

Centre for Post Graduate Studies and Research in Ayurved of
Tilak Ayurved Mahavidyalaya, Pune

PRE-M.D./M.S.

Sub: Research Methodology and Medical Statistics

Admitted Batch 2022-23

ATP

Part A – Research Methodology

S. No.	Topic	Name of the Faculty
1.	Introduction to Research	
A.	Definition of the term research	Dr.Yoginee Patil
B.	Definition of the term anusandhan	
C.	Need of research in the field of Ayurveda	
2.	General guidelines and steps in the research process	Dr.Vinaya Dixit
A	Selection of the research problem	Dr.Vinaya Dixit
B	Literature review: different methods (including computer database) with their advantages and limitations	
C	Defining research problem and formulation of hypothesis	
D	Defining general and specific objectives	
E	Research design: observational and interventional, descriptive and analytical, preclinical and clinical, qualitative and quantitative	Dr Manjiri Deshpande
F	Sample design	
G	Collection of the data	
H	Analysis of data.	
I	Generalization and interpretation, evaluation and assessment of hypothesis	
J	Ethical aspects related to human and animal experimentation	Dr Apoorva Sangoram
K	Information about Institutional Ethics Committee (IEC) and Animal Ethics Committee (AEC) and their functions. Procedure to obtain clearance from respective committees, including filling up of the consent forms and information sheets and publication ethics.	
3.	Preparation of research proposals in different disciplines for submission to funding agencies taking EMR-AYUSH scheme as a model.	
4.	Scientific writing and publication skills	Dr Vinaya Dixit
a	Familiarization with publication guidelines- Journal specific and CONSORT guidelines	Dr Manjiri Deshpande
b	Different types of referencing and bibliography	
c	Thesis/Dissertation: contents and structure	
d	Research articles structuring: Introduction, Methods, Results and Discussions (IMRAD)	



5.	Classical Methods of Research.	
a	Concept of Pratyakshadi Pramana Pariksha, their types and application for Research in Ayurveda	Dr Mohan Joshi
b	Dravya-, Guna-, Karma-Parikshana Paddhati	Dr Apoorva Sangoram
c	Aushadhi-yog Parikshana Paddhati	
d	Swastha, Pariksha Paddhati	Dr Mihir Hajarnavis
e	Atura Pariksha Paddhati	Dr Manjiri Deshpande
f	Dashvidha Parikshya Bhava	
g	Tadvidya sambhasha, vadmarga and tantrayukti	Dr Yoginee Patil
6.	Comparison between methods of research in Ayurveda (Pratigya, Hetu, Udaharana, Upanaya, Nigaman) and contemporary methods in health sciences.	Dr Mihir Hajarnavis
7.	Different fields of Research in Ayurveda	
a	Fundamental research on concepts of Ayurveda	Dr Mohan Joshi
b	Panchamahabhuta and tridosha	
c	Concepts of rasa, guna, virya, vipak, prabhav and karma	Dr Apoorva Sangoram
d	Concept of prakriti-saradi bhava, ojas, srotas, agni, aam and koshta	Dr Minakshi Randive
8.	Literary Research-	
a	Introduction to manuscriptology: Definition and scope. Collection, conservation, cataloguing.	Dr Mohan Joshi Dr. Madhura Kulkarni
b	Data mining techniques, searching methods for new literature; search of new concepts in the available literature.	
c	Methods for searching internal and external evidences about authors, concepts and development of particular body of knowledge	
9.	Drug Research (Laboratory-based)-	
a	Drug sources: plant, animal and mineral. Methods of drug identification	Dr Apoorva Sangoram
b	Quality control and standardization aspects: Basic knowledge of Pharmacopoeial standards and parameters as set by Ayurvedic Pharmacopoeia of India.	
c	Information on WHO guidelines for standardization of herbal preparations. Good Manufacturing Practices (GMP) and Good Laboratory Practices (GLP).	
10.	Safety aspects:	
	Protocols for assessing acute, sub-acute and chronic toxicity studies. Familiarization with AYUSH guidelines (Rule 170), CDCSO and OECD guidelines.	Dr Apoorva Sangoram
11.	Introduction to latest Trends in Drug Discovery and Drug Development	Dr Apoorva Sangoram/ Dr Yoginee Patil Dr Dattatraya Naik (IEC Chairman)
	Brief information on the traditional drug discovery process	



	Brief information on the latest trends in the Drug Discovery process through employment of rational approach techniques; anti-sense approach, use of micro and macro-arrays, cell culture-based assays, use of concepts of systems biology and network physiology	
	Brief introduction to the process of Drug development	
12.	Clinical research:	
a	Introduction to Clinical Research Methodology identifying the priority areas of Ayurveda Basic knowledge of the following: - Observational and Interventional studies	Dr Manjiri Deshpande Dr Minakshi Randive
b	Descriptive & Analytical studies	
c	Longitudinal & Cross-sectional studies	
d	Prospective & Retrospectives studies Cohort studies	
e	Randomized Controlled Trials (RCT) & their types	
f	Single-case design, case control studies, ethnographic studies, black box design, cross-over design, factorial design.	
g	Errors and bias in research.	
h	New concepts in clinical trial- Adaptive clinical trials/ Good clinical practices (GCP)	
i	Phases of Clinical studies: 0,1,2,3, and 4	
	Survey studies -	Dr Mihir Hajarnavis
	Methodology, types, utility and analysis of Qualitative Research methods. Concepts of in-depth interview and Focus Group Discussion.	
13.	Pharmacovigilance for ASU drugs. Need, scope and aims & objectives. National Pharmacovigilance Programme for ASU drugs.	Dr Apoorva Sangoram
14.	Introduction to bioinformatics, scope of bioinformatics, role of computers in biology. Introduction to Data base- Pub med, Medlar and Scopus. Accession of databases	Dr Taranoom Patel
15.	Intellectual Property Rights- Different aspect and steps in patenting. Information on Traditional Knowledge Digital Library (TKDL).	Dr. Mohan Joshi



