## SleepWatching India

Indian Society for Sleep Research (ISSR) Newsletter Issue 4

| From Editor's Desk Pg-2 | Sleep Labs in India Pg-6 | Board Review Corner- Sleep |
| :---: | :---: | :---: |
|  |  | Medicine Pg 16 |
| ISSR Activities Pg-3 | Sleep Labs in ASEAN Region | Sleep Secrets Pg-20 |
|  | Pg-8 |  |
| ISSR-WSF Certified | Personal Opinions of | PSG Secrets Pg- 26 |
| Physicians and Technologists | Sleepwatcher Pg-11 |  |
| Pg-4 |  |  |
| Events in Region and World | Board Review Corner- Sleep | Events In India Pg-32 |
| Pg-5 | Technology Pg 12 |  |

## Message from President ISSR



## Dear Friends,

## Heartiest Dipawali Greetings,

The Indian Society for Sleep Research (ISSR) is celebrating in 2017 its 25 years of service to the Nation in advancing sleep science and medicine. On this commemorative occasion we are organizing an International conference during September 21-23, 2017 at Goa, one of the most coveted tourist destinations on this planet.

It gives me great pleasure in announcing the $25^{\text {th }}$ Anniversary Congress. The ISSR team extends you a warm welcome at Goa for best of sleep science and medicine.

The ISSR was established on $10^{\text {th }}$ September, 1992 by Dr V Mohan Kumar, during the first International Congress on Sleep-Wakefulness in India. The Congress marked the beginning of practice of modern sleep medicine in India. During these 25 years ISSR has made name and fame nationally as well as globally. The activities of the society include organization of national and international conferences, national sleep medicine and technology courses, certification programmes for physicians and technicians. During these years we have made many friends amongst the sleep community at home and abroad. We have also received enormous support from Asian Sleep Research Society, World Sleep Federation and international sleep faculty to fulfill the aims and objectives of our society. In addition to thanking our friends, it is also the time to assemble again to decide on our future course of action in sleep health in the fast changing society and environment. On behalf of ISSR and my colleagues, I extend to you all a warm welcome at GOASLEEP during September 21-23, 2017.

Hrudananda Mallick


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Newsletter Editor
Dr. Tripat Deep Singh


It was fun working on the latest issue of "SleepWatching India", interacting with the entire contributing faculty and seeing how everyone was committed to ensure that the readers have high quality content to read. I am thankful to all the contributors in this issue.

Only one Sleep lab from Kolkata provided their details though I sent invitation to 10 Sleep labs in India. I would request the Sleep labs to share their details so that as a community we know each other and can learn and develop together.

To develop as a community we need to know our friends in the region as well. With this in mind I have started a new section "Sleep Labs in ASEAN Region". In this issue I am happy to share the details of Singapore General Hospital Sleep lab from Singapore with you. I am thankful to Dr. Toh Song Tar for accepting the invitation and sharing the details. I am sure that all of us will have a lot to learn from our friends in the region and will benefit from their experiences and knowledge. I will invite one sleep lab from ASEAN Region to share their details in each issue.

Dr. Deepak Shrivastava has provided 10 questions for Board exams of Sleep medicine and Sleep Technology with detailed referenced answers. I am sure aspirants who plan to take the exams will find this section useful.

In "Sleep Secrets", Dr. Manvir Bhatia provided high yielding facts about "Normal Sleep architecture in adults" and Dr. Mahesh Babu, Pediatrician at NUS Singapore, provided high yielding facts about "Normal Sleep Architecture in Infants and Children". I am sure readers will understand difficult concepts presented in a simple way in this section and will learn the most essential concepts about the topic.

In "PSG Secrets", I discuss patient hook up for Level 1 Sleep Study with photos.

I have started a new section "Events in India" to cover the highlights of Sleep Science related events happening in different parts of India for the benefit of the readers. I encourage everyone to submit a summary of any Sleep Science related event happening in India to this newsletter.

I would like to invite all of you to ASEAN Sleep Congress being held from 710 March 2017 in Manila Philippines and look forward to see many of you at National Sleep Medicine Course 2-4 Dec 2016 in Dehradun India.

I look forward to your feedback and hope you enjoy this issue. Email us at sleepwatching@yahoo.com.sg

Happy Reading!!
Dr. Tripat Deep Singh.

## ISSR Activities

| 2014 | 2015 | 2016 | 2017 |
| :---: | :---: | :---: | :---: |
| WSF Exam 13 July 2014 Online exam No. Of Applicants=3 | WSF Exam 26 July 2015 Online Exam No. Of Applicants=5 | WSF Exam 17- July 2016, Online Exam No. Of Applicants= 6 | WSF Exam July 2017 <br> Online Exam |
| Asian Sleep Research Society (ASRS) Conference 22-24 Sep 2014 Kovalam, Kerala, India | National Sleep Medicine Course 5-6 Dec 2015 Guwahati, Assam India | National Sleep Medicine Course 2-4 Dec 2016 Dehradun, Uttarakhand India | National Sleep Medicine Course 21 Sep 2017, Goa |
| $3^{\text {rd }}$ National Sleep <br> Technology Course 26-27 <br> Sep 2014 Delhi, India | $4^{\text {th }}$ National Sleep Technology Course 9-10 Dec 2015 AIIMS Delhi, India | $5^{\text {th }}$ National Sleep Technology Course 29-30 Nov 2016 AllMS Delhi, India | $6^{\text {th }}$ National Sleep Technology Course Dec 2017 AIIMS Delhi, India |
| Workshop on Sleep Medicine at APICON 19 Nov 2014 Puri, Orissa, India | 'Importance of Sleep in School Children' Program | IBSM exam for Sleep <br> Technologist 31 July 2016 <br> AllMS Delhi <br> No. Of Applicants= 3 | IBSM exam for Sleep Technologist <br> July 2017 AIIMS <br> Delhi <br> Silver Jubilee <br> Congress of Indian <br> Society for Sleep <br> Research 22-23 Sep <br> 2017, Goa |
| Instituted Budur Krishna Murthy Young Investigator and Travel award | Started Newsletter "SleepWatching India" and Literature Updates "Sleep Update India" |  |  |

For more details on each activity please visit www.issr.in

In 2011, the Indian Society for Sleep Research (ISSR) constituted a ten member Indian Board of Sleep Medicine (IBSM) headed by a Chair. World Sleep Federation (WSF) conducts "International Sleep Specialist" exam and certifying exam for Sleep Technologists through IBSM. WSF has conducted the exam for Sleep Medicine doctor's 4 times since 2012 and one time for sleep technologists starting in 2015. Below is the list of Doctor's and Sleep technologists from India who have qualified the WSF exam.

