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Sleep Medicine
Perspective, Potential, and Prospect

Prologue :

Taking cognizance of the rapid advances in the emerging specialty of Sleep Medicine, the National Academy of Medical Sciences planned and organized a Regional Symposium on the subject as a part of the Annual Conference of the Academy at the All-India Institute of Medical Sciences, Jodhpur. The Regional Symposium was aimed :

'to enhance knowledge of sleep physiology and raise awareness of the spectrum of sleep disorders that physicians may see in their patients and to enhance participants' understanding of the association of increasing prevalence of sleep disorders with the obesity epidemic in children and adults; consequences of sleep disorders; specific disease states associated with such disorders and the treatments available'.

Learning objectives in terms of cognitive, psychomotor and behavioural outcomes were articulated in order to achieve a positive outcome.

This special issue of ***Annals*** provides the scientific content of the presentations made at the Symposium. The pre- and post-symposium assessment as well as programme evaluation indicated most satisfactory outcome as summarized (page 185).

Nevertheless, Sleep Medicine is not just a compendium of clinical conditions dealing with etiology, pathogenesis, diagnosis and management. It has broader dimensions and wider ramifications which need to be amplified so as to generate awareness not only amongst healthcare providers but also in health planners, social and behavioural scientists as well as in the community at large so as to facilitate the emergence of a well considered collective and cohesive response and appropriate intervention strategies.

Historical Perspective :

Beginning in the middle of the 20th century, investigators both in the basic science laboratories as well as in multiple clinical disciplines have qualitatively and quantitatively added to our knowledge about sleep-wake functioning. Although sleep clinics were established in the United States and in some countries in Europe in the 1970s, most of these were confined to the diagnosis and management of Obstructive Sleep Apnea. No regulatory requirements of a training or certification were required and till the turn of the 20th century, any physician could open a Sleep Clinic and/or a Sleep Laboratory to provide specialized care for sleep disorders.

The situation was no different, perhaps worse in India. It was in September, 1992 that the International Conference on

'Sleep-Wakefulness' was held at the All-India Institute of Medical Sciences, New Delhi and provided an impetus to the Indian biomedical and clinical scientists who responded collectively to the unmet national needs in the specialty. It was at this conference that the '**Indian Society for Sleep Research**' was born and a classic Monograph "**SLEEP-WAKEFULNESS**" was published on behalf of the organizers of the conference with dynamic leadership of the past President of the National Academy of Medical Sciences, Dr. B. Ramamurthi as President and Dr. V. Mohan Kumar, a distinguished Fellow of the Academy as General Secretary of the newly constituted 'Indian Society for Sleep Research'. Long-term plans for the organizational structure and operational framework were nurtured. The second remarkable effort at this conference was the birth of a second organization "**The Asian Sleep Research Society**" with Professor T. Okuma from Japan as President and Dr. V. Mohan Kumar as Vice-President.

With the establishment of Indian Society for Sleep Research and the Asian Sleep Research Society, a mechanism of networking with other International Sleep Research Societies was established. This has now emerged as the World Federation of Sleep Research & Sleep Medicine Societies (WFSRSMS) with a large number of national associations affiliated to this organization. In some countries, there are more than one associations dealing with Sleep Medicine : separate organizations for dealing with biomedical research viz-a-viz associations involved in public health and education for sleep health care. For example, in the US, American Academy of Sleep Medicine (AASM) and National Sleep Foundation (NSF) deal with professional advancement and public interest, respectively.

Social demographics of Sleep Health Care :

The social demographics and economic cost to society as a result of disorders of sleep are now receiving major attention. The US National Transportation Safety Board, as a result of well conducted studies, observed that the leading cause of fatal-to-the-driver heavy truck crashes is fatigue-related (31%) and alcohol (29%), with sleep deprivation being a significant contributor. Indeed the later has been implicated in the nuclear incidents at Chernobyl and Three Mile Island and the explosion of the space shuttle Challenger.

