

# Report on the Online Workshop on Research Methodology and Biostatistics



The Department of Epidemiology at Tamil Nadu Dr. M.G.R Medical University, Guindy, organized an online workshop on **Research Methodology and Biostatistics** on **March 28, 2025**. This workshop, designed for third-year MBBS Part-I Undergraduate Medical students, marked the first session of the annual series conducted from March 2025 to September 2025.

The primary aim of this workshop was to enhance students' understanding of research methodology and biostatistics, enabling them to apply these concepts in their academic and professional pursuits. The workshop adhered to a well-structured schedule, commencing with the presentation of a QR code for a pre-test on Research Methodology and Biostatistics. Following this, a series of lectures were delivered, accompanied by interactive sessions to encourage active participation and deepen participants' comprehension. As the lecture series drew to a close, a QR code for a post-test and feedback was shared, enabling attendees to further assess their understanding and provide valuable input.

## Workshop Details

- **Organizing Institution:** Tamil Nadu Dr. MGR Medical University, Department of Epidemiology
- **Mode:** Online
- **Target Audience:** Third-year MBBS Part- I undergraduate students

- **Total Participating Colleges: 7**
  - SRM Medical College Hospital and Research Centre, Trichy-238
  - Velammal Medical College Hospital and Research Institute-67
  - Coimbatore Medical College-192
  - Swamy Vivekanandha Medical College Hospital and Research Institute-146
  - Chengalpattu Medical College-76
  - Sri Muthukumaran Medical College Hospital and Research Institute-135
  - Government Medical College, Ramanathapuram-91
- **Total Participants: 945**

## Sessions and Key Discussions

The workshop consisted of **five sessions**, covering various aspects of research methodology and biostatistics. The topics included:

1. **Research Ideas/Questions & Objectives** – Session by Dr. T.S. Gugapriya, Professor, Department of Anatomy, AIIMS, Nagpur
  - Explained the **research process, difference between a research idea and a research question, components of a research question, types of research questions, and formulating research objectives.**
  - Conducted an **interactive activity**, where participants were given the broad topic of **depression** and were asked to develop their own research questions based on their interests.
2. **Searching and Organizing Literature** – Session by Dr. Senthil Kumar, National Institute of Epidemiology (NIE), ICMR, Chennai
  - Demonstrated how to use **PubMed** for **searching relevant literature** effectively.
  - Explained the use of **Zotero** for **organizing references and managing citations.**

**3. Research Designs** – Session by Dr. A. Balaji, Vice Principal, MEU Coordinator, Professor & HOD, Community Medicine, Arunai Medical College and Hospital

- Provided an overview of different **study designs used in health research**, including:
  - **Descriptive studies** (case reports, case series, cross-sectional studies)
  - **Analytical studies** (case-control and cohort studies)
  - **Experimental studies** (randomized controlled trials)
- Explained the **advantages, limitations, and appropriate applications** of each study design.
- Discussed **bias, confounding, and ethical considerations** in research design.

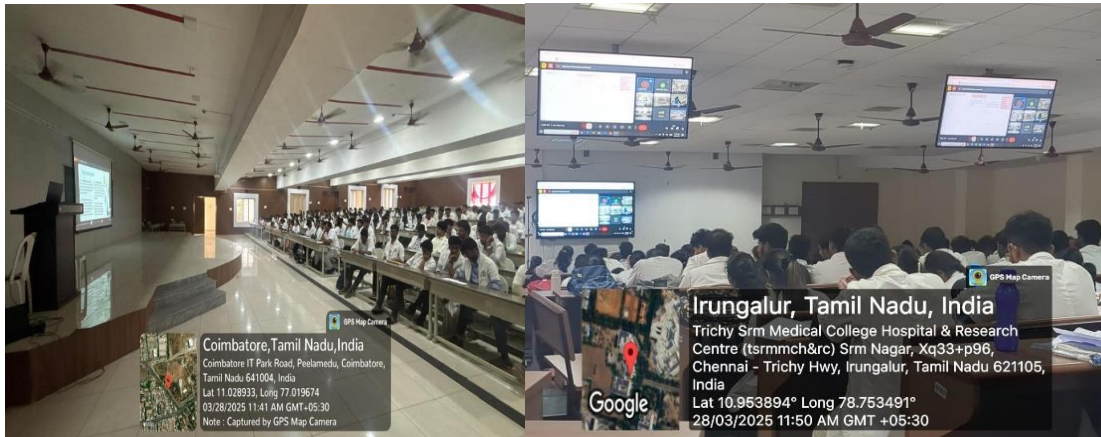
**4. Basic Biostatistics in Health Research** – Session by Dr. L. Pari Dayal, Assistant Professor, Department of Statistics, Madras Christian College, Chennai

