Datta Meghe Institute of Medical Sciences
(Deemed to be University), Wardha

NAAC Re-accredited Grade 'A+'

Updated Curriculum of Research Methodology for AIPHDCET under DMIMS (DU)

(Theme based)

Content :

Updated Curriculum of Research Methodology for AIPHDCET, DMIMS(DU)

THEME 1: BASICS OF RESEARCH METHODOLOGY

1.1 : Introduction to Research

- Definition of Research
- Types & Methods of research in health
- Applied versus Fundamental research
- Exploratory research, Observational research
- Inductive and Deductive approaches
- Health system research

1.2: Designing Research protocol

- Research Protocol Development
- Research spiral components
- Literature search strategy, Sources of information
- Identification of Research problem, Research gap
- Research question
- Research Hypothesis, Null and Alternative Hypothesis
- Study Objectives

1.3: Data and types

- Types of Data ,Primary and Secondary data
- Scales of measurement of data- Nominal data, Ordinal, Interval and Ratio scale
- Variables and Confounders, Dependent and Independent Variables, Extraneous variable, Control variable
- Bias and errors

THEME 2 : RESEARCH STUDY DESIGNS AND APPROACHES

2.1 :Study Design :

- Case study ;Descriptive study
- Cross-sectional study
- Analytical studies - Case Control, Cohort studies
- Retrospective and Prospective study designs
- Nested Case Control study
- Experimental/Interventional study
- Randomized control trials, Clinical Trials
- Randomization, Blinding
- Quasi Experimental study
- Field Trials
- Research on Diagnostic Tests
- Introduction to systematic review and meta-analysis
- Association and Causation
- Concept of correlation and regression

2.2: Study population:

- Selecting Cases and Control
- Comparison Group
- Target population
- Matching
- Case Definition
- Inclusion and Exclusion Criteria

2.3: **Qualitative research methods :**

- Approaches, main qualitative methods (unstructured observation, structured observation, unstructured and semi-structured interviewing, systematic interviewing, multiple informant interviewing)
- Ethnography, Grounded Theory, Participant Observation,
- Representativeness, reliability and validity
- Coding, Content analysis, Pattern thematic analysis
- Qualitative methods for community health need assessment - Community health needs assessment in the context of population-based methods
- Management and analysis of qualitative data
- Computer-assisted qualitative data analysis
- Limitation of Qualitative research

THEME 3 :SAMPLE SIZE , SAMPLING, DATA COLLECTION& DATA MANAGEMENT

3.1 :Sample size estimation and Sampling methods

- Importance and principles of sampling
- Sampling Frame, Sampling Unit, Sampling Error
- Concept of Population and Sample
- Sampling in Qualitative and Quantitative research
- Types of Sampling Methods
- Radom/ Probability Sampling and Non-Random Sampling
- Simple Random Sampling
- Systematic Random Sampling
- Stratified Random Sampling
- Multiphasic Random Sampling
- Multistage Random Sampling
- Cluster Sampling
- Sampling with Probability Proportional To Size
- Quota Sampling
- Snowball Sampling
- Purposive sampling
- Sample Size estimation -Sample size estimation for descriptive study, analytical study, interventional study
- Allowable error, Effect size

3.2 :Data Collection Methods :

- Survey techniques & tools
- Design of survey and data collection instruments – relevance to study objectives; development and types of questions; length order, layout and coding of survey instrument
- **Questionnaire** –Meaning Of Questionnaire, Drafting Of Questionnaire, Size Of Questions, Clarity Of Questions, Logical Sequence Of Questions, Simple Meaning Questions, Other requirements Of a good questionnaire
- **Observation** - Steps in Observation, Meaning And Characteristics Of Observation, Types Of Observation, Stages of Observation, Problems, Merits And Demerits
- In depth Interview
- Focus Group Discussion
- Self-Administered questionnaire
- Checklist
- Instrument adaptation and validation
- Reliability and Validity of tool
- Pilot testing /Pre-testing the tool

3.3 :Data Quality and management

- Introduction to data quality assessment
- Data triangulation
- Double method of data collection and management
- Data base manipulations, Managing entries of missing data
- Use of computers in data management and analysis

THEME 4 : STATISTICAL METHODS IN RESEARCH

4.1 : **Descriptive and Inferential statistics**

- Descriptive statistics
- Measures of central tendency
- Tabular and Graphical presentation of data
- Charts, Graphs-Bar, Pie, Scatter, Histogram, Line diagram, Spot map
- Measures of dispersion- Range, Standard Deviation, Interquartile range, Variance
- Inferential statistics
- Test of significance – parametric and non-parametric test
- Degrees of freedom, Power of a test
- Chi Square Test, Student t test, Z test, Fischer Test, ANOVA, Mann-Whitney
- p value, Confidence Interval, Levels and limits

4.2 Distribution of data

- Normal curve
- Skewed distribution of data

4.3 : **Approaches to Diagnostic research**

- Evaluation of screening test ,
- Specificity, Sensitivity,
- Positive and Negative Predictive value, Level of agreement and Kappa, ROC curve

4.4 Approach to analysis of – Observational study, RCT, Clinical research

- Incidence, Prevalence
- Probability and Odds
- Risk estimation, Odds ratio, Relative Risk, Relative risk reduction, Attributable risk reduction,Number needed to treat, Number needed to harm
- Type I and II Error

4.5 : Correlation, Regression analysis, Survival analysis

- Correlation coefficient and Logistic regression analysis
- Introduction to multivariate analysis
- Introduction to survival analysis, Life Table

THEME 5 : ETHICS IN RESEARCH AND SCIENTIFIC WRITING

5.1 : Ethics in research

- Importance of ethics in research
- Principles of ethics
- International Declarations
- Nuremberg code, Helsinki declaration, ICMR guidelines, accepted ethical principles concerning research on human subjects, confidentiality, obtaining communal consent for field trials
- Informed consent, Verbal Consent , Written consent , Assent
- Institutional review board / ethics committee – approval
- Animal ethics committee – approval
- Good clinical practice (GCP)
- Research ethics, Plagiarism , Guidelines for the plagiarism check

5.2 : Scientific writing

- Project Report / Thesis /Dissertation writing
- Components of project report
- Work plan, Logic model, Gantt Chart
- Budget, Source of Funding
- Citation, referencing and bibliography
- Reference Management
- Critical appraisal of Journal Article and Writing a Research Paper
- Modes of dissemination of research findings
- Publication of article in indexed scientific journals

RECOMMENDED BOOKS FOR REFERENCE :

1. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches , by John W. Creswell
2. Qualitative Data Analysis: An Expanded Sourcebook, by Matthew B. Miles
3. Research Methodology: Methods and Techniques – Abridged, Audiobook, Box set, by C. R. Kothari, Third edition.
4. Research Methodology: A Guide for Researchers in Management and Social Sciences Paperback – 2006 , by Taylor & Bill .
5. R. Bonita, R. Beaglehole, T. Kjellström. Basic Epidemiology, 2nd edition World Health Organization. 2006
6. Mahajan B K , Text book of Biostatistics, sixth edition J P Brothers.
7. Principles and Practice of Biostatistics by J V Dixit
8. Research Methodology for Health Professionalsby RC Goyal
9. Mahajan's Methods in Biostatistics For Medical Students And Research Workers by by Bratati Banerjee, 7th edition
10. Pauli H.G. Training in research methodology: review and proposals (Advisory Committee on Medical Research,25th Session, Geneva, 10-13 October 1983). Geneva, World Health Organization, 1983.

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