



Syllabus of PhD Optometry entrance examination

1 EPIDEMIOLOGY AND COMMUNITY EYE CARE

1. Prevalence, incidence and distribution of visual impairment
2. Methodology
 - 2.1 Basics of Epidemiology study methods
 - 2.2 Types of study designs
 - 2.3 Screening for visual disorders
3. Childhood blindness
4. Refractive errors and presbyopia
5. Age related cataract
6. Low Vision
7. Diabetic retinopathy
8. Glaucoma
9. Age related Macular Degeneration
10. Vitamin A deficiency
11. Corneal and external diseases
12. Prevention strategies
13. Concept of Health and Disease
14. Principles of Epidemiology and Epidemiological Methods
15. Screening for Eye Disease – Refractive errors, Low Vision, Cataract, Diabetic retinopathy, Glaucoma, Amblyopia, Squint.
16. Blindness
17. Health Information and Basic Medical Statistics
18. Communication for Health Education
19. Health Planning and Management
20. Health care of community
21. How to plan and implement Vision2020

2 RESEARCH METHODOLOGY

1. Need for Research in optometry
2. Introduction to research methods , Conducting a literature review , Research design , Sampling methods , Data collection and data collection tools , Data analysis : Quantitative and Qualitatively , Public health research , Issues in Research . Writing skills for students
3. Introduction and method of collecting and presenting of statistical data
4. Calculation and interpretation of various measures like mean, median, standard deviations, Skewness and Kurtosis
5. Probability distribution
6. Correlation and regression
7. Significance tests and confidence intervals
8. Parametric tests –

- 8.1 Test for single proportion
- 8.2 Test for Equality of proportions
- 8.3 Test for single mean
- 8.4 Test for equality of means
- 9. ANOVA:-
 - 9.1 One way
 - 9.2 Two way
- 10. Non parametric tests –
 - 10.1 Chi-square tests
 - 10.2 Fisher’s exact test
 - 10.3 McNemar test
 - 10.4 Mann-whitney U-test
 - 10.5 Median test
 - 10.6 Sign test
 - 10.7 Wilcoxon test

3 OCULAR DISEASES AND DIAGNOSTICS

- 1. Refresher of anterior segment ocular diseases, diagnosis and therapeutics
- 2. Refresher of glaucoma diagnosis and therapeutics
- 3. Surgical treatment of anterior segment diseases
- 4. Anterior segment Diagnostics
 - 4.1 Specular Microscopy
 - 4.2 Topography
 - 4.3 Corneal Hysteresis
 - 4.4 Orbscan, Pentacam
 - 4.5 Pachymetry
 - 4.6 Abberometry
 - 4.7 AS OCT
 - 4.8 HRT
 - 4.9 GDx
 - 4.10 ONH evaluation
 - 4.11 Gonioscopy
 - 4.12 Fluoresceinangiography
 - 4.13 Refractive surgery
 - 4.14 Cataract evaluation
- 5. Refresher of posterior segment ocular diseases, diagnosis and therapeutics
- 6. Surgical treatment of posterior segment diseases
 - 6.1 Posterior segment Diagnostics
 - 6.2 ERG
 - 6.3 EOG
 - 6.4 VEP
 - 6.5 OCT
 - 6.6 Fundus photography
 - 6.7 Neuro optometric diseases and disorders

4 ADVANCED CONTACT LENSES

1. Anatomy and Physiology of the Cornea and related Structures
2. Contact Lens Materials
3. Microbiology, Lens Care and Maintenance
4. Tears and contact lenses
5. Optics and Lens Design
6. Clinical Instrumentation in contact lens practice
7. Rigid Gas Permeable corneal lens fitting
8. Soft contact lens fitting
9. Toric Contact lens fitting
10. Lens care regimen
11. Contact lens standards
12. Lens checking : Soft and Rigid
13. Contact lens complications
14. Special types of Contact lenses – diagnosis, surgery, protective, therapeutic, sports, partially sighted
15. Extended and Continuous wear Lenses
16. Scleral Contact lenses
17. Bifocal and Multifocal contact lenses
18. Orthokeratology
19. Keratoconus
20. Post keratoplasty contact lens fitting
21. Post refractive surgery contact lens fitting
22. Pediatric contact lens fitting
23. Cosmetic and prosthetic contact lens fitting
24. Contact lens for abnormal ocular conditions
25. Contact lens and Myopia control
26. Legal issues and contact lenses
27. Contact lens manufacturing
28. Modifications procedures

