Board of Studies of Department of Pulmonary Medicine, SGPGIMS, Lucknow

Syllabus for PDCC in Sleep Medicine

Prof. Alok Nath

Dr. Ajmal Khan

Dr. Zia Hashim

Dr. Mansi Gupta

Prof. Ashutosh Agarwal

Prof. Dhruv Chaudhry

Prof. S P Ambesh

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

Curriculum for PDCC Sleep Medicine

Overview:

The Department of Pulmonary Medicine was established by the 59th Governing body of the institute dated 12th June 2006, and was formally started in July 2009 with an objective of providing quality care to patients attending this hospital and giving state of the art medical facilities which are not available in surrounding regions of Uttar Pradesh. Also, it aimed at producing super specialists in the field of Pulmonary Medicine of high repute and establishing new paradigms in areas of research. The DM programme in Pulmonary was started in 2020 with an annual intake of 4 students. Sleep Medicine is an evolving subspecialty of Medicine, devoted to the diagnosis and therapy of sleep disturbances and disorders. The department also started with Post-doctoral Certificate Course in Sleep Medicine (PDCC), in the year 2022 with an intake of 2 students annually.

Post-doctoral Certificate Course (PDCC) in Sleep Medicine:

Around 50-70% of the world population suffers from various sleep-related problems. Competence in sleep medicine requires an understanding of a plethora of diverse disorders such as sleep apnea, narcolepsy, idiopathic hypersomnia, Kleine-Levin syndrome, restless leg syndrome or circadian rhythm disturbances, insomnia, etc. Management in these disorders differs greatly and cannot be undertaken without a correct diagnosis. Therefore, a physician trained in sleep medicine is an integral part of the team that provides comprehensive assessment and care to the patients.

Fellowship in sleep medicine is a well-established discipline in several countries including USA, Canada, UK, Australia, etc. The World Federation of Sleep Research & Sleep Medicine Societies (WFSRSMS) was founded in 1987 with an aim to promote both sleep research and physician training and education. WFSRSMS has members across the USA, Europe, Australia, and members in Asia include the Australasian Sleep Association (ASA) of New Zealand and Australia and the South-east Asian Academy of Sleep Medicine (SEAASM), an umbrella organization for the societies of several Asian nations including India.

Despite the increasing awareness among physicians and the rising burden of sleep-related disorders in India, the current post-graduate training (General medicine/ Pulmonary Medicine) provides only a limited exposure to the candidates in the specialized area of sleep medicine.

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

Colour Coding
Global GREEN
Regional BLUE
National ORANGE
Local (State) PINK

Currently, there are only a few dedicated teaching and training programs for sleep medicine even at the most prestigious teaching institutes in India.

The Department of Pulmonary Medicine at SGPGIMS, Lucknow is one of the pioneer centers in the country (along with AIIMS (Bhopal), and Nithra Institute of Sleep Sciences (Chennai) to provide a university approved one year certificate course (PDCC) in Sleep Medicine aimed at structured teaching and training in sleep medicine.

Programme Objectives:

The approach to sleep medicine is becoming multipronged and complex in recent times. The goal of this programme is to provide comprehensive training to physicians interested in sleep medicine to independently diagnose and manage various sleep related disorders.

The PDCC programme in sleep medicine aims at producing competent sleep specialists:

1. Who shall recognize the health needs of the community, and carry out professional obligations, ethically and in keeping with the objectives of the national health policy.
2. Who shall have mastered the competencies pertaining to Sleep Medicine, that need to be practiced at the secondary and tertiary levels of health care delivery system.
3. Who shall fulfill the growing need and demand for trained sleep specialists to work as part of a multi-disciplinary medical team in any health care set-up.
4. Who shall be aware of the contemporary advances and developments in Sleep Medicine.
5. Who shall have acquired the basic skills in teaching and training of the medical and paramedical professionals.
6. Who shall have acquired a spirit of scientific inquiry and be oriented to the principles of research and epidemiology.

Programme Outcomes:

At the end of PDCC in Sleep Medicine, the student will acquire the following competencies under the following three domains:

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

Colour Coding

Global	GREEN
Regional	BLUE
National	ORANGE
Local (State)	PINK

(A) Cognitive domain (Knowledge domain)

1. Recognize the importance of Sleep Medicine in the context of the health needs of the community and the national priorities in the health sector.
2. Identify social, economic, environmental, biological, and emotional determinants of health in each case, and take them into account while planning therapeutic, rehabilitative, preventive, and promotive measures/strategies.
3. Demonstrate sufficient understanding of the basic sciences in Sleep Medicine including sleep physiology, respiratory physiology, etc., appropriate to their level of training.
4. Develop thorough knowledge and judgment in the comprehensive evaluation, treatment, and prevention of various sleep related disorders like insomnia, sleep related breathing disorders, restless leg syndrome, narcolepsy etc.
5. In-depth knowledge and competence in the technical skills necessary for the performance and interpretation of the diagnostic and treatment procedures used in sleep medicine.
6. Have basic understanding about the functioning of different equipments in routine use in the Sleep laboratories and knowledge about how to reduce their maintenance cost for the institution.
7. Knowledge about Sleep Medicine and its digital applications and fundamentals of use of artificial intelligence, machine learning and wearables in Sleep medicine.
8. Acquire knowledge and experience to discuss and review recent scientific data to further the cause of Sleep Medicine and increase visibility on national and global platforms.

