

Report on the Online Workshop on Research Methodology and Biostatistics



The Department of Epidemiology, Tamil Nadu Dr. MGR Medical University, Guindy, organized an online workshop on **Research Methodology and Biostatistics** on **May 30, 2025**. This workshop, designed for MBBS Undergraduate Medical students, marked the third 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:** Department of Epidemiology, The Tamil Nadu Dr. MGR Medical University
- **Mode:** Online
- **Target Audience:** Third Year part 1 MBBS Undergraduate students

- **Total Participating Colleges: 1**
 - **Melmaruvathur Adhiparasakthi Institute of Medical Sciences and Research**
- **Total Participants: 150**

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. Subha Anirudhan, Professor, Department of Conservative Dentistry and Endodontics, Sri Ramakrishna Dental College and Hospital, Coimbatore
 - Explained what **research process is, difference between a research idea and a research question, why research? components of a research question, starting with a research question and formulating research objectives.**
2. **Searching and Organizing Literature** – Session by Dr. S.A.Rizwan, Scientist D, NIE, ICMR, Chennai.
 - Demonstrated how to use **PubMed for searching relevant literature** effectively.
3. Key concepts while searching using PubMed (MeSH) and Embase (Emtree) – Live hands on experience on Pubmed search advanced guide.
4. **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.

5. **Basic Biostatistics in Health Research** – Session by Dr.Vasantha, Technical Officer –C NIRT,ICMR

- 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)

6. **Research Protocols** – Session by Dr. K. Yuvaraj, Head, Evidence Synthesis Unit, PROPUL Evidence, Chennai.

- Explained the **importance of a research protocol** in conducting structured, ethical, and scientifically valid research. Discussed the **essential components of a research protocol**.



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INTERACTIVE SESSIONS BY THE EXPERTS

The screenshot shows a Google Meet interface. The main window displays a slide titled "Case scenario". The slide content includes a stick figure holding a lightning bolt and a 3D figure with a red question mark. The meeting title bar at the top indicates "Subha Anirudhan (Presenting, annotating)". The bottom toolbar shows the time as 11:16 and the meeting name "DoE-Virtual RMBS Workshop for ...".

Research Ideas /Questions & Objectives - Dr. Subha Anirudhan

The screenshot shows a Google Meet interface. The main window displays a slide titled "How to do a literature search?". The slide content includes a list of bullet points: "Developing the research question (RQ) is the first step", "Breaking the RQ into concepts", "Identifying the synonyms or keywords for the concepts", and "MeSH (PubMed), Emtree (Embase) are special terms used for indexing articles by human review". The meeting title bar at the top indicates "Rizwan S A (Presenting)". The bottom toolbar shows the time as 12:04 and the meeting name "DoE-Virtual RMBS Workshop for...".

Searching and Organizing Literature – Dr. S.A. Rizwan

The screenshot shows a Zoom meeting interface. The main window displays a presentation slide with the following content:

SPECIFIC LEARNING OBJECTIVES

- At the end of the session the learner should be able to
 - Define a study design and differentiate the qualitative and quantitative research methods
 - Enlist and describe the types of study designs, data collection methods and analysis
 - Interpret and select the appropriate study designs

The participant grid on the right shows three participants: 'amch communitymedicine' (muted), 'Excallburs', and 'MEETING-TNMGRMU' (muted). The bottom toolbar includes icons for chat, mute, video, and other meeting controls.

Research Designs – Dr. A. Balaji

The screenshot shows a Zoom meeting interface. The main window displays a presentation slide with the following content:

What is Probability?