5 PEDIATRIC OPTOMETRY AND BINOCULAR VISION

1. Refractive Development:
 - 1.1 Early Refractive Development
 - 1.2 Visually Guided control of Refractive State: Animal Studies
 - 1.3 Infant Accommodation and Convergence
2. Oculomotor Function:
 - 2.1 Conjugate Eye Movements of Infants
 - 2.2 Development of the Vestibuloocular and Optokinetic reflexes
3. Spatial and Chromatic Vision:
 - 3.1 Front-end Limitations to Infant Spatial vision: Examination of two analyses
 - 3.2 Development of the Human Visual Field
 - 3.3 Development of Scotopic Retinal Sensitivity
 - 3.4 Infant Color vision
 - 3.5 Orientation and Motion selective Mechanisms in Infants

- 3.6 Intrinsic Noise and Infant performance
- 4. Binocular Vision:
 - 4.1 Development of interocular vision in Infants
 - 4.2 Stereopsis in Infants and its developmental relation to visual acuity
 - 4.3 Sensorimotor Adaptation and Development of the Horopter
 - 4.4 Two stages in the development of Binocular Vision and Eye Alignment
- 5. Retinal and cortical Development
- 6. Abnormal Visual Development
- 7. What next in Infant Research
- 8. Clinical Applications:
 - 8.1 Assessment of Child Vision and Refractive Error
 - 8.2 Refractive Routines in the Examination of Children
 - 8.3 Cycloplegic Refraction
 - 8.4 Color Vision Assessment in Children
 - 8.5 Dispensing for the Child patient
 - 8.6 Pediatric Contact Lens Practice
 - 8.7 Dyslexia and Optometry Management
 - 8.8 Electrodiagnostic Needs of Multiple Handicapped Children
 - 8.9 Management Guidelines – Ametropia, Constant Strabismus
 - 8.10 Management Guidelines – Amblyopia
 - 8.11 Accommodation and Vergence anomalies
 - 8.12 Nystagmus
 - 8.13 Common genetic problems in Paediatric optometry
 - 8.14 Pediatric Ocular Diseases
 - 8.15 Ocular Trauma in Children
 - 8.16 Myopia control
 - 8.17 Clinical uses of prism

6 GERIATRIC OPTOMETRY

- 1. Visual Disorders – Medical Perspective
 - 1.1 The Epidemiology of Vision Impairment
 - 1.2 Vision Impairment in the pediatric population
 - 1.3 Ocular Diseases :
 - 1.3.1 Age – Related Cataract,
 - 1.3.2 Glaucoma
 - 1.3.3 ARMD
 - 1.3.4 Diabetic retinopathy
 - 1.3.5 Corneal Disorders
 - 1.3.6 Ocular Trauma
 - 1.3.7 Sensory Neuro-ophthalmology and Vision Impairment
 - 1.3.8 Refractive Disorders
- 2. Visual Disorders – The Functional Perspective
 - 2.1 Low Vision and Psychophysics
 - 2.2 Visual Functioning in Pediatric Populations with Low Vision
 - 2.3 Perceptual correlates of Optical Disorders