## Sleep Medicine Doctor's

## 2012

Dr. Tripat Deep Singh
Dr. Vikas Mittal
Dr. Teresa MPC Ferreira
Lt Col Dr Karuna Datta
Dr. Nitika Dang
2013
Dr. Pragati Agrawal
Dr. Pramod Krishnan
Dr. Haseeb Hasan
Dr. Kripesh Sarmah
Dr. Ravi Gupta
2014
Dr. Apar Jindal
Dr. Sujit Jagtap
Dr. Ghulam Hussain
2015
Dr. Sourav Das
Dr. Deepak Menon
Dr. Rajanish Sharma
Dr. Vivekananda Lahan
Dr. Hardeep Kumar

2016

Dr Alkesh Kumar Khurana
Dr Abdul Muniem
Dr Sapna Erat Sreedharan
Dr Kandraju Satish

## Sleep Technologists

## 2015

Mr. John Mohd Nengroo
Ms. Anubha Sharma
Mr. Utsah Mahamallick
Mr. Basharat Ahmad
Mr. Rahul Rawat
Mr. Adil Ahmad
Mr. Bharat Shah
Mr. Utsav Bansal
Mr. Yuvraj Kunwar
2016- Conducted by Indian board of Sleep Medicine (IBSM)

Dr Saumy Johnson
Mr. Awnish Kunwar Singh
Mr. Jaibeer Kumar
Details at:
http://worldsleepsociety.org/progra ms/examination/recipients-of-sleep-specialist-certification
$4^{\text {th }}$ ASEAN Sleep Congress http://asiansleep.org/latest\ news/news_text. 7-10 March 2017 Manilla Philippines

Workshop on Cognitive
www.imcpcthailand.com/sleep2017
Behavioral Therapy for Insomnia 15-17 March 2017, Bangkok, Thailand
Sleep and Breathing 6-8
April 2017 Marsielle France
http://www.esrs.eu/conferences-events/all-events-at-a-glance.html

## ATS Conference 19-24 May <br> http://conference.thoracic.org/attendees/future2017 Wahington DC conferences/

Sleep 3-7 June 2017 Boston http://www.sleepmeeting.org , US

Chest Congress 7-9 June 2017 Basel Switzerland
http://www.chest-sgpswitzerland2017.org/congress.html

XV Eurpean Biological Rhythm Congress 30 July$3^{\text {rd }}$ Aug 2017 Amsterdam Netherlands
NSMC 21 Sep 2017, Goa www.issr.in
m

## Somnos Sleep Clinic Kolkata

## 1. When was the Sleep Lab started?

The Sleep Lab started in February 2016

## 2. How many beds does the Sleep lab have for Level 1 Sleep studies?

Currently we have 1 bed with Level 1 Sleep Lab
3. What type of Diagnostic studies are done in the Sleep centre?

Full night PSG, MSLT, MWT, Manual titration (CPAP/ BiPAP), Expanded EEG sleep recording, Parasomnia screening.
4. What type of PAP titration facilities are available at your Sleep centre?

Manual and automatic CPAP and BiPAP titration facilities are available at the centre

## 5. What are the educational/training opportunities available for Doctors and technicians at your Sleep centre?

At present none for Doctors, technicians can apply for 7-10 days training course against a fees.
6. How many sleep techs are employed at the Sleep centre? What are their day time and night time duties?

At present there is one regular and one stand by technician. Their daytime duties are to assist in running the sleep lab and clinic. On the morning following the nights of polysomnography, they get a day off.
7. How many Level 1, level 3 studies, PAP titration studies, MSLT and MWT are done in one year?
Till September 26, we have done 31 Level 1 studies, 11 level 2 studies (in home settings), 0 level 3 studies, 2 MSLT, 0 MWT, 21 PAP titration.

Dr. Sourav Das, MBBS, MD (Psych), IBSM (WSF)
Visiting Consultant, Medica Superspeciality Hospital, Kolkata Visiting Consultant, Iris Multispeciality Hospital, Kolkata

Address of Somnos clinic from Jan-Feb 2017 onwards-
14 B, Selimpur Road, Kolkata -700031, Beside Carmel High School, Jadavpur Police station crossing from Jan-Feb 2017.


Ph: 08335035139
email: dr.sourav91@gmail.com
Website: www.somnossleepclinic.org
8. What are the contact details of the Sleep centre- address, phone no., email id, website?

Present address of Somnos Sleep Clinic - Kolkata

128, Jodhpur Garden, First Floor, Opposite South City Mall, Near Silverline Eye Hospital, Kolkata 700045.


Patient Hookup
email:
somnossleepclinic@gmail.com
Ph: +917059160507, +919431955365.


Patient Room

THE TEAM


Dr. Sourav Das
Consultant
Psychiatrist, \& Sleep Medicine Specialist


Dr. Uttam. Agarwal

Mr. Praseniist Das
Sleep Technician

## Singapore General Hospital Sleep Lab, Singapore

## 1.When was the Sleep Lab

 started? If possible, Please do share a picture of Sleep lab when it startedBasic research in sleep medicine started way back in the 1970s with makeshift equipment in the thenNorris Block in Singapore General Hospital. In 1987, a dedicated sleep laboratory was established in ward 46 . There was a need to start a Sleep Medicine service to manage patients presenting with sleep disorders in Singapore. That was the time when Sleep Medicine started to gain more prominence in the international arena. Our sleep laboratory expanded and was moved to the current site at ward 54 in 1998.
2. How many beds does the Sleep Lab have for Level 1 Sleep studies?

The sleep laboratory in Singapore General Hospital has 6 beds for Level 1 sleep studies currently.

## 3.What types of Diagnostic studies are done in the Sleep centre?

These diagnostic studies are done in the Sleep Disorders Unit, they are: Overnight Sleep study, Multiple Sleep Latency Test (MSLT), Maintenance Wakefulness Test (MWT), Overnight Sleep Study with CPAP Titration/ BIPAP Titration and Split Night Study
4.Is the centre accredited by any accreditation body? if yes, which one? What are the contact details of the accreditation body?

