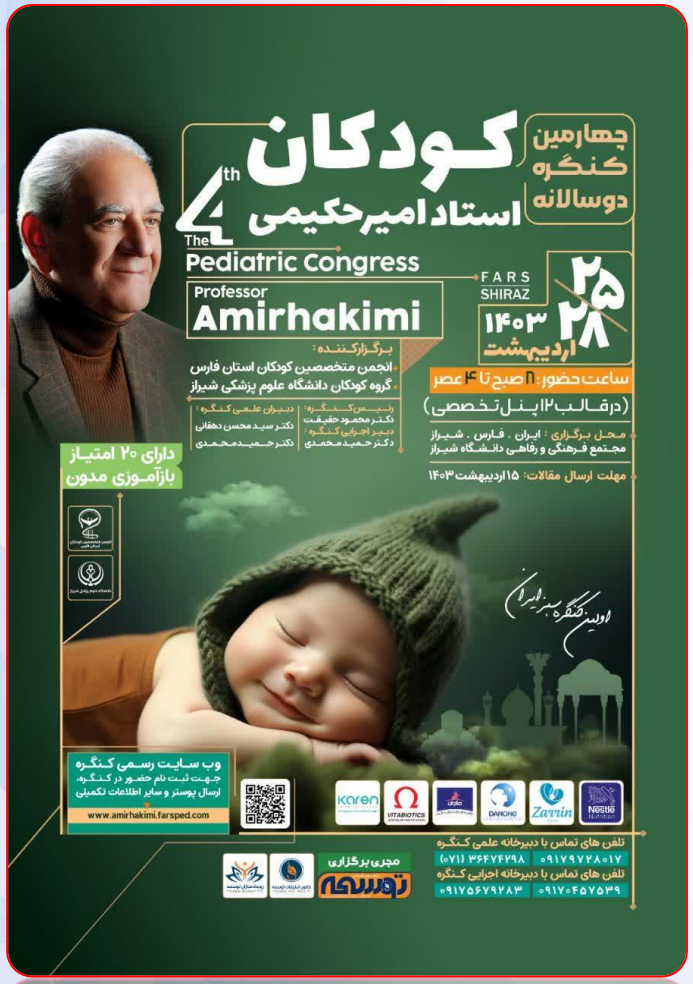