- 2.4 Functional aspects of Neural Visual Disorders of the eye and Brain
- 2.5 Visual Disorders and Performance of specific Tasks requiring vision
- 3. Visual Disorders – The Psychosocial Perspective
 - 3.1 Developmental perspectives – Youth
 - 3.2 Vision Impairment and Cognition
 - 3.3 Spatial orientation and Mobility of people with vision impairments
 - 3.4 Social skills Issues in vision impairment
 - 3.5 Communication and language: Issues and concerns
 - 3.6 Developmental perspectives on Aging and vision loss
 - 3.7 Vision and cognitive Functioning in old age
- 4. Interactions of Vision Impairment with other Disabilities and sensory Impairments.
 - 4.1 Children with Multiple Impairments
 - 4.2 Dual Vision and Hearing Impairment
 - 4.3 Diabetes Mellitus and Vision Impairment
 - 4.4 Vision Problems associated with Multiple Sclerosis
 - 4.5 Vision Impairment related to Acquired Brain Injury
 - 4.6 Vision and Dementia
 - 4.7 Low Vision and HIV infection
- 5. The Environment and Vision Impairment: Towards Universal Design
 - 5.1 Indian Disabilities act
 - 5.2 Children’s Environments
 - 5.3 Environments of Older people
 - 5.4 Outdoor environments
 - 5.5 Lighting to enhance visual capabilities
 - 5.6 Signage and way finding
 - 5.7 Accessible Environments through Technology
- 6. Vision Rehabilitation:
 - 6.1 In Western Countries
 - 6.2 In Asia
 - 6.3 Personnel preparation in Vision Rehabilitation
- 7. Psychological and social factors in visual Adaptation and Rehabilitation
 - 7.1 The Role of psychosocial Factors in adaptation to vision Impairment and Habilitation outcomes for Children and Youth
 - 7.2 The Role of psychosocial Factors in adaptation to vision Impairment and Habilitation outcomes for Adults and Older adults
 - 7.3 Social support and adjustment to vision Impairment across the life span
 - 7.4 The person – Environment perspective of vision impairment
 - 7.5 Associated Depression, Disability and rehabilitation
 - 7.6 Methodological strategies and issues in social research on vision Impairment and rehabilitation

7 LOW VISION CARE AND REHABILITATION

- 1. Habilitation of Children and Youth with vision Impairment
- 2. Rehabilitation of working –age Adults with Vision Impairment
- 3. Rehabilitation of older Adults with Vision Impairment

4. Functional consequences of vision Impairment
5. Vision evaluation of Infants
6. Educational assessment of visual function in Infants and Children
7. Functional Evaluation of the Adult
8. Functional orientation and Mobility
9. Functional Assessment of Low Vision for Activities of Daily living
10. Psychosocial assessment of adults with vision impairment
11. Assistive Devices and Technology for Low Vision
12. Assistive Devices and Technology for Blind
13. Vision and Reading - Normal Vs Low Vision
14. Clinical Implications of color vision Deficiencies

8 VISION THERAPY

1. Clinical Conditions

1.1 Strabismus and Amblyopia

1.1.1 Amblyopia

- Anisometropic / Isometropic Refractive Amblyopia
- Strabismic Amblyopia
- Hysterical Amblyopia
- Form Deprivation Amblyopia
- Differential diagnoses in childhood visual acuity loss

1.1.2 Strabismus

- Esotropia-
 - Infantile
 - Accommodative
 - Acquired
 - Microtropia
 - Sensory
 - Convergence Excess
 - Divergence Insufficiency
 - Non-accommodative
 - Sensory Adaptations
- Exotropia
 - Divergence Excess
 - Convergence Insufficiency
 - Basic Exotropia
 - Congenital
 - Sensory
 - Vertical Deviations
 - Noncomitant Deviations (AV Syndrome; Duane's Retraction Syndrome; Brown's Syndrome; III, IV, VI nerve palsy, etc.)
 - Differential diagnoses in strabismus
- Special clinical considerations
 - Anomalous Correspondence
 - Eccentric Fixation

- Suppression
 - Motor Ranges
 - Stereopsis
 - Horror fusionalis/intractable diplopia
- 1.2 Perception and Information Processing
 - 1.2.1 Neurological / Psychological
 - Ambient / focal systems.
 - Visual perceptual midline
 - Parvo cellular / Magno cellular function
 - Perceptual Style (central, peripheral)
 - Impact of colored filters
 - Attention
 - 1.2.2 Intersensory and Sensorimotor Integration
 - Visual-auditory
 - Visual-vestibular
 - Visual-oral
 - Visual-motor
 - Visual-tactual
 - 1.2.3 Performance indicators
 - Laterality and directionality
 - Visual requirements for academic success
 - Bilaterality
 - Gross and fine motor ability
 - Form perception/visual analysis
 - Spatial awareness
 - Visualization
 - Visual memory
 - Visual sequential memory
 - Form constancy
 - Visual speed and visual span
 - Visual sequencing
- 1.3 Refractive conditions and visual skills
 - 1.3.1 Refractive Conditions
 - Developmental influence on refraction & emmetropization
 - Aniseikonia
 - Myopia
 - Astigmatism
 - Hyperopia
 - 1.3.2 Ocular Motor Function
 - Eye movements and reading
 - Pursuit dysfunctions
 - Nystagmus