Probability

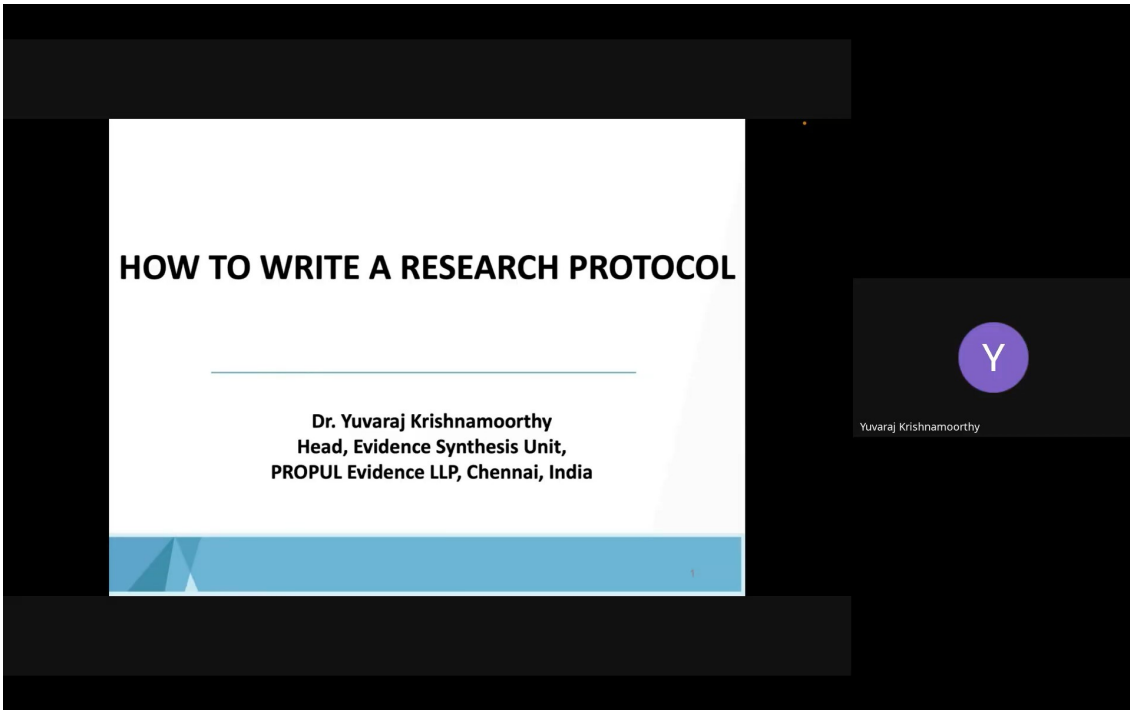
- is the measure of the likelihood that an event will occur in a Random Experiment.
- $0 \leq p \leq 1$
- Probability can be defined as the ratio of the number of favorable outcomes to the total number of outcomes of an event.

Conditional Probability

- Conditional Probability is a measure of the probability of an event given that (by assumption, presumption, assertion or evidence) another event has already occurred.

The video feed on the right shows a participant wearing glasses and a yellow shirt. The bottom toolbar includes a play button, a progress bar at 4:38:07 / 6:05:00, and other meeting controls.