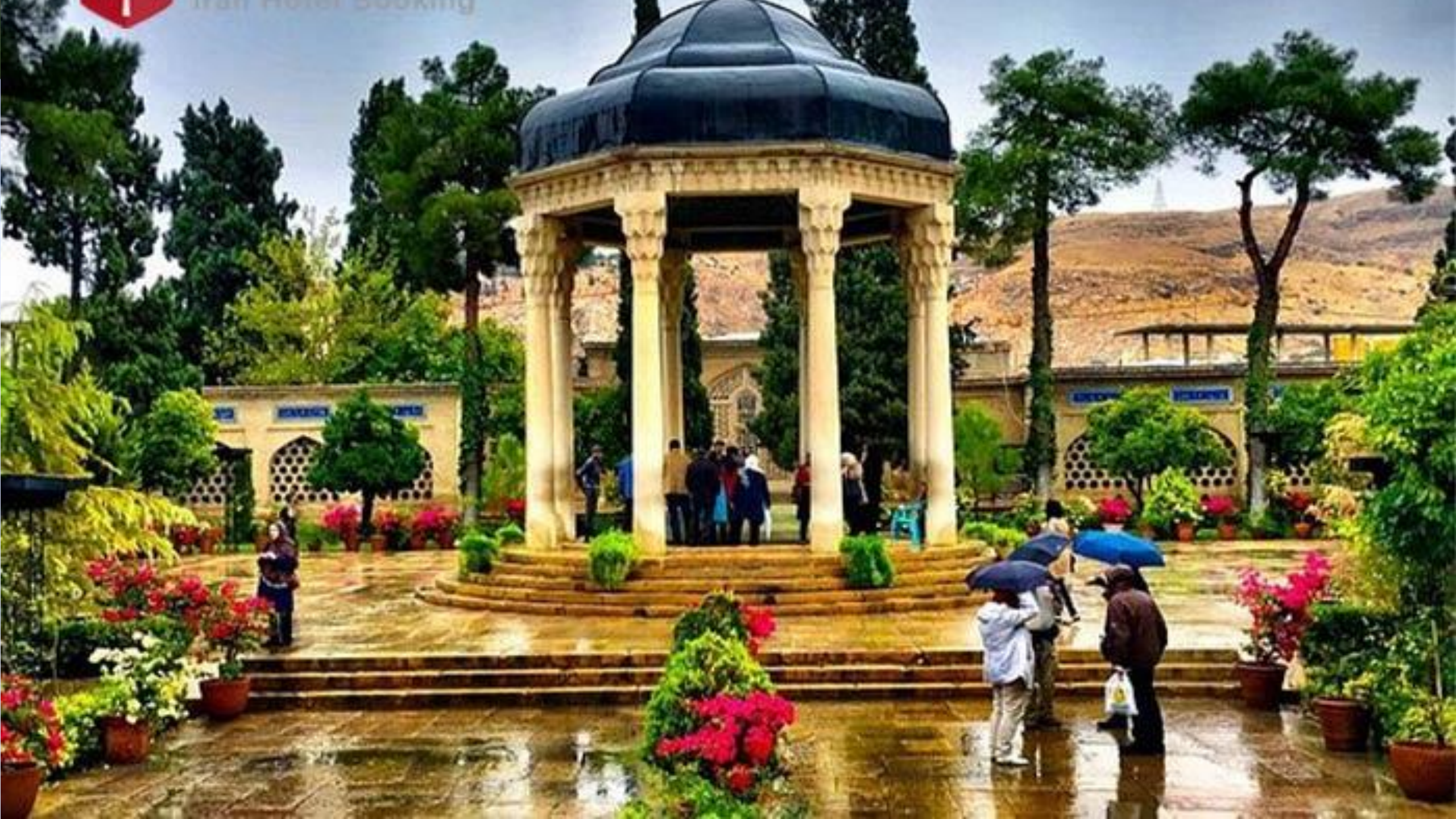