Yes, the sleep laboratory is accredited by the NATA (National Association of Testing Authorities, Australia).
(http://www.nata.com.au/nata/)

Dr Toh Song Tar
Consultant, Department of Otolaryngology, Singapore General Hospital
Director and Consultant, Sleep Disorders Unit, Singapore General Hospital
Adjunct Assistant Professor and Senior Clinical Lecturer, National University of Singapore

# Singapore General Hospital Sleep Lab, Singapore 

5.When was the accreditation obtained? How long it took you to prepare for and get the accreditation?
The accreditation was obtained in 2008 by the then accreditation body (The Thoracic Society of Australia and New Zealand - TSANZ) and our laboratory was subsequently reaccredited in 2014 by the current accreditation body (NATA). It took us more than a year to prepare during the initial accreditation and a year to prepare before the reaccreditation.
6. What are the PAP titration facilities available at your Sleep Centre?
We can conduct up to 3 CPAP/BIPAP titrations in a night. We are currently using the ResMed TX titration system.
7.What are the educational/training opportunities available for Doctors and technicians at your Sleep Centre especially for candidates from other countries?
We conduct sleep symposium on a regular basis (yearly). We also welcome doctors and technicians to be attached at the sleep laboratory for attachment or exchange programs. A fellowship program is available for doctors who can spend at least 6 months with us.
8.How many sleep techs are employed at the Sleep Centre?
What are their day time and night time duties?
We have 10 sleep technicians at our sleep laboratory who are on rotating day and night shifts. Day shifts starts at 0830 and ends at 1730 and night shifts starts at 1900/2000 and ends at 0700/0800.

## 9.How many Level 1, level 3 studies, PAP titration studies, MSLT and MWT are done in one year?

More than 1000 Level 1 sleep studies, which include MSLT and MWT were conducted last year. Close to 100 Level 3 sleep studies were also performed in 2015.
10. What are the contact details of the Sleep Centre- address, phone no., email id, website?

The Sleep Laboratory is situated at
Singapore General Hospital Blk 5 Level 4, Outram Road Singapore 169608

Contact Number: (+65)63266202
E-mail: gnrsdu@sgh.com.sg
Website: www.sgh.com.sg

## Singapore General Hospital Sleep Lab, Singapore



From left to right (front row): A/Prof Pavanni Ratnagopal, Dr Shahul Hameed, A/Prof K. Puvandenra, Dr Toh Song Tar (Director of SDU), Dr Ong Thun How, Dr Tan Keng Leong, Dr Leow Leong Chai, A/Prof Ng Beng Yeong

From left to right (back row): Mr Raymund Turqueza, Dr Lim Li Ling, Ms Kinjal Doshi, Ms Ethel Sheela, Ms Hemalatha Satharasinghe, Ms Siti Nur Zakiah, Ms Tan Xiu Juan, Ms Siti Raudha (Manager of SDU), Ms Jade Tay, Ms Song Peirong, Ms Nur Izzianie, Mr Kevin Beck


Control Room
Patient Room

Q 1.Why did you choose to become
Sleep Technologist? Sleep Technologist?

Ans. Sleep medicine is catching of in India because of awareness sleep breathing disorders.This developing field will offer job opportunities. I can see my future in this field.

## Q 2. What is the most challenging aspect of being <br> Sleep Technologist?

Ans.The most challenging aspect of being Sleep Technologist is dealing with patients and trouble shooting during recording in home testing.

## Q 3.What are the career opportunities for Sleep Technologist in India?

Ans. They say plenty of opportunities but the issue is how to know the vacancies.

Q 4. What is required to improve the quality of Sleep Technologists in India?

Ans. Professional training and opportunities for continuing education.

Q 5. Do you think starting a 1yr diploma course in Sleep Technology in an institute of National importance will benefit the sleep technologists in India?

Ans. Yes I think starting a 1 yr diploma course in Sleep
Technology in an institute of National importance will greatly benefit sleep medicine in India.
1.Which of the following is INCORRECT regarding the desirable EEG sampling rate is 500 Hz according to the 2.3 edition of AASM scoring manual?
A. For EEG, 500 Hz sampling rate could improve resolution of spikes in the EEG and better maintain details of the waveform.
B. Capturing 500 data points in one second of time will more accurately represent, or recreate, the analog EEG signal.
C. Once a signal is digitized then it can only be restored to its original analog value if the signal is sampled at a rate of 500 Hz .
D. The sampling rate for analog-to-digital conversions must be at least two times the value of the highest frequency of the waveform available to capture, also known as "Nyquist theorem"

## 2.A disadvantage of piezo-

 electric effort belts is their:A. Invasive nature
B. Need to interface with an external power source
C. Tendency to change polarity after large movements
D. Tendency to pick up EKG artifact
3.According to Center for Disease Control, standard precautions include all of the following except which of the following substances.
A. Saliva
B. Sweat
C. Semen
D. Urine

Dr. Deepak Shrivastava MD, FAASM, FACP, FCCP, RPSGT
UC Davis School of Medicine, California, USA

Contact Details:


Deepak Shrivastava, MD

## 4.Which of the following characteristics define mixed apnea?

A. Reduced airflow followed by a period of no airflow
B. No airflow followed by a period of reduced airflow
C. A period of effort followed by a lack of effort with no airflow throughout
D. No effort followed by resumption of effort, with no airflow throughout

## 5.During a polysomnography recording of stage $\mathbf{N} 1$ sleep the EMG suddenly shows sustained, high amplitude activity, which persists after the patient wakes up. Which of the following indicates this event?

A. Sleep terror
B. Nocturnal leg cramp
C. Tonic-clonic seizure
D. Hypnic jerk
6.A patient with COPD is on Betablocker and theophylline therapy. Which of the following polysomnographic findings should be expected?
A. Increased sleep onset latency and frequent awakenings
B. Increased slow wave sleep and frequent nightmares
C. Decreased slow wave sleep and decreased REM latency
D. Decreased sleep onset latency and alpha delta sleep
7.Which of the following changes are NOT included in recently released AASM Manual for the Scoring of Sleep and Associated Events, Version 2.3
A. A new Technical Specifications section in the Movement Rules chapter
B. New rules, figures, and clarifications for scoring periodic limb movements in sleep (PLMS)
C. A new note to clarify how to score an arousal immediately preceding a transition to wake.
D. A new rule in scoring REM sleep stage R.
8.In infants younger than 6 months post-term, non-EEG parameters are helpful in distinguishing NREM sleep from REM sleep. Which of the following parameters is absent in REM sleep?
A. Rapid eye movements
B. Transient muscle activity
C. Loss of chin muscle tone
D. Regular respirations

## 9.Which of the following is not a criterion for scoring arousal during sleep stages N1, N2, N3, or R?

A. If there is an abrupt shift of EEG frequency including alpha or theta
B. Frequencies greater than 16 Hz (but not spindles) that lasts at least 3 seconds
C. At least 10 seconds of stable sleep preceding the change in frequency.
D. Scoring of arousal during REM requires a concurrent increase in submental EMG lasting at least 3 seconds

## 10.Which of the following in correct in scoring bruxism?

A. Bruxism can be scored reliably by audio in combination with polysomnography by a minimum of 2 audible tooth grinding episodes/night of polysomnography in the absence of epilepsy.
B. A period of at least 10 seconds of stable background chin EMG must occur before a new episode of bruxism can be scored.
C. Sustained elevations of chin or masseter EMG activity are scored as bruxism if the duration is more than 10 second
D. Brief elevations of chin or masseter EMG activity are scored as bruxism if they are 10 seconds in duration and if at least 3 such elevations occur in a regular sequence.