(B) Affective domain (Attitudes including Communication and Professionalism)

1. Practice Sleep Medicine ethically and in step with the principles of primary health care.
2. Demonstrate kindness, empathy and compassion towards all patients and their families.
3. Demonstrate empathy and a humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with societal norms and expectations.
4. Treat patients in a holistic manner and respect patients' right to information and opinion.
5. Communicate well with patients and make efforts to explain the rationale of diagnostic and treatment to patients and their caregivers in their own language for ease of understanding.

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

Colour Coding
Global GREEN
Regional BLUE
National ORANGE
Local (State) PINK

6. Should have the ability to pass on such information and knowledge gained to other students and colleagues, especially those working in resource-limited settings to improve cardiac care of the region, state, and country.
7. Should actively cultivate skills to work in a team, with mutual respect, basic human courtesy and a supportive attitude towards others including clinicians, para-clinical staff, policy makers and health administrators to improve sleep medicine services at a regional, state, and national level.
8. Communicate openly and honestly with all patients and their caregivers, hospital administrators, regulatory authorities, peers and researchers of the sleep medicine fraternity and other allied members of the public and community leaders.
9. Develop a habit of maintaining honest, detailed, and comprehensive medical records.
10. Maintain principles of etiquette and abide with country's laws, adopting ethical practices.
11. Be aware of ethical principles of clinical research guided by IEC.
12. Should demonstrate principles of equality when dealing with individuals of special groups.
13. Should be able to accept feedback and criticisms with an open mind.
14. As a skilled professional, be aware of the value of maintaining punctuality in clinical work.

(C) Psychomotor domain

1. Skills to appropriately investigate and manage all types of sleep disorders.
2. Plan and order the required investigations for patients in a cost-effective manner tailored to the individual needs of the patients.
3. Diagnose and manage majority of the conditions pertaining to Sleep Medicine based on clinical assessment, and appropriately selected and conducted investigations
4. Analyze the results of frequently used as well as specialized investigations necessary in Sleep Medicine practice, including polysomnography, oximetry, capnography, esophageal manometry, actigraphy, etc. as required on a case-to-case basis.
5. After having performed under supervision during training, should be able to demonstrate requisite skills and confidence in independently using modalities like:
   a. Basic and advanced pulmonary function testing.
   b. Polysomnography, Actigraphy, MSLT-MWT.
   c. Bedside ICU ultrasonography.

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

d. Interpret nuclear scans, thoracic CT, and MRI

6. Develop skills as a self-directed learner, recognize continuing educational needs; select and use appropriate learning resources.
7. Demonstrate competence in critically analyzing the relevant published research literature in the field and in understanding the concepts of good quality clinical and basic science research designs and methodologies in Sleep Medicine.
8. Skills to participate in seminars, Continued Medical Education programs, panel discussions, lectures to discuss and review recent scientific data to further the cause of Sleep Medicine in the country and increase visibility on national and global platforms.
9. Acquire and demonstrate the administrative skills needed to organize and supervise the services pertaining to Sleep Medicine demonstrating adequate managerial skills.

Courses offered in PDCC Sleep Medicine:

Course	**Description**
Course I	Basic Aspects of Sleep Medicine
Course II	Applied and recent advances in Sleep Medicine

Course Objectives:

The formation of the structured course for PDCC in Sleep Medicine at SGPGIMS, Lucknow, stems from the recognition that a Pulmonologist's involvement is indispensable for diagnosing and managing sleep related disorders. The courses are designed with an objective of providing comprehensive knowledge and training in the basic sciences and research methodology related to Sleep Medicine, as well as clinical skills needed for diagnosing and managing cases.

Course I- Basic Aspects of Sleep Medicine:

At the end of the training, the candidate should have an in-depth knowledge about:

1. Role and responsibilities of a sleep physician

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

2. Applied anatomy pertaining to sleep medicine
3. Neurobiology and functions of sleep
4. Respiratory sleep physiology
5. Cardiorespiratory interactions during sleep
6. Epidemiology of various sleep related disorders
7. Pathophysiological mechanisms of various sleep related disorders
8. Clinical pharmacology and biochemistry pertaining to sleep medicine
9. Communication skills and medicolegal aspects and its implications
10. Clinical biostatistics, research, and teaching methodology

Course II: Applied and recent advances in Sleep Medicine:

At the end of the training, the candidate should be able to act as a specialist in Sleep Medicine.