Pediatric Insomnia

Dr Reza Orangpour

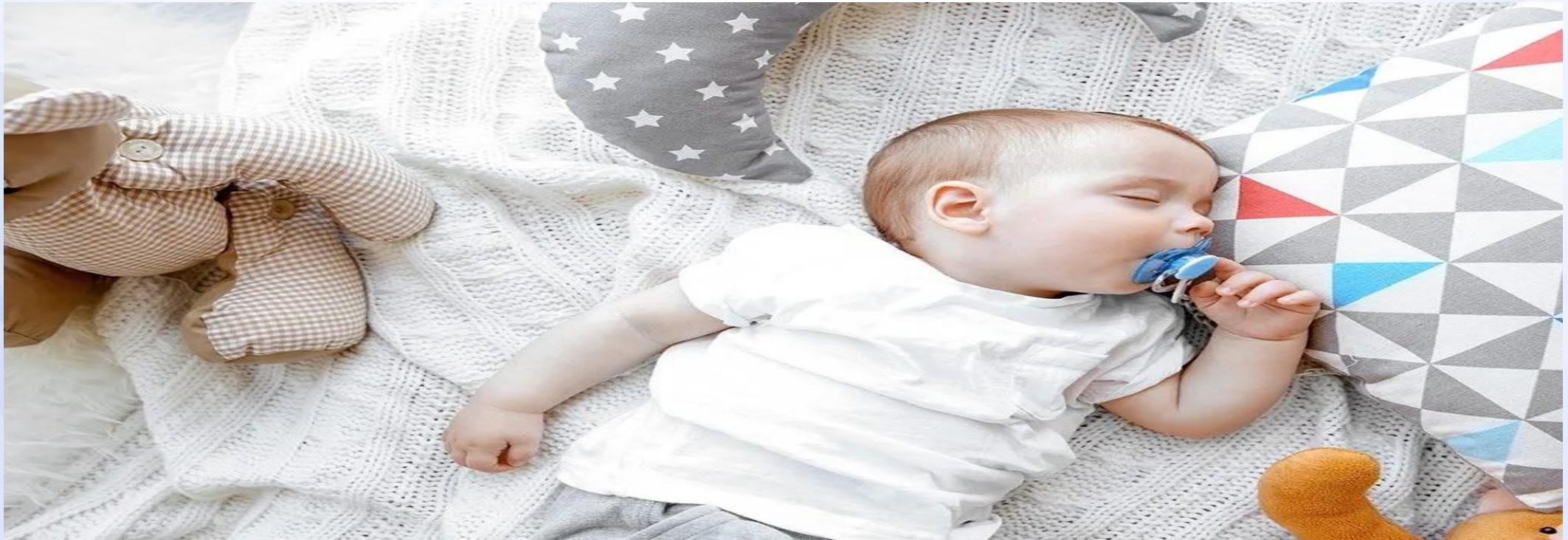
Pediatric sleep Disorders Fellowship



Case1:

A 9 months old Previously healthy girl was referred for difficulty falling asleep.

Her parents complaint that she requires rocking and a pacifier to go to sleep and wakes up frequently during the night when her pacifier falls out of her mouth.



Quantity of Sleep

- With aging gradually night sleep increase and day sleep decrease.
- After 3 years old (from 4 years old) child does not need nap .
- Approximately 0-2y ⟶ 60% S 40% W
  2-5y ⟶ S=W
  5-18y ⟶ 40% S 60% W

Prevalence

Different epidemiological studies indicate that up to 50% of children experience a sleep problem.

- *Vietnam and thailand :10%*
- *United States and Australia : 25-30%*
- *China and Taiwan:75%*
- *Iran: 80%*

Complex combination of biological , circadian, neurodevelopmental , environmental , cultural and behavioral variables.

Late onset sleep usually more than 20 minutes and exactly more than 30 minutes is pathologic

R/O Limit-Setting

- Bedtime refusal
- Inadequate reinforcement of parents or caregiver for bedtime setting that resulting in the child stalling or refusing to go to bed at appropriate time.
- parents allow infant or child to sleep in their bed when the child refuses to sleep or rocking him/her.
- Allowing the child to fall asleep while watch TV in the living room.
- When limits are not set and enforced or even enforced sporadically, sleep will be delayed, insufficient and inadequate.

Management for limit-setting

Sleep habits:

- Establish a setting for bedtime
- Institute bedtime fading
- Evaluate daytime sleep habits
- Establish a consistent bedtime routine
- Provide transitional objects(>9m)
- Exposure to morning bright light
- Guideline for parents

R/O
Sleep Onset association Insomnia

- Characterized by the childs inability or unwillingness to fall asleep or return to sleep in the absence of specific conditions such as a parent rocking the child to sleep, watching TV, feeding, and presence of parents in the room. (*Sleep Accessories*)

Night waking in early infancy

- By 3 months full term, babies are capable of sleeping through the night and have circadian rhythm.
- We have not INSOMNIA under 6 months old
- Infant and children typically arouse briefly an average of 2 to 6 times/ night. Parents should allow infants to self-sooth themselves.
- Infants after 6 months don’t need night feeding(4-6 hr)

Child wakes → cries → mother intervention and feeding → repeat night crying → each time quick reward → establish of reflex → irritability and fatigue of parents → depression

- Temper tantrum and easy or difficult child negatively correlated with total sleep duration
- Sensory threshold, greater response to daytime stimulus or more response to stimulus at night

Pediatric Insomnia Diagnosis Criteria

A: one or more of the following:

- Difficult initiation
- Difficult maintaining
- Waking up earlier than desired
- Resistance for going to bed on appropriate schedule
- Difficult sleeping without parent intervention

Pediatric Insomnia Diagnosis Criteria

B: one or more of the following:

- Fatigue, Malaise
- Attention , Concentration, Memory impairment
- Mood disturbance
- Daytime Sleepiness
- Behavioral Problems
- Reduced energy and motivation
- Concern about or dissatisfaction with sleep