## Answers:

1. Answer C: A signal can be digitized and then restored to its original analog value if the signal is sampled at twice the highest frequency contained in the signal. All other choices are correct.

Reference: Analog. In: Tech terms dictionary [Internet]. Available at http://www.techterms.com/defini tion/analog. The AASM manual for the scoring of sleep and associated events: rules, terminology and technical specifications. Westchester, III: American Academy of Sleep Medicine; 2007. p. 19-20.
2. Answer C: Piezo bands sometimes falsely indicate paradoxical or out of phase efforts if one of the bands reverses its polarity after a gross body movement.

Reference: Atlas of clinical polysomnography, Vol. 2, (p. 189)
3. Answer B: Standard precautions apply to all body fluids, secretions, and excretions except sweat.

Reference:
http://www.cdc.gov/ncidod/hi p/ISOLAT/std_prec_excerpt. htm
4. Answer D: An apnea by definition is no airflow, which rules out choices $A$ and $B$. The central component, indicated by an absence of respiratory effort, precedes the resumption of effort, which, in the continued absence of airflow, is the obstructive component of the apnea.

Reference: Berry R.B. (2002), Sleep medicine pearls ( $2^{\text {nd }}$ ed.), (p.69)
5. Answer B: Nocturnal leg cramps belong to "sleep/wake transition" category of parasomnias. They tend to occur from stage N1 sleep.

Reference: Allen RE, Kirby KA, Nocturnal leg cramps, Am Fam Physician 2012;86:350-5; Butler J, Mulkerrin E, O’Keeffe S. Nocturnal leg cramps in older people. Postgrad Med J 2002; 78:596-8.
6. Answer A: Beta-blockers may cause difficulty in initiating and maintaining sleep as well as frequent awakenings and nightmares. Theophylline may contribute to insomnia.

Reference: Chokroverty S. (2002). Clinical companion to sleep disorders medicine ( $2^{\text {nd }}$ ed.) (pp. 157-158)
7. Answer D: In addition to A, B and C , other changes in the 2.3 edition of the scoring manual show a new rules and figures for scoring sleep stages when 3 or more segments of an epoch meet criteria for different stages; and for electrode placement for monitoring or detecting movements.

There are new rules about video PSG requirements for diagnosing sleep related rhythmic movement disorder and REM sleep behavior disorder. A revision to the rule for scoring bruxism is that masseter EMG activity is included as a way to detect bruxism.

Reference:
http://www.aasmnet.org/articles.asp $x$ ? id=6204
8. Answer D: REM sleep has irregular respirations
9. Answer D: Scoring of arousal during REM requires a concurrent increase in submental EMG lasting at least 1 second.
10. Answer $A$ : Choice $B$ is incorrect as a period of at least 3 seconds of stable background chin EMG must occur; Choice C is incorrect as sustained elevations of chin or masseter EMG activity are scored if occur for 2 seconds and choice $D$ is incorrect as elevation of chin or masseter EMG activity is present for a duration of 0.25-2 seconds.

Reference: Berry RB, Brooks R, Gamaldo CE, Harding SM, Lloyd RM, Marcus CL and Vaughn BV for the American Academy of Sleep Medicine. The AASM Manual for the Scoring of Sleep and Associated Events: Rules, Terminology and Technical Specifications, Version 2.3. www.aasmnet.org. Darien, Illinois: American Academy of Sleep Medicine, 2016.
1.A 60 -year-old man with history of poorly controlled hypertension, type 2 diabetes, and high cholesterol suffers a right middle-cerebral-artery (MCA) distribution ischemic stroke confirmed by MRI of the brain. While in acute rehabilitation, his wife notices that he is snoring loudly and is sleepier than usual. Prior to the stroke, he did not snore or exhibit daytime sleepiness. Which one of the following steps would be the most appropriate next step for this patient?
A. Monitor without specific management; snoring and excessive daytime sleepiness may be caused by stroke and should resolve with time
B. Polysomnography should be ordered; sleep-disordered breathing is common after stroke and has important implications for stroke morbidity
C. Prescribe Modafinil; hypersomnolence is common after MCA strokes and should be treated
D. Maintenance of wakefulness test (MWT) should be ordered; hypersomnolence after MCA strokes is uncommon and requires further evaluation
2. Which one of the following drug classes would be most likely implicated in aggravating the symptoms of restless legs syndrome (RLS)?
A. Antihistamines and antipsychotics
B. Beta-blockers and proton-pump inhibitors
C. Acetyl cholinesterase inhibitors and anticonvulsants
D. Opioids and phosphdiesterase-5 inhibitors
3.Flying in which one of the following directions, does jetlag tend to be worst?
A. North
B. South
C. East
D. West