Basic Biostatistics in Health Research – Dr. Vasantha



Research Protocols – Dr. K. Yuvaraj

COMPARISON SCORES OF PRE-TEST AND POST-TEST

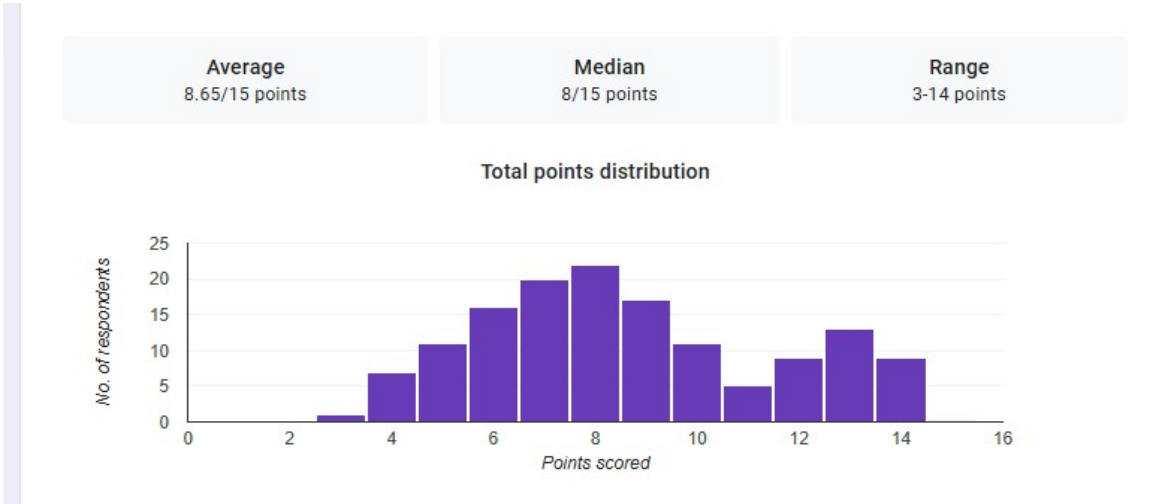


Fig 1. Pre-test Score of Participants

N =150

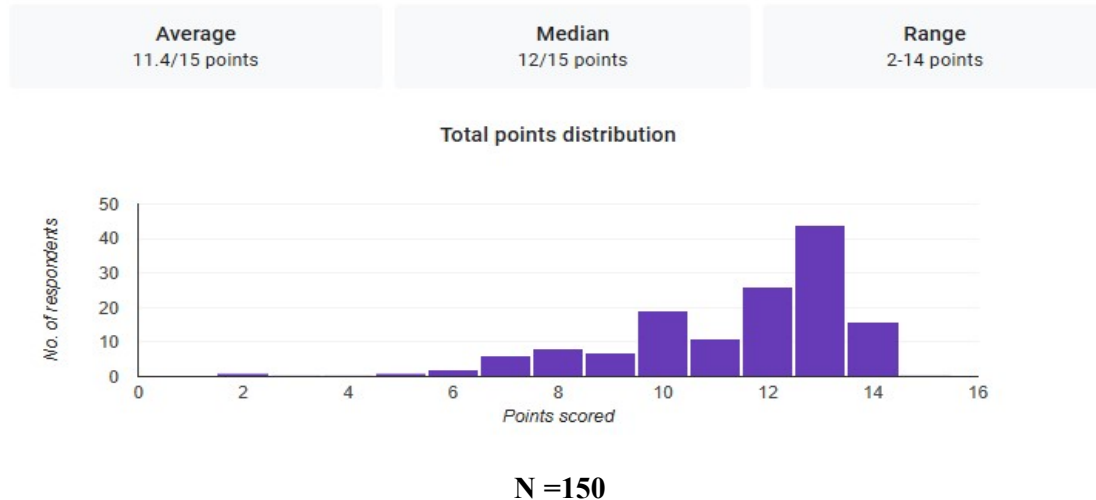


Fig 2. Post-test Score of Participants

OVERALL FEEDBACK FROM THE STUDENTS OF MAPIMS:

The day was effectively initiated by Dr. G. Srinivas, Professor and Head, Department of Epidemiology, whose introductory session set an enthusiastic and insightful tone for the rest of the workshop. The sessions provided participants with a solid grounding in research methodology and biostatistics, offering valuable insights that will support their academic research, thesis work, and future careers in medicine. The workshop concluded with closing remarks from Dr. Jasmine S. Sundar, Assistant Professor, Department of Epidemiology, TNMGRMU.

Key Aspects That Impressed Participants

Research Ideas, Questions & Objectives – The session by **Dr. Subha Anirudhan** was highly appreciated, especially for its engaging and interactive activity on formulating research questions.

Searching and Organizing Literature – **Dr. S.A. Rizwan** delivered a practical and informative session on using databases like PubMed.

Research Designs – **Dr. A. Balaji** effectively explained various study designs and their real-world applications, providing much-needed clarity.

Basic Biostatistics in Health Research – **Dr. Vasantha** was praised for simplifying complex statistical concepts, making them accessible to undergraduate students.

Research Protocols – The session by **Dr. K. Yuvaraj** offered valuable insights into systematically structuring a research study