Pediatric Insomnia Diagnosis Criteria

- C: Reported sleep-wake complaints can not be explained purely by inadequate opportunity for sleep (enough time for sleep , safe environment)
- D: Sleep disturbance and associated daytime symptoms occur for at least 3 times per week
- E: Sleep disturbance and associated daytime symptoms occur for at least 3 months.
- F: Is not explained by another sleep disorders

- Separate bed from birth
- Separate room from 1 year old

Co sleeping is a routine in 35% of white and 70% of black families

- In Iran 55.9%
- Side effects:
- more SWS and less REM sleep during night

Excessive breast feeding (alternative for pacifier)

excessive nocturnal fluids

Excessive Nocturnal Fluids

- Night waking in infants is 3 to 8 times/night BUT

  Infants from 7-12 months do not need physiologic feeding during night
- Diapers are heavily soaked by morning
- BMF more than 2 times per night and more than 3 minutes suggest excessive nocturnal fluids intake.
- Treatment: gradually discontinue over 2 weeks

INSOMNIA IN THE FIRST YEAR

- Colic: Paroxysms of irritability or crying lasting more than 3 hours a day, occuring more than 3 days per week, and continuing for more than 3 weeks
- Food allergy
- High 5HT levels in the first 3 months then increase of urine 5-HIAA
- 5HT and MLT have different effects on bowel muscles
- Serotonin contracts while MLT relaxes
- MLT at birth is high and derived from placenta circulation, then reduced and between 1-3 month increases gradually, and after 3 months circadian rhythm secretion starts.

Genetic Predisposition

- Family history was the second strongest predictive factor in insomnia: vulnerable phenotype(LeBlanc et al 2009)
- 35% of insomnic children have a first or second degree relative with a current or previous sleep problem (mostly mothers)(Bastien & Morin 2000)
- **Higher familial incidence** in **earlier onset** vs later onset
- Primary insomnia is heritable and related to anxiety , depression and stress-reactivity(Harvey et al 2014)

- Analyzing family history and features of child insomnia to evaluate genetic predisposition to dysfunction of neurotransmitters system:
- Histaminergic
- Serotoninergic
- Dopaminergic

- Serotonergic Dysfunction
- Insomnia, Parasomnia, Headache/Migraine, Depression, Mood disorders
- No difficulties in falling asleep
- *Mid-night awakenings*

- Dopaminergic Dysfunction
- Anemia, RLS, PLM, Growing pains, Breath-holding spells
- Difficulty in falling asleep
- *Nocturnal Hyperactivity(a horse in the bed)*

- Histaminergic Dysfunction
- Atopic dermatitis, Milk intolerance, Cows milk allergy, GER
- Difficulty in falling asleep
- *Several night awakenings(all night)*

Medical Insomnia

- Metabolic disorders
- Endocrine disorders
- Infections : otitis media, parasites
- Food allergies, Cows milk allergy
- Medications:
  - ❖Hypnotics
  - ❖Antihistamines
  - ❖Sedatives
  - ❖Benzodiazepin
  - ❖Antibiotics
  - ❖Muscle Relaxants