- Introduced **fundamental biostatistical concepts** such as:
  - **Types of data (qualitative vs. quantitative, continuous vs. categorical)**
  - **Measures of central tendency (mean, median, mode)**
  - **Measures of dispersion (range, variance, standard deviation)**
  - **Probability distributions** used in health research
- Explained **hypothesis testing and the hypothesis testing process**, including:
  - **Formulating null and alternative hypotheses**
  - **Types of errors (Type I and Type II errors)**
  - **Steps in hypothesis testing** (selecting appropriate tests, setting significance levels, interpreting p-values)

**5. Research Protocols** – Session by Dr. K. Ilavenil, Assistant Professor, Karpagam Faculty of Medical Science & Research, Coimbatore. Explained the **importance of a research protocol** in conducting structured, ethical, and scientifically valid research. Discussed the **essential components of a research protocol**, including:

- **Title and background**
- **Objectives and hypothesis**
- **Methodology**

- Data collection methods
- Statistical analysis plan
- Ethical considerations



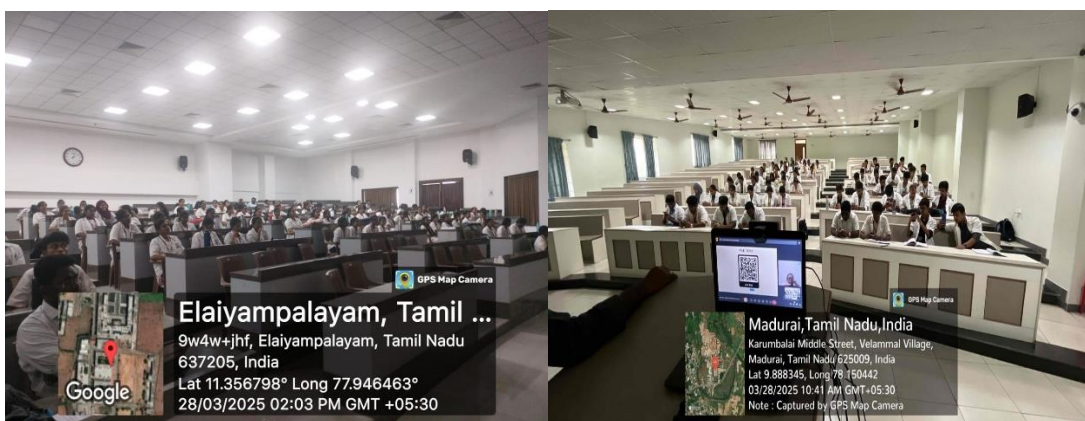
**Coimbatore Medical college**

**SRM Medical college**



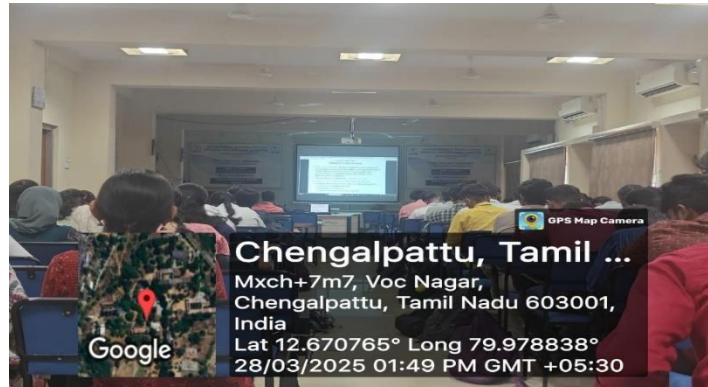
**GMC, Ramanathapuram**

**Sri Muthukumaran Medical College**



**Swamy Vivekanandha Medical College**

**Velammal Medical College**



## Chengalpattu Medical College

### INTERACTIVE SESSIONS BY THE EXPERTS

**RESEARCH IDEA VS QUESTION**

| I wonder If ..  | To find out..  |
|---|--|
| I wonder if Indians have different Nasal dimensions!! | What are the morphometric proportional dimensions of normal adult Indian population of both genders? |
| Less specific Very broad                              | Clearly defined (Predictor/outcome/specified population)   |
| Less operational Low practicality                     | Simple, measurable objective   |

**RESEARCH IDEA** vs **RESEARCH QUESTION**

**How to do a literature search?**

- Step 1**
  - Developing the research question (RQ) is the first step
- Step 2**
  - Breaking the RQ into concepts
- Step 3**
  - Identifying the synonyms or keywords for the concepts
  - Based on the PICOT [P-Population/Patient; I- Intervention ;C- Comparison; O- Outcome; T-Timeframe]
- Step 4**
  - Medical Subject Headings (MeSH) for PubMed

meet.google.com/exi-vrbb-oby?pli=1&authuser=2

Balaji Arumugam (Presenting, annotating)