- Saccadic Dysfunctions
- 1.3.3 Accommodation
 - Role in myopia development
 - Role in computer-related asthenopia
- 1.3.4 Fusion in Non-Strabismic Conditions
 - Fixation disparity
 - Motor fusion
 - Sensory fusion
- 1.4 Special clinical conditions
 - 1.4.1 Acquired brain injury (traumatic brain injury {TBI} and stroke)
 - 1.4.2 Developmental disabilities (Down Syndrome, Developmental delay, etc.)
 - 1.4.3 Visually induced balance disorders
 - 1.4.4 Motor disabilities (Cerebral Palsy, ataxia, etc.)
 - 1.4.5 Behavioral disorders
 - 1.4.6 Autism spectrum disorders
 - 1.4.7 ADD / ADHD
 - 1.4.8 Dyslexia and specific reading disabilities
 - 1.4.9 Learning Disabilities
 - 1.4.10 Computer Vision Syndrome
- 2. Vision Therapy Concepts to Consider
 - 2.1 Peripheral awareness:
 - 2.1.1 focal / ambient roles
 - 2.1.2 Significant findings which are good or poor prognostic indicators of vision therapy and lens application
 - 2.1.3 Development, rehabilitation, prevention, enhancement
 - 2.1.4 Behavioral lens application
 - 2.1.5 Yoked prism rationale for treatment and application
 - 2.1.6 The relationship between the visual and vestibular systems
 - 2.1.7 SILO/SOLI
 - 2.1.8 Visual stress and its impact on the visual system
 - 2.1.9 Role of posture in vision development, comfort and performance
 - 2.1.10 Disruptive therapy: Discuss this type of therapy and how it can be used as a clinical therapeutic tool.
 - 2.1.11 Relationship of speech-auditory to vision
 - 2.1.12 How television, reading, video gaming might restrict movement, computer work, nutrition, etc., impact vision?
 - 2.1.13 Perceptual Style, e.g., spatial/temporal, central/peripheral

Skill indicators for Optometry

1. PATIENT HISTORY
 - 1.1 Communicates with the patient
 - 1.1.1 Modes and methods of communication are employed which take into account the physical, emotional, intellectual and cultural background of the patient.
 - 1.1.2 A structured, efficient, rational and comfortable exchange of information between the optometrist and the patient takes place.
 - 1.2 Makes general observations of patient
 - 1.3 Obtains the case history
 - 1.4 Obtains and interprets patient information from other professionals
2. PATIENT EXAMINATION
 - 2.1 Formulates
 - 2.1.1 An examination plan based on the patient history is designed to obtain the information necessary for diagnosis and management.
 - 2.1.2 Tests and procedures appropriate to the patient's condition and abilities are selected.
 - 2.2 Implements examination plan
 - 2.2.1 Tests and procedures which will efficiently provide the information required for diagnosis are performed.
 - 2.2.2 The examination plan and procedures are progressively modified on the basis of findings.
 - 2.3 Assesses the ocular adnexae and the eye
 - 2.3.1 The structure and health of the ocular adnexae and their ability to function are assessed.
 - 2.3.2 The structure and health of the anterior segment and its ability to function are assessed.
 - 2.3.3 The structure and health of the ocular media and their ability to function are assessed.
 - 2.3.4 The structure and health of the posterior segment and its ability to function are assessed.
 - 2.3.5 The nature of the disease state is determined.
 - 2.3.6 Microbiological tests are selected and ordered
 - 2.4 Assesses central and peripheral sensory visual function and the integrity of the visual pathways
 - 2.4.1 Vision and visual acuity are measured.
 - 2.4.2 Visual fields are measured.
 - 2.4.3 Colour vision is assessed.
 - 2.4.4 Pupil function is assessed.
 - 2.5 Assesses refractive status
 - 2.6 Assesses oculomotor and binocular function.
 - 2.6.1 Eye alignment and the state of fixation are assessed.
 - 2.6.2 The quality and range of the patient's eye movements are determined.
 - 2.6.3 The status of sensory fusion is determined.
 - 2.6.4 The adaptability of the vergence system is determined.
 - 2.6.5 Placement and adaptability of accommodation are assessed.
 - 2.7 Assesses visual information processing
 - 2.7.1 Visual perceptual abilities are assessed.
 - 2.7.2 Visual-motor integration is assessed.
 - 2.8 Assesses the significance of signs and symptoms found incidental to the ocular