1. To diagnose primary central sleep apnea, more than how many central apneas must occur per hour of sleep, each lasting 10 seconds or longer.
A. 2
B. 5
C. 10
D. 15
4.Which one of the following disorders is best characterized as circadian processes that appear out of alignment, no clear sleep, or wake pattern, several random naps over a 24hour period, and normal total sleep time for a 24 -hour period?
A. Adjustment insomnia
B. Confusional arousals
C. Irregular sleep-wake rhythm
D. Idiopathic insomnia
5.In patients with anxiety, which one of the following disorders of sleep is most common?
A. Nightmares
B. Chronic daytime sleepiness
C. Difficulty waking up in the morning
D. Difficulty falling asleep
6.A 15-year-old male presents with difficulty falling asleep. The problem began approximately 1 year prior. During the school week, his parents ask him to go to bed at 10 pm. After he gets into bed, he lies awake in bed for 2 to 3 hours. Once he falls asleep, his sleep is described as "deep." His alarm is set for 6 am and he often sleeps through the sound of the alarm. His weekend sleep schedule is 2 am to 10 am . On these nights, he has no difficulty sleeping. Which one of the following choices best describes the patient's disorder?
A. Psychophysiological insomnia
B. Adjustment insomnia
C. Delayed sleep phase syndrome
D. Sleep onset association disorder
7.Which one of the following symptoms would be the most likely reported symptoms in a patient with central sleep apnea?
A. Early waking in the morning and un-refreshing sleep
B. Delayed onset of sleep and chronic oversleep
C. Evening tiredness and periodic limb movements
D. insomnia and Excessive Daytime sleepiness
2. Which one of the following contributors would have the lowest likelihood of causing confusional arousal?
A. Family history
B. Night shift work
C. Diet
D. Stress
9.There are 2 forms of idiopathic hypersomnia: that with long sleep time and that without long sleep time. How many hours per night would a patient have to sleep on a regular basis in order to receive the idiopathic hypersomnia with long sleep time designation?
A. 6 hours
B. 6 hours with a daily afternoon nap of 2 hours
C. 8 hours with a daily afternoon nap of 2 hours
D. 10 hours
3. Answer: B. Polysomnography should be ordered; sleep-disordered breathing is common after stroke and has important implications for stroke morbidity.

References: Iranzo A. Prevalence and clinical importance of sleep apnea in the first night after cerebral infarction. Neurology. 2002; 58)6):911-6.; Davis AP. Early diagnosis and treatment of obstructive sleep apnea after stroke: Are we neglecting a modifiable stroke risk factor? Neurol Clin Pract. 2013 Jun; 3(3):192-201
2. Answer: A. Certain medications that may aggravate symptoms include antinausea drugs (prochlorperazine or metoclopramide), antipsychotic drugs (haloperidol or phenothiazine derivatives), antidepressants that increase serotonin, and some cold and allergy medications-that contain sedating antihistamines; pregnancy, especially in the last trimester (in most cases, symptoms usually disappear within 4 weeks after delivery); and alcohol and sleep deprivation.

Reference: National Institute of Neurological Disorders and Stroke. Restless Legs Syndrome Fact Sheet: http://www.ninds.nih.gov/disorders/rest| ess_legs/detail_restless_legs.htm.
3. Answer: C. Jetlag is an example of a temporal sleep disorder and is especially problematic when traveling east across multiple time zones. Trips to the west are generally tolerated better. Temporal sleep disorders stem from changes in your orientation to the clock and the rising and setting of the sun.

Reference: Lombardo, G. Sleep to Save Your Life: The Complete Guide to Living Longer and Healthier Through Restorative Sleep New York: Collins. 2005.
4. Answer: B. In primary central sleep apnea, more than 5 central apneas occur per hour of sleep, each lasting at least 10 seconds, with more than $50 \%$ of the events determined to be central rather than obstructive. These episodes appear to be more common during sleep stages 1 and 2, and severe fragmentation caused by apnea may preclude the patient from going into deep sleep (delta sleep). The events are less common during REM sleep and the length of the apneicventilatory cycle is less than 45 seconds.

Reference: Becker K, et al. Central Sleep Apnea: Differential Diagnoses \& Workup. Available at:
http://emedicine.medscape.com/artic le/304
5. Answer: C: Irregular sleep-wake rhythm is one of several circadian rhythm disorders; people with these disorders have sleep times that seem to be out of alignment and their sleep patterns do not follow the "normal" sleep times at night. The sleep of patients with irregular sleepwake rhythm is so disorganized that there is no apparent sleep or wake pattern. People with irregular sleepwake rhythm may sleep off and on in a series of naps over a 24 -hour period, and the sleep pattern is broken up into pieces. This is similar to infants who sleep for a few hours and then are awake for a few hours.

If you add up all of the sleep times throughout the course of the day, the total sleep time may be normal for that age. During the day, it may seem like the patient is sleepy because they nap so much, and during the night, it may seem like they have insomnia because they are awake for long periods of time during the night.

Reference: The American Academy of Sleep Medicine. Irregular SleepWake Rhythm. Available at: http://www.sleepeducation.com/Disor der.aspx?id=60.
6. Answer: D. People with anxiety disorders feel nervous, tense, have difficulty controlling worrying, and find it hard to relax, thus their sleep patterns are often affected. Sleep disorders are found in over $50 \%$ of patients with generalized anxiety disorder, and difficulty in falling and staying asleep is the most common sleep disturbance.

Reference: Cleveland Clinic. Sleep and Psychiatric Disorders. Available at:
http://my.clevelandclinic.org/disorder s/Sleep_Disorders/hic_Sleep_and_P sychiatric_Disorders.aspx.
7. Answer: C The question describes a patient with delayed sleep phase syndrome. Option D is correct, as the patient has difficulty initiating sleep; however, once he falls asleep, his sleep is normal for his age. He also has difficulty awakening in the morning.

Reference: Carskadon, M. (2011). "Sleep in adolescents: the perfect storm." Pediatr Clin North Am 58(3): 637-647. Carskadon, M., C. Vieira, et al. (1993). "Association between Puberty and Delayed Phase Preference." Sleep 16(3): 258262.
8. Answer: D. The most common reported symptoms in patients with central sleep apnea are insomnia and excessive daytime sleepiness or fatigue. In general, the degree of daytime hypersomnolence is less than that observed with obstructive sleep apnea, and insomnia is generally more prominent. The presence of insomnia may actually put these patients at increased risk of central apneas because a greater number of sleep-wake transitions provide more opportunities for unstable breathing patterns.

Reference: Becker K. Central Sleep Apnea - Epidemiology. Available at: http://emedicine.medscape.com/artic le/304967-overview\#a0199.
9. Answer: D. Idiopathic hypersomnia causes disabling daytime sleepiness. The condition takes 2 forms: idiopathic hypersomnia with long sleep time and idiopathic hypersomnia without long sleep time. Those patients with a long sleep time sleep more than 10 hours each night, though they still experience sleepiness during the day. Patients who have idiopathic hypersomnia without a long sleep time sleep for a shorter period (less than 10 hours).
10. Answer: C.

## Normal Sleep Architecture in Adults

1. How many types of sleep adults have? What are the different NREM sleep stages according to R\&K Scoring manual and AASM scoring manual?

Adults have 2 types of sleep REM and Non-REM . The non-REM sleep is further divided into 4 stages (I,II,III and IV) according to R and K Scoring system (1968). In the modern AASM manual, Stage III and IV are taken together as Slow wave sleep reducing the stages of NREM sleep to 3- N1, N2 \& N3.
2. What is the percentage of time spent in each sleep stage during one night of Sleep?