Neurologic Disorders

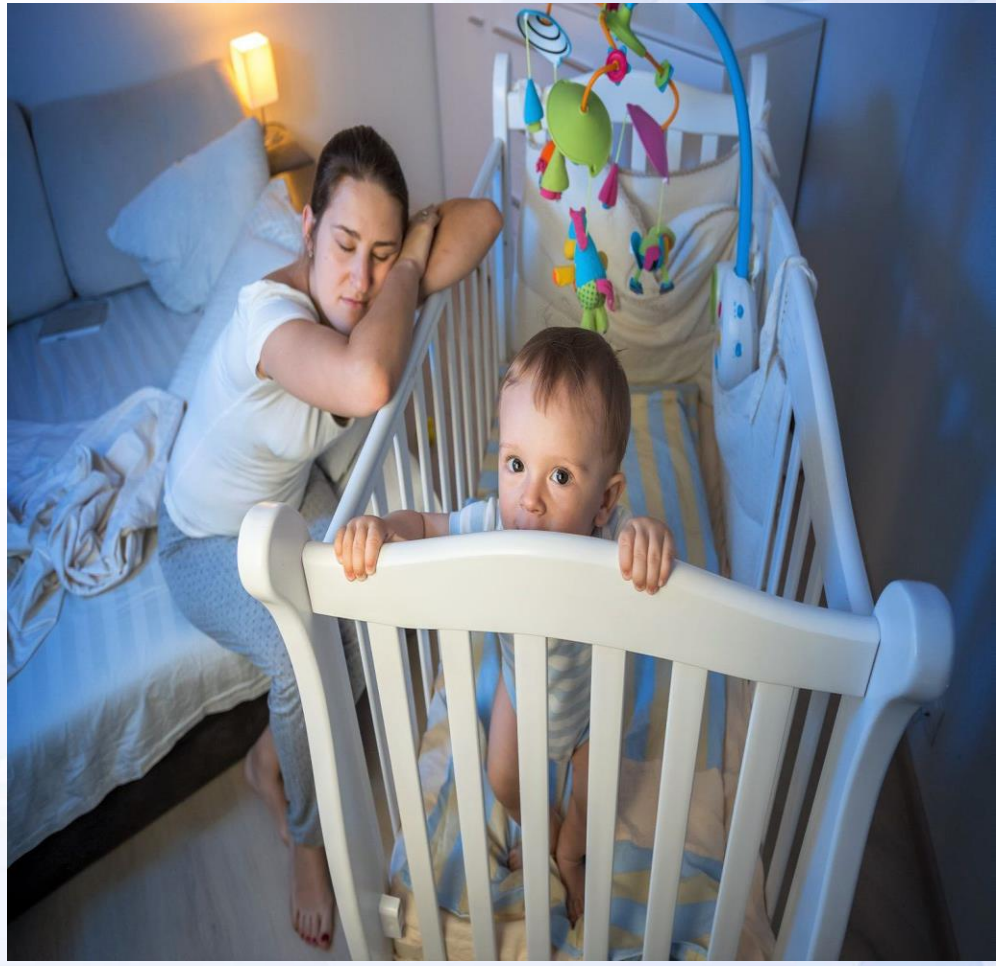
- Primary Neurological disorder
- Medications or Nocturnal Seizures
- ADHD: Night time awakening and restless sleep, Motor activity during nights, OSA, Treatment with Stimulants

Chronic Illness

- Painful illness: including fibromyalgia, rheumatologic disorders, musculoskeletal pain, functional abdominal pain, headache and migraine, cancer, spasm in CP
- Asthma
- DM
- GERD
- Eczematous Dermatitis

Consequences of Insomnia

- Negative functional outcomes including sleepiness, inattention, other cognitive and behavioral deficits
- Psychiatric outcomes such as depression and self-harm behaviors
- Health outcomes such as obesity and metabolic consequences
- Significant impact on families with negative effects on daytime function and family stress