examination in relation to the patient's eye and/or general health.

2.8.1 Pertinent non-ocular signs and symptoms found incidentally during the ocular examination are identified and considered.

2.8.2 Ensures that significant non-ocular signs and symptoms are investigated.

3. DIAGNOSIS

3.1 Interprets and analyses findings to establish a diagnosis or diagnoses.

3.1.1 Accuracy and validity of test results and information from the case history and other sources are critically appraised.

3.1.2 Test results and other information are analysed, interpreted and integrated to establish the diagnosis or diagnoses.

4. PATIENT MANAGEMENT

4.1 Designs a management plan for each patient and implements the plan agreed to with the patient.

4.1.1 The diagnosis is presented and explained to the patient.

4.1.2 Consideration is given to the relative importance or urgency of the presenting problems and examination findings.

4.1.3 Management options to address the patient's needs are explained.

4.1.4 A course of management is chosen with the patient, following counselling and explanation of the likely course of the condition, case management and prognosis.

4.1.5 The informed consent of the patient is obtained for the initiation and continuation of treatment.

4.1.6 Patients requiring ongoing care and review are recalled as their clinical condition indicates, and management is modified as indicated.

4.2 Prescribes spectacles

4.2.1 The suitability of spectacles as a form of correction for the patient is assessed.

4.2.2 The patient's refraction, visual requirements and other findings are applied to determine the spectacle prescription.

4.3 Prescribes contact lenses

4.3.1 The suitability of contact lenses as a form of correction for the patient is assessed.

4.3.2 The patient's refraction, visual requirements and other findings are applied to determine the contact lens prescription.

4.3.3 Therapeutic and cosmetic contact lenses are recommended and prescribed.

4.3.4 Contact lenses are correctly ordered and on receipt, parameters are verified before the lenses are supplied to the patient.

4.3.5 Contact lenses are checked on the eye for physical fitting and visual performance.

4.3.6 The patient is instructed in matters relating to ocular health and vision in contact lens wear, contact lens care and maintenance.

4.3.7 Contact lens performance, ocular health and patient adherence to wearing and maintenance regimen is monitored.

4.4 Prescribes low vision devices.

4.4.1 A range of low vision devices is demonstrated.

4.4.2 Low vision devices suited to the patient's visual requirements and functional needs are prescribed.

4.4.3 The patient is instructed in the use of the low vision device.

4.4.4 The success of the low vision device is evaluated and monitored and additional or alternative devices are prescribed.