### What's the Job of an Epidemiologist?

- To find out the cause and effect relationship
- The analyse the association between the exposure and the outcome
- To measure the strength of association between the causative factor (Exposure) and the Disease (Outcome)
- To prove or disprove the causal hypothesis

#### Study Designs in Epidemiology

13:37 | exi-vrbb-oby

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Ila Karun (Presenting, annotating)

### Activity

- What are the details to be included under the methodology of a research protocol?
- Scan the QR code to add your answers

27

15:28 | exi-vrbb-oby

Ila Karun (Presenting, annotating)

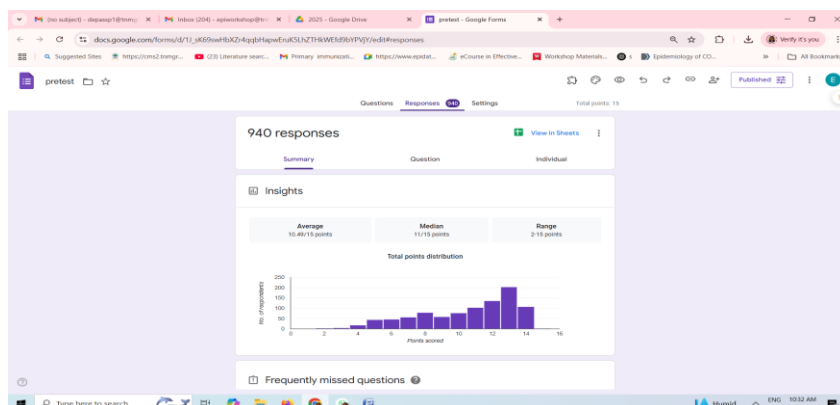
Methodology in Research Protocol

Write what must be added in methodology section of the research protocol.

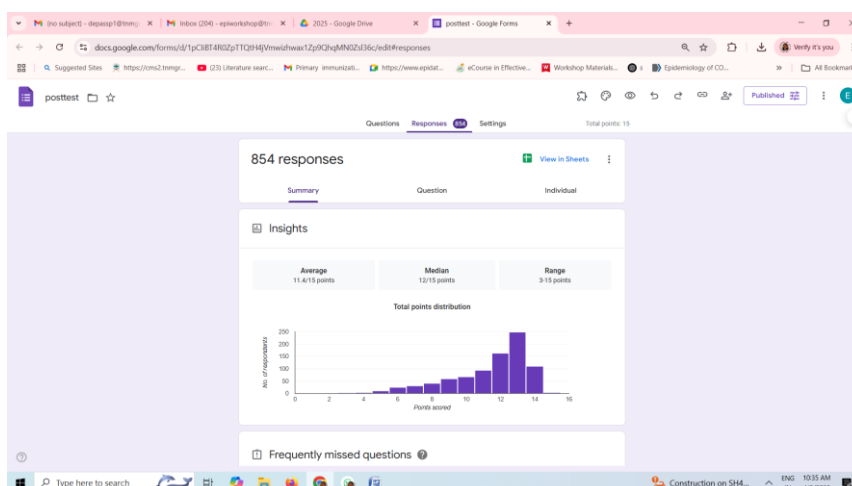
- Exposure Definition** (3 minutes app)
  - Investigation on details
- Data Collection, research Design** (3 minutes app)
  - Proper data collection
- Sampling method** (3 minutes app)
  - Proper data collection
- Methodology** (3 minutes app)
  - Proper data collection

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## COMPARISON SCORES OF PRE-TEST AND POST-TEST



**Fig 1. Pre-test Score of Participants**



**Fig 2. Post-test Score of Participants**

### OVERALL FEEDBACK FROM THE COLLEGES:

Dr. Jasmine S. Sundar, Senior Assistant Professor concluded the research methodology workshop. The workshop provided students with a strong foundation in research and biostatistics, which will be valuable in academic research, thesis work, and future medical studies. The introduction session by Dr. G. Srinivas set an engaging tone for the day and provided a solid foundation for the subsequent modules.

## Key Aspects That Impressed Participants

- **The research methodology sessions** – Participants valued the structured approach to understanding research fundamentals.
- **Quality of the sessions** – Many noted that the sessions were well-planned and covered essential topics in research and biostatistics.
- **Tips for conducting research** – Practical tips on how to formulate research ideas and questions were particularly useful.
- **Various institutional research examples** – Exposure to different research methodologies from various institutions was appreciated.
- **Way of explanation** – The clear and patient explanations by faculty members were highlighted as a strong point.
- **Interactive nature of the sessions** – Many participants enjoyed the interactive approach, which helped in better understanding concepts.
- **Diversity of faculty members** – The presence of experienced professors from different fields was found to be valuable.
- **Engaging activities and discussions** – Hands-on exercises, such as formulating research questions, made learning more effective.
- **Clarity in research protocols and methodology** – Many participants mentioned that learning about protocol writing helped them understand how to structure a research study.