1. He/she should be able to diagnose and manage sleep related disorders independently:
   a) Sleep apneas and Hypoventilation: Central, Obstructive, Mixed
   b) Insomnia, Parasomnias, Behavioral/psychiatric disorders
   c) Narcolepsy, Restless-leg syndrome, Periodic limb movement disorder
   d) Circadian rhythm and Shift-work related disorders
   e) Pediatric sleep apnea
2. In sleep related-critical care, he/she should be able to:
   a) Manage emergencies in sleep medicine such as seizures, parasomnias, etc.
   b) Resuscitate the critically ill with acute and chronic respiratory failure
   c) Provide assisted respiratory support in the hospital and on long term basis.
3. Of practical procedures, he/she should be able to perform:
   a. Various bedside procedures required in medical management of patients.
   b. Comprehensive lung function studies including spirometry, diffusion-studies, airway resistance and compliance, body plethysmography and blood gas analysis.
   c. Specialized procedures for diagnosis and management of sleep disorders such as polysomnography, actigraphy, performing CPAP titrations, MSLT, MWT, etc.
4. He/she should be able to clinically interpret tests pertaining to sleep medicine such as:
   a) Radiographic data like Chest X-rays, CT-Scans, USG, MRI, etc.

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

b) ECG, Pulse oximetry

c) Polysomnography, actigraphy, limb movement recording, MSLT, MWT, etc.

5. He/she must acquire skills & knowledge in sleep medicine about:
   a. Recent changes, controversies, and trends in sleep medicine
   b. Newer therapeutic modalities/drugs
   c. Updated national and international guidelines
6. He should be able to establish and run an independent sleep medicine unit in hospitals and/or medical colleges.

Course Outcomes:

Course I- Basic Aspects of Sleep Medicine:

Students must have gained in-depth knowledge about:

a) Role and responsibilities of a sleep physician

b) Applied anatomy pertaining to sleep medicine

c) Neurobiology and functions of sleep

d) Respiratory sleep physiology

e) Cardiorespiratory interactions during sleep

f) Epidemiology of various sleep related disorders

g) Pathophysiological mechanisms of various sleep related disorders

h) Clinical pharmacology and biochemistry pertaining to sleep medicine

i) Communication skills and medicolegal aspects and its implications

j) Clinical biostatistics, research, and teaching methodology

Course II

Students should have acquired clinical skills & knowledge about:

1. Diagnosis and management of Sleep apneas and Hypoventilation: Central, Obstructive, Mixed; Insomnia, Parasomnias, Behavioral/psychiatric disorders; Narcolepsy, Restless-

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

leg syndrome, Periodic limb movement disorder; Circadian rhythm and Shift-work related disorders; Pediatric sleep apnea

2. Diagnosis and management of emergencies in sleep medicine such as seizures, parasomnias, etc.; resuscitation of the critically ill with acute and chronic respiratory failure, including assisted respiratory support in the hospital and on long term basis.
3. Necessary procedural skills required for practicing sleep medicine including diagnostics such as polysomnography, actigraphy, performing CPAP titrations, MSLT, MWT, etc.
4. Assessment and interpretation of laboratory, sleep laboratory, radiological and pulmonary functions, related data.
5. Recent changes, controversies, and trends in sleep medicine; Newer therapeutic modalities/drugs, Updated national and international guidelines
6. Triage, prioritizing the resources and decision making.
7. Establishing and running an independent sleep medicine unit.

Teaching and training activities:

The teaching and training activities focus on all essential components of education such as in-depth knowledge of the subject, clinical and research skills, attitudes and behavior, communication, etc. It is broadly divided into theoretical, clinical, and practical aspects, and methodology of research and teaching.

a. Theoretical: The theoretical knowledge is imparted to the candidates through:

a. Seminars – Once a week: Trainees are required to present a minimum of 10 topics based on the curriculum in their training year to the combined class of teachers and students. A free discussion is encouraged. The topics are given to the trainees with the dates for presentation.
b. Journal club meetings- Once a week: Trainees are required to attend a minimum of 5 journal club meetings based on the curriculum in their training year. A list of suggested Journals is given towards the end of this document. A faculty member suggests the article and moderates the discussion, with participation by other faculty members and resident doctors. Candidate summarizes and discusses the scientific article critically. The contributions made by the article to furtherance of scientific knowledge and limitations, if any, will be highlighted.

