

Dr. D. Y. Patil Vidyapeeth, Pune

Pattern for Pre-Ph. D. Examination for the faculties of

**Medicine, Dentistry, Biotechnology & Bioinformatics, Nursing,
Allied Medical Science (Physiotherapy)**

Paper I	Research Methodology & Biostatistics No of total Questions - 10 (5 Questions on Research Methodology and 5 Questions on Biostatistics) Each Questions carries 5 marks	Total Marks - 50
Paper II	Recent advances in the concerned speciality No of total Questions - 10 Each Questions carries 5 marks	Total Marks - 50
Paper III	Presentation & Discussion (Relevant to the Research topic for Ph. D.)	Total Marks - 50

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Pre-Ph. D. Syllabus – Physiotherapy

PAPER I : Research Methodology & Biostatistics

Section A

(5 Questions – 5 Marks each)

Objective: On completion of the study of this subject, the research student should be able to:

- Enumerate the steps in research process
- Acquire skills of reviewing literature, formulating a hypothesis, collect data, writing research proposal etc

Following are the topics to be included but not limited to:

1. Research in Physiotherapy

- a. Introduction
- b. Research for Physiotherapist: Why? How? And When?
- c. Research – Definition, concept, purpose, approaches
- d. Internet sites for Physiotherapist

2. Research Fundamentals

- a. Define measurement
- b. Measurement framework
- c. Scales of measurement
- d. Pilot Study
- e. Types of variables
- f. Reliability & Validity
- g. Drawing Tables, graphs, master chart etc

3. Writing a Research Proposal, Critiquing a research article

- a. Process of selection of research question including prioritization and feasibility
- b. Defining a problem
- c. Research process : Process of writing a research proposal:
- d. Formulating a question, Operational Definition
 - Inclusion & Exclusion criteria
 - Data collection & analysis
 - Results, Interpretation, conclusion, discussion

- Informed Consent
 - Limitations
- e. Scientific writing for thesis and research publications.

4. Research Design

- a. Principle of Designing
- b. Design, instrumentation & analysis for qualitative research
- c. Design, instrumentation & analysis for quantitative research
- d. Design, instrumentation & analysis for quasi-experimental research
- e. Design models utilized in Physiotherapy

5. Research Ethics

- a. Importance of Ethics in Research
- b. Main ethical issues in human subjects' research
- c. Main ethical principles that govern research with human subjects

- d. Components of an ethically valid informed consent for research

6. Review of literature

- What is review of literature,
- need for review of literature
- primary and secondary sources for review, treatise, monographs, patents
- current literature methods, abstraction of research papers, major secondary sources, bibliographic databases
- web as source of information, information retrieval, information processing
- critical evaluation, organization of materials collected and writing of review, methods of writing references and bibliography.

7. Evaluating role of bias and confounding

- Types of bias, control of bias, evaluation of role of bias
- Nature of confounding, methods of controlling confounding.

SECTION B

(5 Questions – 5 Marks each)

Objective: On completion of the study of this subject, the research student should be able to:

- Describe the importance & use of biostatistics for research work
- To provide learners in-depth knowledge of the Indian patent law, training in writing of patent application and to develop expertise in patent search.

Following are the topics to be included but not limited to:

1. Biostatistics

- a. Introduction
- b. Definition
- c. Types
- d. Application in Physiotherapy

2. Data

- a. Definition
- b. Types
- c. Presentation
- d. Collection methods

3. Measures of Central tendency

- a. Arithmetic mean, median, mode. Relation ship between them
- b. Partitioned values- Quartiles, Deciles, Percentiles
- c. Graphical determination

4. Measures of Dispersion

- a. Range
- b. Mean Deviation
- c. Standard Deviation

5. Normal Distribution Curve

- a. Properties of normal distribution
- b. Standard normal distribution
- c. Transformation of normal random variables.
- d. Inverse transformation
- e. Normal approximation of Bioaxial distribution.