There is a general agreement that a lack of adequate sleep is related to several adverse effects of health including some that may be of cognitive import. Therefore, seven to nine hours of sleep has been generally recommended for adults. As against this, a recent gallup poll conducted between December 05 and December 08, 2013, with a random sample of 1031 adults, aged 18 and older, living in all 50 US states has shown that 40% of American adults get less than 7 hours of sleep at night, the average being 6.8 hours. There is an average reduction of more than one hour when compared to data similarly obtained in 1942. It is argued that this significant reduction in sleep is on account of lifestyle changes i.e.

visiting discos / parting till late at night in higher socio-economic classes while in lower and middle classes it may be related to the demands of working and parenting.

It is axiomatic that for children a good night's sleep is an essential pre-requisite for good health, mental growth & development, scholastic performance as well as for desirable behavioural attributes. With focus on 'Sleep in Children' a National Sleep Foundation poll in 2014, aimed at ascertaining sleep practices and beliefs of the modern American family with school-aged children was conducted. The poll required the parents to provide an estimate of amount of sleep their child typically gets on a school night. The data showed that parents' estimates of sleep time were *8.9 hours* for children ages *6 to 10*, 8.2 hours for 11 and 12 year olds, 7.7 hours for 13 and 14 year olds, and 7.1 hours for teens ages 15 through 17. The data needs to be viewed in the context of the National Sleep Foundation recommendations which state that children ages *6 to 10* should get *10 to 11* hours of sleep per night. Parents were also asked as to how much sleep their child needs to have in order to be in optimal state of health and performance. 26% of parents estimated that their child's sleep must be at least one hour more than the child actually gets on the school nights. It is interesting to observe that parents do understand the importance of quality sleep : more than nine in ten parents think sleep to be extremely or very important for their child's performance in school, health and his/her well-being, and mood and behviour the next day.

A significant co-relation emerged between the availability of electronic devices in a child's bedroom and a reduction in night sleep. According to the parents' reports nearly three out of four (72%) children ages 6 to 17 year have at least one electronic device in the bedroom. Parents also have a more negative view of the quality of their child's sleep if the child leaves such an electronic device on while sleeping.

An interesting fact that emerged from the study was that the children whose parents have healthy sleep environments tend to have healthier sleep environments themselves. Nearly two-thirds (65%) of children whose parents have one or more "interactive" electronics (tablet or smartphone, laptop or desktop computer, and/or video game) in their bedroom also have at least one device in their own bedroom. Only 24% of children have a device in their bedroom if their parents do not.

The implications of such data are obvious in terms of contemporary relevance to emerging life style in upper and middle class families in India. Generating awareness is an urgent need : time is of essence.

Sleep and Nutrition :

It has been previously reported that there was a possible co-relation between poor sleep and low blood levels of omega-3 long chain polyunsaturated fatty acids (LC-PUFA) in infants as well as in children and adults with behavioural and learning difficulties. It was proposed to

investigate possible links between sleep pattern and fatty acids status in healthy children.

A randomized placebo-controlled study undertaken at the University of Oxford, England has shown that higher levels of omega-3 DHA, are associated with better sleep. The design of the study was based on investigating the effect of 16 weeks supplementation of daily 600 mg. of algal sources. The primary endpoint was improvement in the sleep of 362 children who were not selected for sleep problems but were struggling readers at a mainstream primary school. At the outset, the parents filled in a child sleep questionnaire, which revealed that four in 10 of the children in the study suffered from regular sleep disturbances. In the pilot study, it was shown that the children on a course of daily supplements of omega-3 had nearly 1 hour (58 minutes) more sleep and seven waking episodes per night compared with the children taking the corn or soybean placebo.

Sleep health care : Tasks ahead

The sound basis of health policy planning and implementation requires a system approach which includes determinants such as epidemiology, demography, human resources and appropriate technology. While studies of epidemiology and demography as cited above provide significant information for the population in the US, similar studies are lacking in India and in most of the developing countries. The obvious reason is the enormous disease burden due to communicable and non-communicable diseases, leaving little resources for additional undertaking. Nevertheless, there is an urgent need to focus on these emerging issues which are likely to be of concern in the near future. For example, a study by Panda et al (2012) reported prevalence of insomnia in 9% of the general population with about 30% reporting occasional insomnia. A higher prevalence of sleep disorders related to initiation and maintenance of sleep (28%) was reported in an urban population from north India. In a large study by Stranges et al. from the University of Warwick, the researchers examined the sleep quality of 50-year-olds from rural populations in Bangladesh, Ghana, India, Indonesia, Tanzania, South Africa, and Vietnam, as well as from an urban area in Kenya. They investigated potential links between sleep problems and social demographics, quality of life, physical health and psychiatric conditions in 24434 women and 19501 men included in the study. They found that a strong link existed between sleep-related problems and psychiatric conditions like depression and anxiety, similar to that reported from the developed world.