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

c. Faculty lectures- Once a month: A subject related topic of relevance is taught by the faculty.
d. The students are encouraged to participate and get exposed to recent advances in sleep medicine through CMEs programmes, symposia, conferences, etc.

b. Clinical & Practical aspects: The clinical and practical training would be imparted to the candidates through:

a. Sleep Clinic (OPD)- Once a week: Trainees manage the dedicated Sleep Clinic (OPD) for Out-patient work-up, diagnosis and management of all sleep related disorders, and follow-up of the patients referred to our centre.
b. Clinical rounds for patients under IPD care- Everyday: The trainee would be attached to a faculty member to be able to pick up methods of history taking, examination, prescription writing and management. This mainly includes bedside sessions and discussions on documentation of case history and examination, investigations and learn management of cases by discussion with faculty of the department, file rounds, management, progress notes, etc.
c. Case presentations & discussions- once a week: The trainee works up interesting and difficult cases for departmental discussion.
d. Practical training in Sleep Laboratory: Candidates is trained in the various clinical and practical aspects of Sleep Medicine at a high-volume clinical setting. The candidates are routinely posted in the sleep laboratory and trained in sleep medicine technology so that they can handle various equipments used for diagnosis and management of sleep related disorders, perform, and analyze polysomnography, actigraphy, etc. independently.

c. Research and Teaching Methodology: The students carry out a Short-term research project during the training year with at least one manuscript submitted for publication in a peer-reviewed indexed journal. Trainees are given exposure to partake in the research projects going on in the departments to learn their planning, methodology and execution to learn various aspects of research. They are involved in teaching and training of nursing and para-medical staff.

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

Curriculum for PDCC Sleep Medicine

Syllabus of PDCC Sleep Medicine:

Each PDCC student is required to possess a comprehensive knowledge of the basic and clinical sciences related to sleep medicine. He/she should have personally performed enough procedures for diagnosis and treatment of sleep disorders such as polysomnography, PAP titrations, assisted ventilation; and manage acute respiratory emergencies. He/she should also possess sufficient knowledge and experience in research methodology and development.

Theory of Sleep Medicine

A. **Physiological basis of sleep**

1. The neurophysiology and neurobiology of wakefulness and sleep
2. Adaptation of bodily functions to sleep
3. Theories on the functions of sleep
4. Circadian biology/Chronobiology
5. Ageing, Gender differences and Sleep
6. Sleep and psychology
7. Effects of acute and chronic sleep deprivation
8. Effects of drugs on sleep

B. **Assessment of sleep disorders and diagnostic procedures**

1. Classification of sleep disorders
2. Clinical history and examination
3. Monitoring sleep and wakefulness
4. Biomarkers for sleep disorders

C. **Insomnia**

1. Classification, definitions, and epidemiology
2. Pathophysiology, clinical picture, and diagnosis

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

3. Comorbidities and special populations
4. Treatment of Insomnia-I: CBT, psychotherapeutic approaches, and drug treatment
5. Treatment of Insomnia-II: Current guidelines, evidence-based alternative interventions

D. **Sleep-related breathing disorders**

1. Classification, definitions, and epidemiology
2. Pathophysiology, clinical picture, and diagnosis
3. Obstructive sleep apnea and comorbidities
4. Treatment of OSA-I: PAP therapy, oral devices, pharmacological management, surgery
5. Treatment of OSA-II: Current guidelines, evidence-based alternative interventions

E. **Hypersomnias of central origin**

1. Classification, definitions, and epidemiology
2. Etio-pathophysiology, clinical picture, and diagnosis
3. Treatment of hypersomnia

F. **Circadian rhythm sleep disorders**

1. Classification, definitions, epidemiology, and pathophysiology
2. Shift work and non-24-hour sleep–wake disorder
3. Clinical picture and diagnosis
4. Comorbidities and health risks
5. Treatment of circadian rhythm disorders

G. **Parasomnias**

1. Classification, definitions, and epidemiology
2. Pathophysiology and psychopathology
3. Clinical findings, and comorbidities
4. Treatment of parasomnias

H. **Sleep-related movement disorders**

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

Curriculum for PDCC Sleep Medicine

1. Classification, definitions, and epidemiology
2. Pathophysiology, clinical picture, and diagnosis
3. Narcolepsy
4. Comorbidities and treatment

I. Sleep and pulmonology

1. Overview and pathophysiology
2. Obstructive sleep apnea and chronic obstructive pulmonary disease overlap
3. Sleep-disordered breathing and asthma
4. Sleep-disordered breathing and Interstitial Lung Disease (ILD)
5. Hypoventilation disorders

J. Sleep and Critical Care

1. Respiratory Failure: pathogenesis, causes, diagnosis and management
2. Resuscitation of the critically ill
3. Cardiopulmonary mechanics
4. Assisted Ventilation: Ventilatory principals, application, assessment, and monitoring, ventilatory care and support, nutritional support, infection control, complications, weaning