6. Correlation analysis

- a. Bivariate distribution
- b. Scatter Diagram
- c. Coefficient of correlation
- d. Calculation & interpretation of correlation coefficient
- e. T-test, Z-test, P-value

7. Regression analysis

- a. Lines of regression
- b. Calculation of Regression coefficient

8. Sampling

- a. Methods of Sampling
- b. Sampling distribution
- c. Standard error
- d. Types I & II error

9. Probability

- Probability scale, measurement of probability, laws of probability for independent events, conditional probability, Bayes' theorem.
- Probability distribution: binomial distribution, Poisson distribution, normal distribution, t distribution.

10. Hypothesis Testing

- a. Null Hypothesis
- b. Alternative hypothesis
- c. Acceptance & rejection of null Hypothesis
- d. Level of significance

11. Parametric & non Parametric tests

- a. Chi square test
- b. Mann -Whitney U test
- c. Wilcoxon Signed test
- d. Kruskal-Wallis test
- e. Friedman test
- f. Spearman rank correlation coefficient
- g. T-test/student T test
- h. Analysis of variance

12. Computing in Data analysis and Data mining

13. Ethics and biomedical research

- General principles on ethical considerations involving human subjects, ethical review procedures, Institutional ethics committee, its organization and functions, general ethical issues.
- Specific principles for clinical evaluation of drugs /devices / diagnosis / vaccines / herbal remedies, specific principles in epidemiological studies, specific principles in human genetic research, specific principles for research in transplantation including fetal tissue implantation.

14. Ethical guidelines for experimental animals

- Sources of experimental animals, Lab. animal husbandry and management, anesthesia and euthanasia, laboratory animal ethics, animal ethics committee, its organization and functions, ethical guidelines for use of animals for scientific research, CPCSEA guidelines, in-vitro system to replace animals, legal provisions for experimentation of animals.

15. Patient Practice –

Patent is the most significant form of Intellectual Property to encourage creativity in Health science and technology and protect invention and development and creation of new technology and health care system throughout the world. The objective of the Programme is to provide learners in-depth knowledge of The Indian patent law, training in writing of patent application, and to develop expertise in patent search.

- a. Overview of Intellectual Property Rights
- b. International Framework for Patents
- c. Indian Patent Law and Procedures

Reference books:

1. Epidemiology in medicine, Charles H. Hennekens and Jules E. Burling. (1987)
2. Oxford Text Book of Public Health (5th edition), volume 2, Oxford University press. (2011)
3. Essentials of Medical Statistics by Bely R. Kirkwood. (2011)
4. An Introduction to biostatistics by P.S.S. Sundar Rau. (2006)
5. Ethical guidelines for biomedical research on human subjects, ICMR, New Delhi 2006
6. Guidelines for care and use of animals in scientific research. Indian National Science Academy, New Delhi 2000.
7. Research Methodology, methods and techniques by C.R. Kothari. (2009)
8. Basic epidemiology, 2nd edition, R Bonita, R Beaglehole and T Kjellstrom (2007)
9. Statistical methods in medical research, 4th edition, P Armitage, G Berry and JNS Matthews. (2001)
10. Biostatistics: A foundation for analysis in health sciences, 9th edition, Wayne W Daniel (2008)

PAPER - II RECENT ADVANCES IN THE CONCERNED SPECIALITY

50 Marks

(10 Question 5 Marks)

- Current issues and trends in Physiotherapy education, Training & evaluation
- Advanced Electro therapeutic agents in the management of Pain, inflammation, tissue healing, wound healing, and various other conditions with/without pharmacological agents.
- Electro diagnosis with therapeutic currents, – S.D. curves for motor, sensory and Pain assessment
- Kinetics / Kinematics of upper & lower extremity and spinal joints, (including T. M. joint)
- Kinetics / Kinematics of Posture, gait, jogging, running, climbing up/down, A.D.L & exercises.
- Application of biomechanical concepts for ergonomics in the prevention / management of environmental & functional hazards related to industrial/work place occupational hazards.
- Energy production, expenditure and transfer during exercise.
- Physiological changes and adaptation of musculo-skeletal system, Nervous system, Cardio-vascular system, Respiratory system, excretory system following aerobic training and An-aerobic training.
- Fatigue- Assessment and management.
- DOMS- Assessment and management.
- Aerobic exercise testing- tests, indications, contraindications, procedure, precaution and termination criteria for normal and special population.
- Exercise prescription for various conditions
- Obesity & weight control-measurement and evidence based management strategies
- Fracture-types, management procedure for various fractures, biomechanical & Physiological reasoning for surgical procedure, evidence based rehabilitation protocols
- Principles and evidence based guidelines for rehabilitation following joint replacements of upper, lower limb & spine, with clinical reasoning.
- Principles and physiotherapy management with recent advances for upper and lower extremity joints.