How do we respond to such problems in a realistic manner and prepare for the emerging issues in the future? A serious concern is lack of human resources which must play a key role in planning, designing and implementing sleep health care programmes in contrast to the felt but unmet needs of critical health manpower. The striking fact is that health and medical educators have neither paid any attention to the issues of sleep behavior nor to the morbidity associated with sleep disorders.

The lack of trained and skilled human resources for sleep health care is not confined to India alone. A survey in 1990-91 of 37 American medical schools showed that sleep and sleep disorders were 'covered' in less than two hours of total teaching time, on average. A 2002 survey of more than 500 primary care physicians in the US who self-reported their knowledge of sleep disorders as follows : Excellent – 0%; Good – 10%; Fair – 60%; and Poor – 30%. The link between lack of appropriate educational modules during undergraduate curriculum and the knowledge of practicing physicians is obvious.

In order to ascertain the situation in India, a well designed proforma with critical parameters was sent to 100 Government Medical Colleges in different states of the country. Early responses have been received from 23 Medical Colleges. To the question : '*Does your Institute conduct any structured course or module in any form, on Sleep Medicine in any of the departments/specialty*', 96% medical institutions have responded "NO" while only one institution (4%) has responded in the affirmative.

Notwithstanding obvious constraints there is need to initiate urgent action. An outline of a sleep health care programme stated below must keep in view these concerns : -

Goal :

The goal of a well-designed sleep health care programme must be aimed :

i) to generate the knowledge and technology required for the prevention and treatment of sleep disorders and associated co-morbidities;

ii) to devise, through service and psychosocial research, improved strategies for integrating sleep health care into primary health care, in a manner most appropriate to local needs, and taking into consideration socio-economic and other related factors;

iii) to promote local and national self-reliance in sleep health care by seeking support both from the governmental and non-governmental organizations, assessing the needs and incorporating training programmes for skilled human resources, and such physical, technical and technological facilities that will enable development of infrastructure and implementation of intervention strategies.

Enabling objectives :

The enabling objectives for such a sleep health care programme may generally include the following :

a) to generate awareness and provide technical inputs and manpower resources for integrating sleep health care in the primary health care system.

b) to provide upgraded facilities at the community health centres and sub-district (Taluka) hospitals.

c) to initiate and develop prototype of tertiary care facilities at district hospitals and medical colleges for diagnosis and management of sleep disorders and associated co-morbidities.

d) to innovate cost effective appropriate technologies and ensure a system of quality control.

e) to collate and disseminate new and relevant information on individual and family sleep behavior as well as sleep disorders especially in children, women, and aged.

f) to coordinate nationwide education and training programmes for public, patients as well as of all categories of primary health care providers including community health workers, allied health care professionals and physicians.

g) to assess current and future needs with regard to the need and supply of skilled human resources, drugs & devices, and procedures for the care and cure of sleep disorders and co-morbidities.

To summarize the strategic approach, it may be stated that :

"Health systems planning for, and research into, sleep health care must be adaptable to the wide variations in social, economic, and medical conditions and structures. Community-based primary health care schemes should be linked to specialized levels to optimize the quality of care, depending upon the requirements of the patient and the availability of resources. A group of experts should review alternative strategies including practice of Yoga and make specific proposals for health systems planning, and for the integration of sleep health care into national health services."

Epilogue :

Sleep is a blend of Scientist's narration and Artist's imagination :

'There is a drowsy state, between sleeping and waking, when you dream more in five minutes with your eyes half open, and yourself half conscious of everything that is passing around you, than you would in five nights with your eyes fast closed and your senses wrapt in perfect unconsciousness.'

- Charles Dickens

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*The views expressed are entirely of the author and are yet to be discussed and endorsed at the appropriate Fora of the National Academy of Medical Sciences.

REFERENCES :**

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