K. Sleep and internal medicine

1. Cardiovascular diseases: Heart failure, CAD, arrhythmias, and hypertension
2. Endocrine diseases: Diabetes mellitus, Thyroid diseases, acromegaly, PCOD
3. Neurological disorders: Chronic fatigue and pain syndromes, epilepsy, parkinsonism, dementia, neuromuscular diseases, autoimmune disease, headaches, stroke
4. Psychiatric disorders: substance use disorders, schizophrenia spectrum disorders, affective disorders, anxiety disorders
5. Sleep in cancer and critically ill patients
6. Sleep disorders in the elderly

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

L. **Pediatric sleep disorders**

1. Chronic insomnia and parasomnias
2. Obstructive sleep apnea
3. Sleep-related movement disorders and narcolepsy
4. Sleep in neurodevelopmental disorders

M.**Societal, economic, organizational, and research aspects**

1. Demographic and socioeconomic aspects of sleep disorders
2. Forensic aspects of sleep medicine
3. Organization of Sleep Medicine Centers
4. Training initiatives in sleep medicine
5. Research design and methodology

Practical skills in Sleep Medicine

A. Role of a sleep physician:

1. Establishing patient rapport
2. Professionalism/ethical behaviour in the sleep center
3. Patient confidentiality /communication skills

B. Sleep focused history and physical examination

1. Concept of sleep functions, hygiene, insomnia, excessive daytime sleepiness, circadian rhythms, shift work problems, etc.
2. Snoring, morning headaches and atypical symptoms
3. Sleep apnea probability scores and questionnaires
4. BMI, neck circumference, waist circumference

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

C. Introduction to the sleep laboratory

- Amplifier instrumentation: Basic electrical principles, differential amplification, polarity and amplitude calculations, filters
- 10-20 system & electrode placement: Head measurement, electrode properties and design, skin preparation and electrode application, montages used in sleep (bipolar and referential)
- EEG monitoring and interpretation: Routine PSG, seizures, etc.
- Basic electrocardiography: monitoring, and interpretation
- Monitoring airflow: Thermal sensors, pressure transducers, capnography, snoring
- Monitoring respiratory effort: RIP, piezoelectric sensors, oesophageal pressure, EMG
- Oxygen saturation and carbon dioxide monitoring: Oxy-haemoglobin dissociation curve, pulse oximeter and carbon dioxide devices, calibration, time constants/ averaging, accuracy
- Performing a routine PSG: Interactive demonstration on montage, patient preparation, calibration, etc.
- Out of center sleep testing: Types and what they monitor, patient preparation, etc.
- Scoring sleep stages
- Scoring respiratory events
- Calculating indices and diagnosing sleep apnea
- Rationale for split-night studies
- PAP therapy: mechanics of PAP therapy, physiologic impact of PAP on the lungs and heart, mask designs, efficacy and compliance, complications, PAP equipment & mask fitting
- Performing CPAP titrations: CPAP, Bilevel, AVAPS, ASV titration protocols, Indications for Bilevel PAP therapy, when to switch from CPAP to Bilevel PAP, CPAP to Bilevel in a single night; selecting the pressures, optimizing PAP therapy, interfaces, acclimation, humidification, monitoring compliance, Auto-PAP
- Alternative treatments for sleep apnea: Surgical therapies, oral appliances, pharmacologic therapies, positional therapies
- Recording limb movements: Electrode placement, calibrations, montages, differentiating PLMS from artefacts and other types of limb movements, scoring PLMS and arousals, calculating PLM and arousal indices

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

- Summarizing the PSG report: Interactive demonstration on the hypnogram, sleep architecture parameters, sleep disordered breathing parameters, PLMS parameters, oxygen saturation and carbon dioxide reporting, etc.
- Polysomnographic features of seizures and parasomnias, technical intervention(s) and documentation, monitoring techniques (including video)
- MSLT and MWT: Indications, protocols, and montages, preparing the patient, documentation, interpretation and report formats, medication effects, etc.
- Artefact recognition & troubleshooting: EEG artefacts, EMG artefacts, cardiac artefacts, respiratory artefacts, environmental artefacts
- Paediatric polysomnography
- Miscellaneous areas: Download data interpretation, how to work in sleep Medicine OPD, operation of CPAP Clinic, counselling sessions, etc.

D. Pulmonary Radiology and Imaging:

- Interpretation of plain radiography, CT/MRI studies, and ultrasound examination.
- Interpretation of ventilation/perfusion scans

E. Supportive investigative/therapeutic procedures

- Pulmonary function tests and their interpretations
- Blood gas analysis, Cardiopulmonary exercise testing, Pulmonary angiography, ECHO

The main objectives of the 1-year training program are to **train the medical postgraduates to be the best skilled "sleep specialist"** with the training in different aspects of theoretical, clinical, and practical spheres of the subject. It aims to enable them to offer skill-based diagnostic, curative and preventive care with the highest professional standards. This training will help to accomplish the local, regional, and national health care needs for quality care commensurate with international standards.