Depends on the age. For most adults :NREM Stage 1:5-10\%, NREM Stage 2: 45-55\%, NREM Stage 3: 15-25\%, REM : 20-25\%. REM sleep is around $50 \%$ in newborns and gradually decreases with age. NREM Stage 3 also declines with age.
3. What is Sleep Cycle? How many sleep cycles are there during one night of sleep?

A sequence of NREM stage (s) and a REM stage make a sleep cycle. There are typically 4-5 sleep cycles in a night of sleep.

## 4. How do we define Sleep Onset? What is normal Sleep onset latency?

Sleep onset is the transition from wakefulness to any of the sleep stages(Usually NREM, sometimes REM as in Narcolepsy). Normal Sleep onset latency is the interval between 'lights off' and start of any Sleep stage based on an EEG recording. Normal range is 10-30 minutes.(Lichstein,2003).

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## 5. How do we define REM Sleep latency? What is normal REM Sleep Latency? What are the reasons for short/long REM Sleep latency?

REM sleep latency is the interval between onset of any stage of sleep and onset of first REM sleep stage. Normal REM Sleep latency is <120 minutes. Sleep Onset REM (SOREM ) is also abnormal.
A short REM latency time may result from narcolepsy, sleep apnea, and depression or withdrawal from tricyclic anti-depressants (TCAs), Monoamine Oxidase Inhibitor (MAOI) medications, amphetamines, barbiturates and alcohol.
Long REM latency may happen due to Sleep apnea, periodic limb movement of sleep and use of REM-suppressing medications, including TCAs, MAOIs, amphetamine, barbiturates, and alcohol.

## 6. How does REM Sleep distribution and duration vary during night?

REM sleep increases in duration through each subsequent sleep cycle at night. Inital REM latency is usually 90-120minutes.On an average, latency between subsequent REM stages is decreased.

## 7. How do we define Lights off and Lights on during Polysomnography?

Lights off/out: The beginning of the study or the time at which the patient first attempts to fall asleep. The lights , television, and other devices that may distract the patient, are turned off. Impedence checks, amplifier calibrations and physiologic calibrations are comleted and artifacts are corrected before lights off/out.

Lights on : the end of the study, orr the point in time when the technician enters the room to wake the patient. Post-test calibration are performed after lights on.

## 8.How do we define Total Sleep Time and Total Recording time during Polysomnography?

Total recording time(TRT) $=$ Light on time to Lights off time

Total sleep time(TST)= Total recording time(TRT) - WASO Sleep latency(SL)
where WASO= time in wake stage after sleep onset till lights on time.
9. What is the definition of Sleep efficiency? What is the normal value for sleep efficiency?

Sleep efficiency (SE) is the percentage of total recording time where the patient was a sleep.

SE(\%)= (TST/TRT) *100 where , TST is Total sleep time, TRT is Total recording time. The normal value for sleep efficiency is at least $85 \%$.
10. During Polysomnography how do we define wake after sleep onset (WASO)? What is the normal value for WASO?

WASO is the total time in minutes spent awake after the first epoch of sleep.

WASO= TRT-TST-Sleep Latency Normal value for WASO increases with age from 10 minutes in newborn to around 100 minutes at $60 y$ years of age.
11. How does sleep architecture change with aging? Which PSG parameters change with aging?

REM sleep and Slow wave sleep decline from around $25-30 \%$ each in young children to $15-20 \%$ in elderly. TST also decreases while time spent in N1 stage and WASO increase the most, with decline in sleep efiiciency.

## 12. Are there any gender differences in sleep architecture?

1. Sleep latency is longer in women than men
2. Women <55 years report more sleepiness than men
3. Older women report 20 minutes less sleep than men
4. Women have more SWS and less

NREM stage 1 sleep than men
5. Men have more NREM stage 1 and stage 2 sleep than women 6 . Normalized delta activity in older women is lower than in older men

Cross ref: J Womens Health (Larchmt). 2014 Jul 1; 23(7): 553562.

## 13. What is the effect of Oestrogen and Progesterone on sleep architecture and PSG parameters?

Progesterone has a sleep promoting effect (GABA A agonist like benzodiazepines and barbiturates)

- Dec.Latency to NREM sleep
- Inc.Latency to REM sleep
- Dec.REM sleep percent

Oestrogen -Primary effects on REM sleep ( $\uparrow$ )
Weakens the coupling between body temperature and sleep-wake cycle Decreased SOL and WASO Increased TST

## 14. What is the effect of different phases of menstrual cycle on sleep architecture?

Non-REM (NREM) sleep and stage 2 sleep significantly increases while REM sleep significantly decreases in the Luteal Phase (second half), (H.S Driver et al 1996). In menstrual pahse, Stage N3 latency increases.

## 15. What is the effect of pregnancy on sleep architecture during different trimesters?

Very low powered studies show increased total sleep time, decreased sleep efficiency, increased daytime naps, decrease in SWS (NREM stage 3), increased stage 1 and 2 sleep, and decreased REM sleep (during late pregnancy) along with increased WASO in entire pregnancy, which recover after delivery.
16. How is sleep architecture and PSG parameters affected during postpartum period? After how long normal sleep architecture is restored postpartum?

The first six months postpartum are associated with a significant increase in wake after sleep onset and a decrease in sleep efficiency compared to the last trimester of pregnancy, mostly ascribed to the baby's erratic sleep-wake cycle. Sleep begins to normalize after around 3-6 months postpartum corresponding to slight regularization of baby's sleep wake cycle.

## 17. How is sleep architecture affected after menopause?

After menopause, total sleep time and sleep efficiency decreases; WASO and sleep latency increases.

## Normal Sleep Architecture in Infants and Children

## 1.What are the different sleep stages in Infants and children according to AASM?

For children above 2 months of age the sleep stages are very similar to the adult classification.
Stage W (Awake)
Stage N1 (NREM 1)
Stage N2 (NREM 2)
Stage N3 (NREM 3)
Stage N (NREM)
Stage R (REM)
For infants $0-2$ months post term age, the sleep staging is different and is scored as-
Stage W (Wakefulness)
Stage N (NREM)
Stage R (REM)
Stage T (Transitional)
2. How is infant sleep architecture different from adult sleep
architecture with regards to sleep stages?