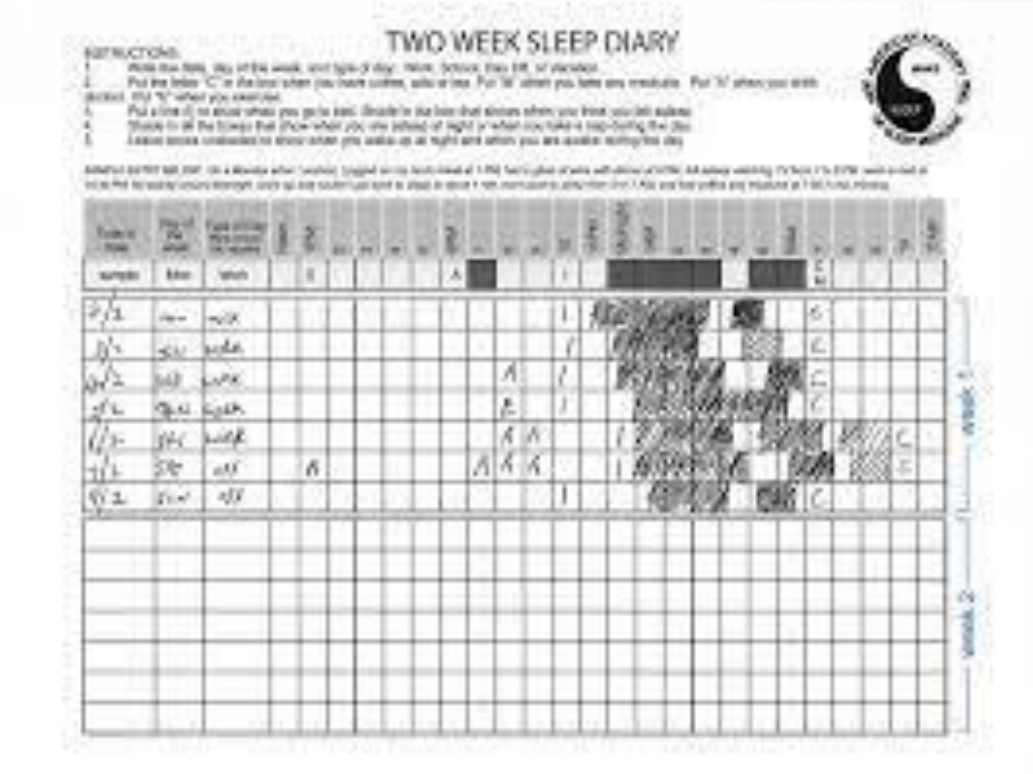
Differential diagnosis

- OSA
- PLMD
- Circadian Rhythm Disorders e.g. DSWPD
- Poor Sleep Practice
- Life Style Issues
- Environmental Issues
- Short Sleeper (Sleep is short but normal without specific complaint and daytime sleepiness or poor performance)
- Chronotypic Sleep (Body Clock Type)
  - Morning Chronotype as larks(early riser)
  - Evening Chronotype as Owl (Late sleeper)

- Process C starts sleep
- Process S maintain sleep
- Synchronization of these process with light-dark condition, occupational situation, social behavior, temperature and …make our sleep

Evaluation

- R/O clinical problems
- Special attention to developmental landmarks and CNS
- Sleep history
- Sleep Diary



- Actigraphy
- PSG (r/o OSA & PLMD)

Refer to Sleep Specialist

❑Persistent or severe bedtime issues

❑Parasomnia with sleep disrupt

❑Association with medical , psychiatric and or developmental conditions

❑Circadian rhythm disorders

Insomnia Treatment

- Treat Underlying causes
- Sleep hygiene
- Behavioral Interventions
- Limited use of hypnotics always associated with behavioral techniques

Sleep Hygiene

- Infants and children should be put to bed awake
- Bedtime and wake time should remain as consistent as possible
- Naps should be timed early enough in the afternoon so as to allow for adequate sleep pressure to accumulate by bedtime
- Enhance morning light exposure and limit light exposure in the evening, including light from TV, video games, computer screens to reinforce physiologic circadian and melatonin rhythm
- Avoid chocolate , energy drinks or caffeinated beverages in the evening

AVOID at bedtime

- Rocking and allow to fall asleep on the parents arms
- Touch hair, hands or other mothers body parts
- Fall asleep out of bed
- Put in the car in order to facilitate falling asleep
- Give pacifier or eat while falling asleep
- Administer herbal infuse

Behavioral Therapy

Has two main components

- Modifying parental cognition on their childs sleep behaviors and needs
- Modifying parental behaviors and responses to the child in an attempt to modify the childs learned responses, expectations and behaviors
- EXTINCTION
- GRADUATED EXTINCTION
- POSITIVE BEDTIME ROUTINES
- POSITIVE REINFORCEMENT
- SCHEDULED AWAKENINGS
- PREVENTIVE EDUCATION

EXTINCTION

- Parents help their children to establish self-soothing skills (put them to bed drowsy not asleep)
- Parents do not respond to their childs attempt for reengagin
- Parents must ignore their child s cries every night, no matter how long it lasts

GRADUATED EXTINCTION

POSITIVE ROUTINES

- Parents develop a bedtime routine by quiet activities that the child enjoys.
- Faded bedtime with response cost involves taking the child out of bed for prescribed periods of time
- Bedtime is also delayed to ensure rapid sleep initiation.
- Once the behavioral chain is well established and the child is falling asleep quickly, the bedtime is moved earlier by 15-30 min over successive nights until a pre established bedtime goal is achieved.