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

Local level	**Our state has a high burden of sleep related disorders, including Obstructive sleep apnea, Obesity hypoventilation syndrome, disorders of hypersomnolence, Insomnia, Circadian rhythm disorders, Narcolepsy, Restless leg syndrome, etc. and the trends highlight the need for effective prevention and management strategies to address the growing burden of sleep disorders. Course curricula are hence designed to be tailor made to these specific disease subsets:** 1. **Obstructive Sleep apnea:** A study conducted by a consumer products firm had revealed that nearly 93% Indians are sleep deprived. The prevalence of obstructive sleep apnea has been observed to be higher in the western region as compared to the other parts of the country. When it comes to rural versus urban divide, similar risk factors are present. However, according to a study, the prevalence of OSA by AHI criteria in rural India is 3.73%. In absolute numbers, this amounts to 36.34 million individuals suffering from OSA. 2. **Obesity Hypoventilation Syndrome:** Obesity hypoventilation syndrome (OHS) is a peculiar condition characterized by the constellation of few entities. This includes a combination of obesity and daytime hypoventilation leading to arterial hypoxemia and hypercapnia. Incidence of OHS has also been increasing in synchronization with increasing prevalence of obesity. The prevalence of OHS in the general population ranges from 0.15 to 0.4%, whereas among patients of SDB, it escalates to 10–30%. Indian studies pertaining to OHS are limited. Prevalence of OHS in patients with SDB has been shown to be like the Caucasian population. 3. **Restless Leg Syndrome:** Restless legs syndrome (RLS), a common sensorimotor disorder, has a wide range of severity from merely annoying to affecting sleep and quality of life severely enough to warrant medical treatment. A higher prevalence of RLS in kidney disease and iron deficiency, with some likelihood of association in some cardiovascular diseases in women, diabetes (and neuropathy), migraine, and dopaminergic treatment in Parkinson's Disease.
National level	1. **Obstructive Sleep apnea:** The prevalence of OSA defined at an AHI ≥5 was a mean of 22% (range, 9-37%) in men and 17% (range, 4-50%) in women. OSA syndrome defined as apnea-hypopnea index ≥5 and excessive daytime sleepiness occurred in 6% (range, 3-18%) of men and in 4% (range, 1-17%) of women. The prevalence in different studies has increased with time and OSA in the last studies was reported in 37% of men and in 50% of women. The prevalence of

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

	obstructive sleep apnea has been observed to be higher in the western region as compared to the other parts of the country. 2. **Insomnia:** Insomnia is an extremely common disorder. The prevalence of insomnia in a study depends on the criteria's selected for determining the prevalence. It is well known that several factors like gender, age, psychiatric disorders among several others are risk factors for insomnia. In a study of 1050 apparently healthy attendants/ relatives of patients attending a tertiary care hospital in a population of 35.1 + 8.7 years age, insomnia was reported in 18.6%of the patients with 18% for initiation of sleep, 18% for maintenance and 7.9% with early morning awakening. 3. **Obesity Hypoventilation Syndrome:** OHS is associated with significant morbidity and mortality. OHS patients as compared to eucapnic patients of SDB have lower quality of life, greater risk of pulmonary hypertension, cor pulmonale, higher need of mechanical ventilation with longer hospital stays, and more health-care expenses. Based on various studies from other countries, the prevalence of OHS in the general population varies from 0.15% to 0.4% whereas that among patients of SDB is 10%–30%. However, till date, there are no studies from India on the prevalence of OHS. The prevalence of OHS in Indian patients is like that of Caucasians. The predictors of OHS in Indian patients are minimum nocturnal SpO_2 <60%, FVC %predicted <74.5%, and BMI > 30.95 kg/m^2.
Regional level	1. **Obstructive Sleep Apnea:** Obstructive sleep apnea is a chronic condition characterized by frequent episodes of upper airway collapse during sleep. Its effect on nocturnal sleep quality and ensuing daytime fatigue and sleepiness are widely acknowledged. Increasingly, obstructive sleep apnea is also being recognized as an independent risk factor for several clinical consequences, including systemic hypertension, cardiovascular disease, stroke, and abnormal glucose metabolism. Estimates of disease prevalence are in the range of 3% to 7%, with certain subgroups of the population bearing higher risk. Factors that increase vulnerability for the disorder include age, male sex, obesity, family history, menopause, craniofacial abnormalities, and certain health behaviors such as cigarette smoking and alcohol use. 2. **Insomnia:** Insomnia is one of the common but neglected conditions seen in family practice with long term and serious effects on the health of a patient. Family physicians have the responsibility of diagnosing

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

	and adequately treating this. Chronic insomnia is seen in 33% of the adult population. Increasing age and diabetes are significantly associated with insomnia, while other socioeconomic factors and co morbidities are not significantly associated. 27% of patients who had insomnia do not perceive the condition, which was statistically significant.
Global level	**Obstructive Sleep apnea, Obesity hypoventilation syndrome, Insomnia, Restless leg syndrome, Circadian rhythm disorders, etc.** are global health issues. The recent advancements in diagnosis and management have been encompassed in the curriculum. Moreover, India being home to appx 17% of the global population, health care decisions and policies based on Indian data are likely to create a global impact.

