected for the different study. **a.** One hundred and two subjects (mean age  $51 \pm 11$  years) for the first objective. Out of these 52 were males (mean age  $54 \pm 11$  years) and rest females (mean age  $47 \pm 10$  years). The total subjects comprised of

29 normal (mean age  $44 \pm 11$  years), 13 pre diabetes (mean age  $51.2 \pm 12.3$  years) and 60 diabetes (mean age  $54 \pm 9.6$  years). **b.** 60 subjects (mean age  $53.8 \pm 9.62$  years) for the second objective. Out of these 35 were males (mean age  $56.83 \pm 8.72$  years) and 25 females (mean age  $49.56 \pm 9.38$  years). The total subjects were divided into controlled diabetes  $n=27$  (mean age  $56.04 \pm 9.28$  years) and uncontrolled diabetes  $n=33$  (mean age  $51.97 \pm 9.65$  years). **c.** 37 subjects (mean age  $54.46 \pm 7.21$  years) comprising 24 males (mean age  $57.46 \pm 7.35$  years) and 13 females (mean age  $54.62 \pm 6.83$  years). Participants in the age range of 18 to 75 years, male or female and those willing to volunteer for study were selected. All participants had to give blood for FBS test on the inaugural day of camp or have a recent blood report.





## Materials & Methods



### EXCLUSION CRITERIA

Subjects with co-morbidity like hypertension, dyslipidemia , fatty liver disease and those taking any medicine in the case of normal and pre diabetic participants. Diabetic subjects taking medicines apart from diabetes. Subjects suffering from any infectious or contagious disease, physically handicapped and those having missing fingers. Females having menstruation or pregnancy on the day of measurement were excluded.

### 5.4 ETHICAL CONSIDERATION

This study was cleared by Institutional Ethics Committee (IEC) at S-VYASA Yoga University, Bengaluru India .The study was cleared vide RES/IEC-SVYASA/66/2015. All the participants were informed about the study and the assessments before conducting the study and Informed consent was obtained from the participants. They were thus conversant with the aims and objectives of the study as well as the intervention modules and their confidentiality was maintained.

## **5.5 DESIGN**

### 1. Survey design

It is a correlational study following a survey design in which data collection was done only once from all participants.

### 2. Survey design

This is an exploratory study based on correlational analysis. EPI readings were carried out before the blood samples were taken for HbA1c.

### 3. Survey design and interventional study

This is a comparative and interventional study. All subjects were diabetic for the interventional study.

## **5.6 INTERVENTIONS**

### **STOP DIABETES MOVEMENT (SDM) YOGA MODULE**

This module includes Bhajan, Prayers, Breathing exercises, Loosening exercises, Sun Salutations, Asanas, Pranayama, Lectures on diabetes and Cyclic meditation. The principle of CM is stimulation followed by relaxation, one gets rest in periodic cycles. Asana is an integral component of CM. It has been compared with the other Yogic methods and tested for various physiological, neurophysiological and psychophysiological advantages (Subramanya & Telles, 2009b). The total program was for 02 hours daily for seven days. The program was held daily from 0600hrs to 0800hrs (Appendix C).

## **5.7 ASSESSMENT TOOL**

Instrument of make Kirliionics Technologies International (KTI) company Saint-Petersburg, Russia (GDV camera Pro with analog video camera, model number: FTDI.13.6001.110310) was used for the assessment purpose. Along with the EPI software, it provides various features such as EPI screening, EPI scientific laboratory, EPI diagram. These are different software programs for analysis and data extraction. EPI screening allows to observe particular sectors of different fingers related to body systems as well different organs. EPI scientific laboratory gives the data for each finger and the average related to general health parameters and EPI diagram brings forth detailed insight into the left and right brain hemisphere communication and distribution of energy through every organ.

**Figure 5: EPI/GDV-COMPACT**



**Figure 6: EPI/GDV-PRO**



## 5.8 EPI PARAMETERS

EPI gives large no of parameters through different image evaluation softwares. For our study we have considered only the images taken without filter which represents the psychophysiological state (Korotkov et al., 2012). Some softwares provide parameters related to general health like software EPI scientific laboratory. Main such parameters that indicate the state of health which we have considered for our study are Total area, Average intensity, Entropy, Fractility and Form coefficient. Another two softwares EPI diagram and EPI screening provide parameters specific to organs and systems and we have considered the Integral area of organs Pancreas, Liver, Immune organs, Coronary vessels, Cerebral vessels, Left kidney and Right kidney. **Integral area (IA)** is relative value and shows the extent to which the EPI gram deviates from an ideal model. It is a measure of general health index of the person being investigated (Korotkov, 2002b) The normal range for IA is  $-0.6$  to  $+1$ . This corresponds to a good health state. The second constituent is **Entropy**. It is the level of non uniformity of image, in other words, the level of stability of the energy field. It is a measure of chaos/disorder in the energy pattern of human energy systems (Kostyuk et al., 2011). Entropy in the EPI system ranges (1 to 2) and is considered normal. **Total area** is the number of pixels in the image having brightness above the threshold (Rubik, 2005). **Intensity** is the light intensity averaged on the area of image. **Fractality** is defined as the ratio of lengths of perimeters of the image glow obtained in different scales of EPI gram. **Form Coefficient**  $FC = \frac{L^2}{S}$  where L is length of EPI gram external contour and S is EPI gram area. **Fractality and Form coefficient** are measure of irregularity in the image external contour (Alexandrova, et.al.2004)

## 5.9 DATA TAKING PROCEDURE

The prescribed guidelines were followed (Alexandrova et al., 2002). It is recommended to collect data after 3 hours of food intake and after 5 hours of any prescribed medications. No other diagnostic procedure was to be held at the same time. They were assessed before and after the respective interventions, and the EPI readings were taken by the same expert, at the same place. There were identical conditions of psychological and physical comfort for all subjects in a quiet and calm environment. Calibration of EPI device was performed routinely as per the guidelines. Subjects were instructed about finger placement on the glass at 45° angles with a gentle but firm touch. They were asked to remove all metallic ornaments that they do not wear for the entire 24 hours a day. Further, a few more things were followed for acquiring consistent readings: (1) The subjects stand on an electrically isolated surface while making a measurement; (2) the measurements were taken without filter; (3) an alcoholic solution was used to clean the glass plate after every subject; and (4) a distance of three feet was maintained between EPI and a dedicated laptop computer while collecting data (Yakovleva & Korotkov, 2015b).