- Postoperative management of tendon injuries
- Degenerative disorders of joints- assessment & management.
- Assessment & management of disorders of Spine - Low Back Pain (mechanical), LBP (Pathological) Disc prolapse. Cord compression. Spondylosis. Ankylosing spondylitis. Spinal injuries, Cranio Vertebral dysfunction, Sacralisation, Lumbarisation, Lumbar Canal Stenosis, Sciatica, Failed Back syndrome, SI joint dysfunction, Zygoapophysael Joint arthropathy, Thoraco-lumbar junction Dysfunction, Coxydynia.
- Core Stability assessment & Training
- Assessment & Rehabilitation guidelines of ligament/tendon/muscular injuries of various

joints of the body (focused on weight bearing joints)

- Amputations – types, principles and evidence based guidelines for management, with recent advances in rehabilitation and functional training.
- Cerebro Vascular accidents-causes, investigations, rehabilitation focused assessment & evidence based management.
- Spasticity management
- Management of a comatosed patient
- Spinal cord disorders – assessment & rehabilitative management.
- Pain pathway & management
- Prosthetics & Orthotics in Paediatric & adults for various impairments and disabilities.
- Bronchial Hygiene – principles, precautions, guidelines of procedure for Humidification, nebulization, aerosol therapy, suctioning
- COPD- Causes, pathomechanics, presentation, evaluation, investigation, management, rehabilitation with clinical reasoning.
- Restrictive lung disorders- Causes, pathomechanics, presentation, evaluation, investigation, management, rehabilitation with clinical reasoning
- Management for respiratory disorder in ICU - Drainage indication, Humidification, O₂ Therapy, Nebulization, Suctioning, Endotracheal Tube, Tracheostomy Tube.
- Cardiac evaluation and management in ICCU - Monitoring, recording, ventilatory support, rehabilitation protocol.
- Pre & Post operative rehabilitation of Arterial disorders / Peripheral Vascular disorders - DVT, Venous insufficiency, oedema congestion, varicose veins, Claudication.
- Burns- types, complications, assessment, rehabilitation principles and guidelines of management.
- Institution based rehabilitation and community based rehabilitation:– its principles and differences, multi-disciplinary approach, role of national institutes, District rehabilitation centre and primary health centre.
- W.H.O's policies about rural health care, concept of primary, secondary, tertiary health centres, district hospitals.
- Principles and Functions of a Rehabilitation team like Medical person, Physiotherapist, Occupational therapist, audiologist, speech therapist, Prosthetics & Orthotics, Vocational guide in C.B.R. of physically handicapped person.
- Pre & Post natal rehabilitation program guidelines.
- Assessment & management for Common women's health issue including Urinary incontinence & menopause.
- Physiotherapist role in industry – preventive, promotive, curative, intervention, ergonomic and rehabilitative services, Work Conditioning and Work Hardening, work station adaptations/ modifications
- Occupational Stress and its management.
- Physiology of Aging, Theories of Aging, Age related changes in Musculoskeletal system, Central Nervous System, Cardio-Vascular system, Respiratory system, Immune system, Metabolic and Temperature related changes, Balance problems
- Role of Physiotherapy in a Home for the aged- geriatric care, holistic approach.
- Life style modification– Diet, Yoga, Exercises for prevention and management to improve health status.

Paper III

Total Marks = 50

Presentation & Discussion

(Relevant to the Research topic for the Ph. D.)