PDCC Sleep Medicine Training Program:

Admission: Admission based on competitive entrance test at the institutional level.

Eligibility criteria: MD/DNB Pulmonary/Respiratory Medicine, MD (Internal Medicine)

Duration of the course: One year with two trainees in each academic session.

Medium of instructions: English (for study and examination)

Fees, Hostel facility, Stipend: As per existing SGPGI norms for the PDCC.

Training Overview: The participation of the trainees in all facets of educational process is mandatory. The training is in a full-time residency pattern under the department of Pulmonary Medicine with graded responsibilities in the diagnostics, clinical management and treatment of patients entrusted to the care of the trainee. Training includes regular, active, and independent involvement in laboratory, experimental work, and research studies. Every candidate takes part in seminars, journal club meetings, group discussions, clinical rounds, case demonstrations, and other continuing medical education (CME) activities. The trainees are expected to involve in teaching and training of junior fellows, nursing, and paramedical staff.

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

Horizontal Flexibility and Choice based programs.

A. Mandatory

a. Pulmonary-Pathology correlation meetings

b. Pulmonary-Radiology correlation meetings.

B. Optional Course

a. Foundation courses

b. Basic curse in Biostatistics

c. Basic course in Medical Ethics

d. Course in Basic Immunology

e. Course on Rational use of antibiotics

f. Course on Research Methodology.

g. Course on Laboratory Animal Science Practices

h. Course on patient safety

i. Microscopy techniques in Medicine

j. Course on Basic Stem Cell Biology

k. Prevention of Chronic diseases

l. Therapeutic Nutrition

Assessment & Evaluation Methodology:

It is essential to monitor the learning progress of each candidate through continuous appraisal and assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves.

- **Internal assessment:**

a) Monitoring is done by the faculty of the department based on participation of the students in various teaching / learning activities.

b) Candidates maintain a work dairy and record his/ her participation in the training programs conducted by the department such as journal reviews, seminars, etc. Special mention is made of the presentations and procedures performed by the candidate. The work diary is scrutinized and certified by the Head of the Department.

c) The assessment is based on day-to-day performance.

d) Quarterly Internal tests (20% weightage in exit exams)

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

e) Feedback is given to the students at the earliest to improve their performance.

- **Attendance:** The candidate is required to attend minimum 75% of the teaching and training activities. However, in extreme circumstances, DPGI/Dean each may waive off 5% of the attendance if the reason given by the candidate is genuine.

- **Exit Examination:**

a) Eligibility: The eligibility is determined as per the prevailing norms at SGPGIMS.

b) Mode: Exit examination comprises of theory examination and practical & clinical examination as per the prevailing norms at SGPGIMS.

c) Examiners:

1. Convenor – Head, Department of Pulmonary Medicine
2. Internal examiner – Faculty of Pulmonary Medicine nominated by Dean, SGPGIMS,
3. External examiner – Pulmonary Specialists – nominated by the Dean, SGPGIMS

d) Theory examination - As per the prevailing norms of SGPGI under MCI rules.

In these papers there may be questions on basic sciences, clinical skills, practical patient scenarios and other topics relevant to Sleep Medicine. Examinee will be assessed, and answer-sheet would be marked not only for the grasp of his expressed knowledge on the subject but also for the following:

- Apportioning time equally for all questions.
- Careful reading of questions and being specific and concise in answers.
- Legible writing
- Planning of the answer and providing rationale for answers.
- Appropriate use of tables, lists and diagrams to save time

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

- Abbreviations explained when first used within each question.
- A consultant approach to a problem is expected.
- No credit to be given for irrelevant information.

e) **Practical examination (including viva section):** As per the prevailing norms of SGPGI under MCI rules. The practical examination is based on testing the clinical competence, skills and knowledge needed but not limited to the following:

- Medical interviewing skills
- Physical examination skills
- Professional qualities/communication
- Counseling skills
- Clinical judgment
- Organisation/efficiency
- Applied knowledge and practical skills in sleep medicine and allied fields

Candidate should be able to:

- Perform an orderly, purposeful, and relevant sequence of assessment of a system, a part of the body, or those parts of the body involved in a local or general problem.
- Carry out correctly the assessment of each potential clinical sign.
- Derive an acceptable diagnosis and relevant differential diagnoses.
- Defend his method of eliciting a clinical sign if asked to do so.
- Request and interpret relevant investigations.
- Discuss an appropriate plan of management (including priority setting) for the patient.
- Define ethical problems in the patient's management.
- Display courtesy to and consideration for the patient and the staff caring for the patient.