SCHEDULED AWAKENING

- In children with frequent awakening at night
- Awaken their child approximately 15-30 min before typical spontaneous night waking.
- As the treatment progresses, the time between scheduled awakenings is increased until eventually there are no awakenings.

Are CBT interventions as effective as reported?

Only CBT Overally 40-50% are successful

Reason?

Parental Resistance

Pharmacological Treatment

- Improve symptoms rather than eliminate them
- Useful for attenuation of symptoms in short term
- Close monitor
- Avoid abrupt withdrawal
- Don’t wait too long
- Always in association of CBT

Indications : ***medical-psychiatric-developmental***

- Iron (ferritin>50)
- Vit D
- Antihistamines(effective in sleep onset but ineffective in sleep maintenance)
  - ❖ Diphenhydramin 0.5 mg/kg
  - ❖ Hydroxyzin 1 mg/kg
- Melatonin(high efficacy in reducing sleep latency but low efficacy in total sleep time)
  - ❖ 0.5-5 mg 1 hr before bedtime
  - ❖ Duration: individualize
  - ❖ Headache, somnolence,hypo/hypertension, dizziness, nausea, gonadal supression, risk of seizure and MI,
  - ❖ Max dose: <40kg 3mg >40kg 5mg
- Zolpidem 5-10mg
- Trazodone 1mg/kg
- Clonidine 0.05-0.1 mg/kg
- Clonazepam 0.25-0.5 mg/kg
- Gabapentin 3-5 mg/kg
- Doxepin

- Serotonergic Dysfunction
- Insomnia, Parasomnia, Headache/Migraine, Depression, Mood disorders
- No difficulties in falling asleep
- *Mid-night awakenings*
  - *L-5-HTP*
- Dopaminergic Dysfunction
- Anemia, RLS, PLM, Growing pains, Breath-holding spells
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- *Nocturnal Hyperactivity(a horse in the bed)*
  - *Iron, Gabapentin*
- Histaminergic Dysfunction
- Atopic dermatitis, Milk intolerance, Cows milk allergy, GER
- Difficulty in falling asleep
- *Several night awakenings(all night)*
  - *Antihistamine, MLT*

Case 2

- A 14 years old adolescent boy with no significant medical history referred for insomnia. He tries to sleep at 11:00 pm but it takes several hours to fall asleep on weekends. He goes to bed at 2:00am and wakes up at 10:00 am.

- Delayed sleep wake phase disorder (DSWPD)
- Usually in adolescent
- Usually due to failed synchronization of circadian rhythm with environmental condition
- Usually owl sleeper BUT poor academic and professional performance due to frequent absenteeism
- Usually weekend oversleep
- Increased consumption of caffeine
- Evening or night preference
- Evaluation by sleep diary or actigraphy
- Two targets in treatment: 1-shifting the sleep –wake schedule to an earlier time
  2-maintaining the new schedule
- Treatment only when major shifting >3hr(avoid nap, bright light therapy, MLT,…)