- 4.4.5 The patient is informed of and, if necessary, referred to other rehabilitative services.
- 4.5 Prescribes pharmacological treatment regimens
 - 4.5.1 Selects appropriate pharmacological agents for the treatment of the patient's condition.
 - Microbiological factors are considered in the choice of therapeutic agent(s)
 - Pharmacological factors are considered in the choice of therapeutic agent(s)
 - Systemic factors are considered in the choice of therapeutic agent(s)
 - Ocular factors are considered in the choice of therapeutic agent(s)
 - Available delivery systems are considered in the choice of therapeutic agent(s)
 - Drug substitution factors are considered in the choice of therapeutic agent(s)
 - 4.5.2 Prescribes therapeutic drugs.
 - 4.5.3 Monitors and modifies treatment regimen.
 - 4.5.4 Instructs/counsels patient on the correct use of the prescribed drugs.
 - 4.5.5 Patients are instructed about precautionary procedures
- 4.6 Dispenses optical prescriptions accurately.
 - 4.6.1 The prescription is interpreted and responsibility for dispensing is accepted.
 - 4.6.2 The patient is assisted in selecting an appliance.
 - 4.6.3 Lenses are ordered and fitted to spectacle frames in accordance with accepted standards.
 - 4.6.4 The appliance is verified against the prescription prior to delivery.
 - 4.6.5 The appliance is adjusted and delivered and the patient is instructed in the proper use and maintenance of the appliance and of any adaptation effects which may be expected.
- 4.7 Manages patients requiring vision therapy.
 - 4.7.1 Treats patients diagnosed with accommodative, vergence, strabismic and amblyopic conditions.
 - 4.7.2 The patient is instructed in the use and maintenance of vision training equipment.
 - 4.7.3 Goals of the vision therapy program and criteria for discharge are set.
 - 4.7.4 Progress of the vision therapy program is monitored.
- 4.8 Treats ocular disease and injury.
 - 4.8.1 Non-pharmacological treatment or intervention procedures are performed.
 - 4.8.2 Pharmacological and/or other regimens are instituted and therapeutic devices are introduced to treat eye conditions.
 - 4.8.3 The patient is instructed in the use, administration, storage and disposal of pharmaceutical agents.
 - 4.8.4 The effect of treatment is monitored and changes in management are recommended.
- 4.9 Refers the patient.
 - 4.9.1 The need for referral to other professionals for assessment and/or treatment is recognised and discussed with the patient.
 - 4.9.2 A suitable professional is recommended to the patient.
 - 4.9.3 Timely referral, with supporting documentation, is made to other professionals.
 - 4.9.4 Patients can be jointly managed with other health care practitioners.

- 4.10 Co-operates with ophthalmologist in the provision of pre- and post-operative management of patients.
 - 4.10.1 Provides pre-operative assessment and advice.
 - 4.10.2 Provides post-surgical follow-up assessment and monitoring of signs according to the surgeon's requirements and the procedure undertaken.
 - 4.10.3 Provides emergency management for observed post-surgical complication.
 - 4.10.4 Arranges appropriate referral for further post-operative treatment or assessment of complications.
- 4.11 Provides advice on vision in the workplace.
 - 4.11.1 Visual screenings for occupational or other purposes are provided.
 - 4.11.2 Advice is provided on eye protection, visual standards and visual ergonomics in the workplace.
 - 4.11.3 Individuals are counselled on the suitability of their vision for certain occupations.
 - 4.11.4 Certification of an individual's visual suitability for designated occupations or tasks is provided.
- 5. RECORDING OF CLINICAL DATA
 - 5.1 Ensures that data is organised in a legible, secure, accessible, permanent and unambiguous manner.
 - 5.1.1 All relevant information pertaining to the patient is recorded in a format which is understandable and useable by the optometrist and his/her colleagues.
 - 5.1.2 Patient records are kept in a readily retrievable format and are physically secure.
 - 5.2 Maintains confidentiality of patient records.
 - 5.2.1 Understands the need to ensure that access to records is limited to authorised personnel.
 - 5.2.2 Information from patient records and/or obtained from patients is released only with the consent of the patient.

10 RESEARCH PROJECT

Research proposal need to be presented in front of the experts

TEXT/ REFERENCE BOOKS:

1. Clinical Ophthalmology: Jack J Kanski
2. Diagnostics and imaging techniques in Ophthalmology: Amar Agarwal
3. Clinical management of binocular vision Mitchell Scheiman and Bruce Wick
4. Applied concepts in vision therapy: Leonard Press
5. Pediatric optometry: Jerome K Rosner
6. Handbook on vision impairment and Vision rehabilitation: Barbara Silverstone, Mary Ann Lang, Bruce Rosenthal, Faye.
7. IACLE MODULES
8. CONTACT LENSES – STONE AND PHILIPS
9. Clinical management of binocular vision Mitchell Scheiman and Bruce Wick
10. Applied concepts in vision therapy: Leonard Press