Practical skills - Practical section includes OSCE and specific skill stations.

Viva – Viva section is comprised of cross-table viva-voce.

Skills, knowledge, and competence to be tested include but not limited to the following:

- Communication

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

- Ethics, Organization and Administration
- Drugs and equipment.
- Research and audit.
- Interpretation of polysomnograms, actigraphy results, PFT reports, ECGs, X-Rays, CT scans, MRI scans and Nuclear Scans etc.
- Interpretation of various laboratory results.

f) Total weightage in result

i. Internal assessment	20%
ii. Theory/papers	20%
iii. Practical examination	60%

g) Pass criteria: Candidate must pass both in theory and practical examination (as per pass criteria under PDCC at SGPGIMS, Lucknow). Candidate who fails in the examination will be given only two chances to clear examination and in case he/she fails to appear in subsequent examination it would be considered that he/she has availed a chance.

***Recommended textbooks and journals*:**

Textbooks

1. Richard B. Berry. **Fundamentals of Sleep Medicine.** Gainesville, Florida: Saunders; 2012.
2. Meir H. Kryger. **Sleep Medicine Review: A Problem-Oriented Approach.** New Haven, Connecticut: Elsevier - Health Sciences Division; 2019.
3. **Principles and Practice of Sleep Medicine.** New Haven, Connecticut: Elsevier - Health Sciences Division; 2021.
4. **Sleep Medicine Textbook.** Regensburg, Germany: European Sleep Research Society; 2021.
5. Murray & Nadel's **Textbook of respiratory medicine.** San Francisco, California: Elsevier - Health Sciences Division; 2021.

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

6. Meir H. Kryger. **Atlas of Clinical Sleep Medicine.** New Haven, Connecticut: Elsevier - Health Sciences Division; 2023.
7. **Fishman's Pulmonary Diseases and Disorders.** Philadelphia, Pennsylvania: McGraw Hill / Medical; 2023.

Journals

1. Chest (https://journal.chestnet.org/)
2. Respirology (https://onlinelibrary.wiley.com/journal/14401843)
3. Chest Clinics (https://www.chestmed.theclinics.com/)
4. Lung India (https://journals.lww.com/lungindia/)
5. American Journal of Respiratory and Critical Care Medicine (https://www.atsjournals.org/journal/ajrccm)
6. European Respiratory journal (https://onlinelibrary.wiley.com/journal/13993003)
7. The Lancet Respiratory (https://www.thelancet.com/journals/lanres/home)
8. British Medical Journal (https://www.bmj.com/)
9. New England Journal of Medicine (https://www.nejm.org/)
10. Sleep Medicine (https://www.sciencedirect.com/journal/sleep-medicine)
11. Journal of Clinical Sleep Medicine (https://jcsm.aasm.org/journal/jcsm)
12. Journal of Sleep Research (https://onlinelibrary.wiley.com/journal/13652869)
13. ERS Handbook of Respiratory Sleep Medicine (https://books.ersjournals.com/content/ers-handbook-of-respiratory-sleep-medicine)
14. Indian Journal of Sleep Medicine (https://www.ijsm.in/journalDetails/IJSM)

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow

15. Sleep Medicine Reviews (https://www.sciencedirect.com/journal/sleep-medicine-reviews/issue)

E-learning resources:

1. How to conduct a clinical assessment of patients with suspected sleep-related breathing disorders (SBD)- **https://www.ers-education.org/lr/show-details/?idP=249281**
2. Polysomnography-**https://www.ers-education.org/lr/show-details/?idP=86348**
3. Home sleep testing- **https://www.ers-education.org/lr/show-details/?idP=249290**
4. Technical specifications for respiratory events- **https://www.ers-education.org/lr/show-details/?idP=249282**
5. RERAS to obstructive, central, and mixed respiratory events- **https://www.ers-education.org/lr/show-details/?idP=249287**
6. Hypoventilation and CSB-**https://www.ers-education.org/lr/show-details/?idP=249289**
7. Follow-up treatment- **https://www.ers-education.org/lr/show-details/?idP=249291**

Addition done in syllabus of the PDCC Sleep Medicine program after revision and approval by Board of Studies:

a. Clearly spelling out program objectives, program outcomes, course objectives and outcomes.
b. Holistic development of trainee in three domains: Affective, Cognitive and Psychomotor.
c. Evolution of sleep patho-physiology, biochemistry and pharmacology and knowledge about new pharmacological management of common and rare sleep disorders.
d. Phenotyping in Sleep disorders
e. Advances in imaging tools in Sleep medicine.
f. Digital health applications in Sleep.
g. Newer statistical Methods and tools for analyzing data.
h. Addition of suggested reading and e learning resources.

Lt Col Varun Bajpai VSM
Executive Registrar
SGPGIMS,Lucknow