It has been proposed for a long time that infant sleep staging needs to be different from the adults. Based on EEG tracings, it was proposed to be divided into 2 main stages in sleep - Active sleep (corroborating to REM) and Quiet sleep (corroborating to NREM). Later on a $3^{\text {rd }}$ stage called Indeterminate stage was added, when the epochs were neither Active nor Quiet stage. The terminologies have later been changed to Stage W, N, R\&T as stated above.

The other main difference is that in older children and adults, the sleep staging is purely done on basis of EEG. Where as in infants it is possible to score the sleep stage based on other recordings from polygraphy too, as tabulated below.

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| Stage | Behavioral | Respiration | EEG | EOG | Chin <br> EMG |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Wake | Eyes open, <br> crying | Irregular | LVI or M | REMs, <br> blinks, <br> scanning <br> eye <br> movements | Present |
| N | Reduced <br> movement, <br> eyes closed | Regular | TA, sleep <br> spindles, <br> HVS | Eyes <br> closed with <br> no <br> movements | oresent <br> or low |
| R | Eyes closed, <br> small <br> movements | Irregular | LVI or M | Low |  |

LVI - Low voltage irregular, M - Mixed, TA - trace alternant, HVS - High voltage slow

## 3. What is the duration of sleep cycle in infants? At what age sleep cycle duration becomes equal to adult sleep cycle?

Sleep cycle, which is defined as an active sleep and quiet sleep along with the indeterminate sleep periods are shorter in infants. In fact, it ranges from 50 minutes at 36 weeks gestation to about 60 minutes at term. Lengthens to adult cycle between $2-5$ years of age.

## 4. What is the total sleep time in infants and children?

Infants 4 months to 12 months should sleep 12 to 16 hours per 24 hours (including naps) on a regular basis.

Children 1 to 2 years of age should sleep 11 to 14 hours per 24 hours (including naps) on a regular basis.

Children 3 to 5 years of age should sleep 10 to 13 hours per 24 hours (including naps) on a regular basis.

Children 6 to 12 years of age should sleep 9 to 12 hours per 24 hours on a regular basis.

Teenagers 13 to 18 years of age should sleep 8 to 10 hours per 24 hours.

The longest sustained sleep period increases from 3.5 hours at 3 months of age to 6 hours at 6 months.

## 5. At what age core body temperature rhythm emerges in Infants?

Circadian rhythm of core body temperature is noticed from the first months of life, the amplitude of these rhythms increases by 3 months of age.

## 6. At what age Sleep spindles first start to appear?

Early sleep spindles can be seen as early as 1.5 months, though they are better characterised and classical by 2-4 months of age.

## 7. At what age infant start having sleep onset via NREM sleep?

Unlike adults, most the first sleep stage of most infants is R or REM sleep. This continues to be the pattern till 2-3 months post term. Later, NREM becomes the first stage of sleep as in adults.

## 8. At what age Sleep stage N1, N2 \& N3 can be differentiated?

Though sleep spindles and K complexes and slow waves start appearing earlier, NREM can be scored as N1, N2 or N3 in most infants by 4-6 months of age.

## 9. By what age infant circadian rhythms get entrained to 24hr sleep wake rhythm?

Circadian rhythms of Heart rate, body movements, temperature, melatonin and cortisol are seen in the first months of life, but are better characterised by 3 months of age.

## 10. By what age K-Complexes, slow waves and vertex waves appear in EEG?

K-Complexes appear 3-6 months post term, Slow waves appear 2-5 months post term and Vertex waves appear 46 months post term.

## 12. By what age children start sleeping through out the night?

By 6-8 months, infants can sleep through out the night without waking up for feeds.

## 13. What changes occur in amount of REM Sleep during 1-3 yrs of life? What sleep disorders are common during this period?

At birth, infants sleep 50\% of their sleep in REM, which drops to around $30 \%$ by 1 year of age and to adult levels of $20 \%$ by 3-5 years of age.

Common sleep disorders in this age group include - Behavioural insomnia of childhood - Excessive night waking, sleep associations (like rocking to sleep, feeding to sleep etc), Rhythmic body movements.

## Sleep Disorders in different age groups-

3-5yrs- Behavioural insomnia of childhood - bed time refusal, Night terrors, OSA, Night mares and nighttime fears, parasomnias sleep walking, sleep terrors

6-12yrs- Inadequate sleep due to social pressures, Sleep walking, OSA, Bruxism, Inadequate sleep hygiene

12-18yrs- Delayed sleep phase syndrome, Insufficient sleep, Insomnia, OSAS, Restless leg syndrome, Narcolepsy.

## Adult Patient hook up for Level 1 Diagnostic Sleep Study

Neuro Parameters- Record EEG, EOG, EMG- Required for Sleep Staging and Scoring Arousals. EEG, EOG and Chin EMG is also recorded during MSLT and MWT in addition to ECG.
A. ElectroEncephalography (EEG)- Electrodes are placed following 10-20 International EEG electrode placement System (Fig:15)
Recommended Leads for Sleep EEG-F4-M1, C4-M1, O2-M1 (Fig:1 and Fig:2)
Backup Leads- F3-M2, C3-M2, O1-M2 (Fig:1)
M1 and M2 are Reference leads- Placed on left and right Mastoid process behind ear respectively (Fig:2)


Fig:2
Fig: 1


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## B. Electrooculogram (EOG) (Fig:3)

Right Electrooculogram (REOG).
Also called E2
Left Electrooculogram (LEOG). Also called E1
REOG is placed 1 cm above outer canthus
LEOG is placed 1 cm below outer canthus
Referenced to M2. (E1-M2 \& E2-M2)


Fig: 3

## C. Chin Electromyogram (EMG)

(Fig: 4)
one electrode is placed in the midline 1 cm above the inferior edge of the mandible;
one electrode placed 2 cm below the inferior edge and 2 cm to the left of the midline;
one electrode placed 2 cm below the inferior edge and 2 cm to the right of the midline.


Fig: 4

Respiratory Parameters- Measure Airflow, Respiratory Effort, Snore, Oxygen Saturation. Home Sleep Testing (HST) measure Respiratory parameters only or Respiratory parameters plus ECG.
A. Airflow- Measured using both Thermistor (Fig:5) and Pressure Transducer (Fig:6)in Level 1 Sleep study. In HST you can use either Thermistor or Pressure Transducer.

During CPAP/BiPAP titration airflow is measured from PAP machine and we do not place Thermistor and Pressure transducer cannula under the mask.


Fig:5 Thermistor- Used to score Apnea


Fig:6 Pressure Transducer CannulaUsed to score hypopnea
B. Respiratory Effort- Two Belts (Fig: 7), one on Thorax at nipple level and One on abdomen at naval level. Belts use Respiratory Inductance Plethysmography (RIP) technology. In HST only one belt is acceptable.