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Part B- Medical Statistics

S. No.	Topic	Name of the Faculty
1.	Definition of Statistics: Concepts, relevance and general applications of Biostatistics in Ayurveda	Dr Mihir Hajarnavis
2.	Collection, classification, presentation, analysis and interpretation of data (Definition, utility and methods)	Dr Mihir Hajarnavis
3.	Scales of Measurements - nominal, ordinal, interval and ratio scales. Types of variables – Continuous, discrete, dependent and independent variables. Type of series – Simple, Continuous and Discrete	Dr Mihir Hajarnavis
4.	Measures of Central tendency – Mean, Median and Mode	Dr Mihir Hajarnavis
5.	Variability: Types and measures of variability – Range, Quartile deviation, Percentile, Mean deviation and Standard deviation	Dr Mihir Hajarnavis
6.	Probability: Definitions, types and laws of probability,	Dr. Manjiri Deshpande
7.	Normal distribution: Concept and Properties, Sampling distribution, Standard Error, Confidence Interval and its application in interpretation of results and normal probability curve.	Dr Mihir Hajarnavis
8.	Fundamentals of testing of hypotheses: Null and alternate hypotheses, type I and type 2 errors. Tests of significance: Parametric and Non-Parametric tests, level of significance and power of the test, 'P' value and its interpretation, statistical significance and clinical significance	Shri Sushil Sawant
9.	Univariate analysis of categorical data: Confidence interval of incidence and prevalence, Odds ratio, relative risk and Risk difference, and their confidence intervals	Shri Sagar Khandagale
10.	Parametric tests: 'Z' test, Student's 't' test: paired and unpaired, 'F' test, Analysis of variance(ANOVA) test, repeated measures analysis of variance	Shri Sagar Khandagale
11.	Non parametric methods: Chi-square test, Fisher's exact test, McNemar's test, Wilcoxon test, Mann-Whitney U test, Kruskal – Wallis with relevant post hoc tests (Dunn)	Shri Sagar Khandagale



12.	Correlation and regression analysis: Concept, properties, computation and applications of correlation, Simple linear correlation, Karl Pearson's correlation co-efficient, Spearman's rank correlation. Regression- simple and multiple	Shri Sagar Khandagale
13.	Population and sample. Advantages of sampling, Random (Probability) and non-random (non-probability) sampling. Merits of random sampling. Random sampling methods- simple random, stratified, systematic, cluster and multiphase sampling. Concept, logic and requirement of sample size computation, computation of sample size for comparing two means, two proportions, estimating mean and proportions	Shri Sagar Khandagale
14.	Vital statistics and Demography: computation and applications - Rate, Ratio, Proportion, Mortality and fertility rates, Attack rate and hospital-related statistics	Dr Mihir Hajarnavis
15.	Familiarization with the use of Statistical software like SPSS/Graph Pad	Shri Sagar Khandagale

Practicals

I- Research Methodology


S. No.	Topic	Name of the Faculty
1.	Pharmaceutical Chemistry	Mrs. Vinaya Walimbe
	Familiarization and demonstration of common lab instruments for carrying out analysis as per API	
2.	Awareness of Chromatographic Techniques	Mrs. Vinaya Walimbe
	Demonstration or Video clips of following:	
	• Thin-layer chromatography (TLC).	
	• Column chromatography (CC).	
	• Flash chromatography (FC)	
	• High-perfo High-performance thin-layer chromatography (HPTLC)	
• High Performance (Pressure) Liquid Chromatography (HPLC)		
• Gas Chromatography (GC, GLC)		
3.	Pharmacognosy	Dr Apoorva Sangoram
	Familiarization and Demonstration of different techniques related to:- Drug administration techniques- oral and parenteral.	
	Blood collection by orbital plexuses puncturing	
	Techniques of anaesthesia and euthanasia	
	Information about different types of laboratory animals used in experimental research	



	Drug identification as per API including organoleptic evaluation	
4	Pharmacology and toxicology Familiarization and demonstration of techniques related to pharmacology and toxicology	
5	Biochemistry (Clinical) Familiarization and demonstration of techniques related to basic instruments used in a clinical biochemistry laboratory – semi and fully automated clinical analyzers, electrolyte analyzer, ELISA-techniques, nephelometry. Demonstration of blood sugar estimation, lipid profiles, kidney function test, liver function test. HbA1c, cystatin and microalbumin estimation by nephelometry or other suitable techniques. Interpretation of the results obtained in the light of the data on normal values.	Dr Minakshi Randive
6	Clinical Pathology Familiarization and demonstration of techniques related to basic and advanced instruments used in a basic clinical pathology lab. Auto cell counter, urine analyzer, ESR, microscopic examination of urine.	Dr Manjiri Deshpande
7	Imaging Sciences Familiarization and demonstration of techniques related to the imaging techniques. Video film demonstration of CT-Scan, MRI-scan and PET-scan.	
8	Clinical protocol development	Dr Manjiri Deshpande
II. MEDICAL STATISTICS		
1	Statistical exercise of examples from Topic number 4, 5, 8-12, 14, 15. Records to be prepared	Dr Mihir Hajarnavis/ Shri Sagar Khandagale

Majland
Dr. Mihir
Hajarnavis
Professor-
Incharge




Principal
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