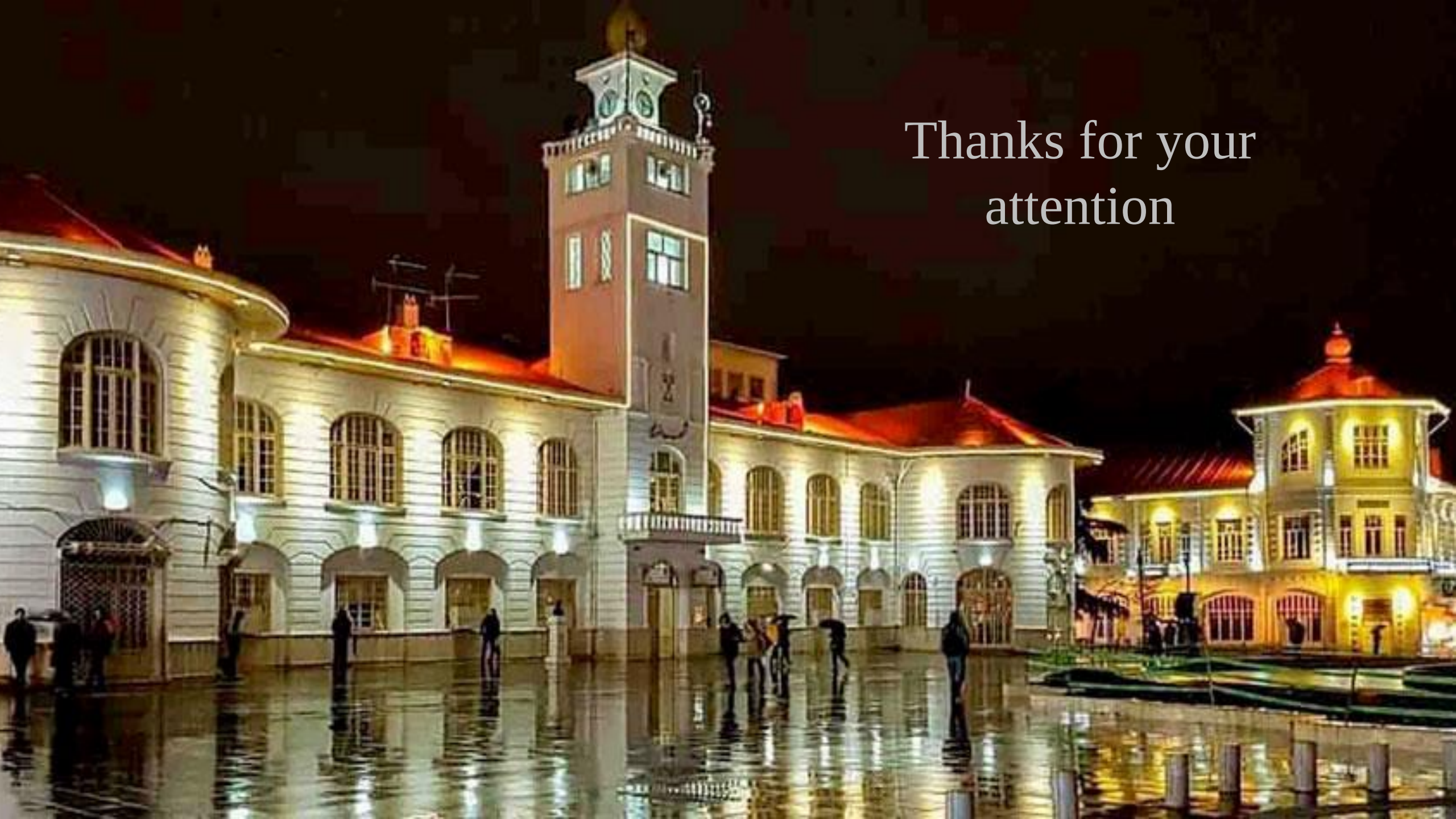
Case 3

- A 7 years old boy with increased sleep latency referred for restless sleep. His parents report that he forgets his school things at school

- ADHD
- Difficulties in going to sleep, Frequent awakenings , Dream content is more negatively colored, Motor restlessness during sleep, Excessive daytime sleepiness, Nocturnal enuresis, Sleep hyperhidrosis, Sleep-related breathing problems, Difficulty waking up in the morning

  Lighter Sleep, Parasomnia(Disorders of Arousals)

Treatment: good sleep hygiene, CBT, Ritalin, Iron, Modafinil,…


Thanks for your
attention