Fig:7 Thoracic and Abdominal belts and Body Position sensor (Red Arrow)
D. Oxygen Saturation- Use Finger pulse Oximeter probe


Fig: 9 Finger Pulse Oximeter probe
C. Snore Sensor- The snore sensor is placed over the trachea or on the side of the neck and secured with tape. In HST, snoring is recorded by pressure transducer cannula.


Fig:8 Snore sensor

Electrocardiogram (ECG) Recorded from lead-II. Two electrodes placed 2 cm below left and right clavicle and one electrode on lower rib cage in midclavicular line


Fig:10 ECG Electrode placement

Leg EMG- Two electrodes are placed longitudinally on the anterior tibialis muscle of each leg 2-3 cm apart and secured with tape to record each leg activity separately.


Fig: 11 Leg EMG Electrodes

## 10-20 International EEG Electrode Placement System

Step- 1 Locate NasionJunction of nose with forehead

Step- 2 Locate Inion (Occipital Protuberance)- at back of head


Fig: 13 Locating Inion (Red Arrow)
Step-4 Measure distance from Nasion to Inion in cm


Fig:14 Locating left pre-auricular point (Red Arrow)

Step-5 (Fig: 15 Red Line)
Measure distance from Nasion to Inion
-Mark $10 \%$ of the total distance up from the nasion as (Fpz) and from inion as (Oz) along the line joining them.

- Mark the halfway point between nasion and inion as (Cz).
- Mark 20\% of the total distance from Cz in front as (Fz) and back as (Pz) along the line joining the nasion and inion.


## Step 7 (Fig:15 Blue Line)

- Measure the distance from the left pre-auricular point to the right preauricular point, with the tape passing through Cz

Mark $10 \%$ of this distance up from the left preauricular point as (T3) and right preauricular point as (T4).
-From Cz mark 20\% of this distance on left as (C3) and right as (C4) side on the line joining the left and right preauricular points

## Step-9 (Fig:15 Green Circle)

-Measure the circumference of the head.
-The measuring tape should pass through FpZ, T3, Oz, T4 and FpZ

- Mark 5\% of the circumference on the left and right of Fpz as (Fp1 and Fp2) and Oz as (O1 and O2)
-Mark $10 \%$ of the circumference to the left of Fp1 as (F7) and right of Fp2 as (F8)
-Mark $10 \%$ of the circumference to the left of O 1 as (T5) and right of O 2 as (T6)

Step-6 Measure distance from left to right pre-auricular point going through Cz


Step-8 Measure the circumference of head going through FpZ, T3, Oz, T4 and back to FpZ


Step-10 (Fig:15 Brown Line) -Measure from Fp1 to O1 passing through C3

- Mark 25\% of this distance on the line joining Fp1 and C3 from Fp1 as F3
Mark 25\% of this distance on the line joining O 1 and C3 from O1 as P3
Measure from Fp2 to O2 passing through C4
Mark 25\% of this distance on the line joining Fp2 and C4 from Fp2 as F4
$25 \%$ of this distance on the line joining O 2 and C 4 from O 2 as P4


Fig:15 10-20 International EEG electrode placement system

## International Sleep Update

The $1^{\text {st }}$ International Sleep Update conducted by ACE School of Sleep Medicine (www.assm.in) held on September $18^{\text {th }} 2017$ Taj Vivanta, New Delhi was a huge success.

International sleep stalwarts Dr Teofilo Lee-Chiong and Dr. Diego Garcia-Borreguero delivered the keynote addresses. Dr. H.N Mallick, Dr. Manvir Bhatia, Dr. Preeti Devnani and the international faculty inaugurated the conference.

The inaugural session on 'Sleep and Heart Health' was chaired by Dr.Manvir Bhatia, and senior neurologist Dr. P.N.Renjen. Dr. Teofilo Lee-Chiong's talk on Cardiovascular impact and OSA highlighted the need for increased recognition in these high risk individuals. He discussed

- The SAVE trial and its impact on current practice.
- The HypnoLaus study amongst several key epidemiological data.
- The pathogenesis of cardiovascular consequences of OSA.

The session on Restless Legs Syndrome was chaired by Dr Sumit Singh and Dr Preeti Devnani. Dr. Diego Garcia-Borreguero discussed the recent consensus on RLS management published in 'Sleep 2016' with the preferred use of GABAergic agents. He also discussed treatment algorithms for long term management. Dr. Preeti Devnani presented challenging cases of RLS for his expert comments.

Other local faculty who contributed to this success were Dr. Bharath Reddy, Dr. Garima Singh, Dr. Somesh Mittal and Dr. Rashmi.

The feedback received from our delegates indicated that this academic feast only whetted their appetite for more such "Sleep Updates".

This encouraging feedback has motivated us to make 'International Sleep Update' a regular feature at ASSM.

Warm Regards,
Dr. Manvir Bhatia
Dr. Preeti Devnani S


## ISSR Membership

The Indian Society of Sleep Research (ISSR) works to protect sleep health and promote high quality patient care. These goals are dependent on the support of the professionals working in the field. Membership with the ISSR funds the activities executed for the benefit of all who practice sleep medicine or conduct sleep research.

The ISSR works to improve sleep health through advocacy, education, and strategic research and practice standards.

The Society will have Life members, Regular members and Corresponding members. In addition to membership the members will receive subscription to-

1. Journal of Sleep and Biological Rhythm
2. ISSR News letter
3. ISSR Literature Updates

We encourage you to become member of ISSR and members to renew their membership so that we have your support in continuation of the field of Sleep Medicine.

For more details on membership please visit www.issr.in

## Professional Sleep Societies and Web links

American Academy of Sleep Medicine (AASM)
American Association of Sleep Technologist (AAST)
American Board of Sleep Medicine (ABSM)
World Association of Sleep Medicine (WASM)
World Sleep Federation (WSF)
European Sleep Research Society (ESRS)
Australasian Sleep Association
Asian Sleep Research Society (ASRS)
Indian Sleep Disorder Association (ISDA)
Indian Society of Sleep Research (ISSR)
Board of Registered Polysomnography Technologists (BRPT)


## Letter to the Editor:

Dr. Tripat Deep Singh
MBBS, MD(Physiology), RPSGT, RST
International Sleep Specialist (World Sleep Federation Program) or updates in the field.

Our readers are invited to write to the editor regarding their views on the published material and also to contribute interesting content

