

## A Report on Webinar on Topic

### **“Role of Statistics in Data Science & Sample size determination in medical and biological sciences”**

Massive complex data is getting generated in the recent decades in different fields including in medical, financial, meteorological, and industrial sectors. This have led to a new discipline called data science, which is considered as a combination of Statistics and computer science in dealing complex data. Given the growing interest of researchers from different disciplines in knowing what data science can offer to them, and in knowing what is the role of Statistics in data science, and given the increasing importance on sample size determination in medical and biological sciences, a national-level webinar was conducted by the Department of Statistics, Pachhunga University College (PUC), Aizawl, on both these topics on 27<sup>th</sup> July 2020.

Dr. Samba Siva Rao Pasupuleti, Assistant Professor, Department of Statistics, Pachhunga University College, Aizawl and Mr. Lalpawimawha, Assistant Professor, Department of Statistics, Pachhunga University College, Aizawl were the organizing secretaries for this webinar. Dr. Anupam Kumar, Associate Professor and Head, Department of Statistics, Pachhunga University College, Dr. Mukesh Ranjan and Dr. Zoramthanga, both Assistant Professors in the Department of Statistics, Pachhunga University College, have coordinated this webinar.

As a part of this webinar, **Prof. Padi Tirupati Rao**, Department of Statistics, Pondicherry University (A Central University), gave a talk on “**Role of Statistics in Data Science**” and **Dr. Atanu Bhattacharjee** (A Fellow of Royal Statistical Society), Assistant Professor, Tata Memorial Centre and Homi Bhabha National Institute, Mumbai, gave a talk on “**Sample Size Determination in Medical and Biological Sciences**”. Each speaker delivered their talk for one hour and their talks were followed by a questions and answers session for about 15 minutes for each speaker.

Other details of the webinar as under:

Date & Time: 27-07-2020 & 10:30 AM to 1:00 PM

Latitude & Longitude: 23°43' 23.808'' N & 92°43' 32.1024'' E

Number of participants registered = 1007

Number of participants attended = 649

## Some Snapshots from the Webinar:

### Sample Size Determination

Sample size calculation is usually performed through controlling the type I and type II errors:

**Precision Analysis**  
Sample size is calculated in such a way that there is a desired precision at a fixed confidence level (i.e., fixed type I error). It is simple and easy to perform.

**Pre-Study Power Analysis**  
It provides a sample size for achieving a desired power for detecting a clinically/scientifically meaningful difference at a fixed type I error rate.

### Crossover Design Sample Size

Suppose, subjects are assigned randomly to receive one of the two sequences of treatments (say,  $RT$  (reference therapy and thereafter test therapy) and  $TR$  (test therapy and reference therapy) through crossover manner.

Let  $\mu_T$  and  $\mu_R$  are mean response of reference and test therapy .  $\sigma_S^2$  and  $\sigma_a^2$  are the inter-subject variance and intra-subject variance, respectively.

The sample size is


**Crossover Design Sample Size**

$$n \geq \frac{CV^2(t_{\alpha, 2n-2} + t_{\beta/2, 2n-2})^2}{(0.2 - |\theta|)^2}$$

where  $\theta = (\mu_T - \mu_R) / \mu_R$ ,  $\delta = 0.2\mu_R$  and  $CV = \frac{\sigma_a}{\mu_R}$ .

### Thank You

We greatly thank the two speakers for their wonderful presentation. They made this webinar a grand success with their wonderful efforts.

  
Signature of IQAC coordinator

  
Signature of HoD