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A Critical Study of Sleep Problems and its Impact on Executive Function (EF) in Children

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Abstract **- Sleep is a naturally recurring state of mind and body of all human age group. If a child refuses or struggles to go to bed at the right time or wakes up several times during the course of sleep, these practices may result in neurobehavioural functioning problem. On a greater part, it may affect the *Effective Functioning* (EF) in his/her prime developmental age. Thus, this study considers a progressive approach to sleep difficulties in children of this age group and their poor EF performance along with several other neurobehavioural functioning, are vulnerable to unmanaged sleep issues. Further, the EF measure is progressive and thus continuum across the lifespan of an individual and can be improved at any time over the course of a person's life. These cognitive processes can be adversely affected by multifarious and infinitely complex factors. Here we shall singularly consider the sleep problems in the children of the period pre-scholar (2-5yr) to a school aged (6-12 yr) children, where each period is a continuum. Both, neuropsychological tests and rating scales are used to measure executive functions. They are usually performed as part of a more comprehensive assessment to diagnose neurological and psychiatric disorders.**

Keywords **- Neurobehavioral functioning, Sleep resistance, Executive functions, Synaptogenesis.**

I. INTRODUCTION

Executive functions are inferred as a set of cognitive processes that are indispensable for the cognitive control of behavior that enables selecting and successfully monitoring behaviors that smooth the progress of the attainment of chosen goals. EF involves basic cognitive processes such as attention, cognitive flexibility, inhibitory control, cognitive inhibition and working memory. For children, sleep is essential for overall mental and physical development. Inadequacy of sleep can potentially affect the emotional, behavioural, cognitive, and entire health outcomes. It can put children at risk for poor sleep quality, impairing their subsequent cognitive abilities and affect neuro-functions associated with working memory.

The current study hypothesizes that sleep quality would be more strongly associated with EF skills for children from pre-schooling to school children (upto the age of 12). Between 20% and 30% of 2- to 5-year-old children suffer regular sleep difficulties, i.e., *bedtime problems*, or through the sleeping i.e., *night waking*. About 11% to 15% of school-age children (6-12 years), experience behavioral sleep problems compared to preschool children, but these problems still occur [5,6]. Behavioral sleep problems result in reduced sleep duration and/or sleep breakup, leading to varying degrees of chronic sleep restriction. through population-based studies, there is a need to determine how these prevalent sleep disruptions might affect children during the course of development, and at some point, there is a need to better understand the impact of sleep on children's neurobehavioral functioning.

II. SLEEP PROBLEMS AND EARLY CHILDHOOD

The amount of effect of may continue to vary with age, because neurological functioning and sleep patterns also change noticeably during the child development. the study proposes to examine from cognitive developmental psychology and neuroscience, as well as pediatric sleep study to demonstrate how, specifically, executive functioning skills (EFS), is negatively influenced by ill-patterned sleep.

Study analyses various reasons, a child may resist sleep. Going on to say he may not feel comfortable to sleep alone or he may fear any nightmare. Young children may suffer night waking and may not be able to easily go to sleep, without parents support. These may result in short sleep hours of the children. There have been reported attention hyperactivity disorder (ADHD), day time sleepiness, early morning waking (ASD), oppositional, mood problems and impaired memory as well, due to impaired and sleep disruptions, in children. Also, nighttime sleep results in an effective daytime functioning, as well along with more specific neurobehavioural impact in school aged children and toddlers [7].

There is evidential research of weak performance and attention, and a sustained sleep benefits in a population of children with ADHD and ASD or any serious issues. EF shows continued development into early adulthood [8]] and a greater capacity to withstand delays with increasing age. For example, the protracted cognitive developmental changes are thought to be associated with age-related changes in the structural and functional organization of lateral prefrontal cortex. By almost any anatomical or functional metric, including cortical thickness, regional volume, resting metabolism, and rate of synaptogenesis, the lateral prefrontal cortex is among the slowest developing regions of cortex. Adult neuro-imaging and neuropsychology studies suggests that These changes in structure in a region of the brain can be well linked with EF. The behavioral sleep problems rise in frequency at a point in development of the capacity for behavioral self-regulation and associated neural circuitry undergo rapid age-related change. These factors are prompting reasons for closer consideration of children's sleep and their neurobehavioral development to be related.

III. SLEEP VS EF AND DEVELOPMENT

The Behavioral sleep problems are most prevalent at the time when there are rapid age-related changes. Children's self-regulatory abilities develop at the same age. These self-regulatory abilities are a set of processes that guide perception, emotion, and action, in situations marked by distraction, novelty, or stress [9] for the parents, where both members work, till the end of the day, drive straight to pick up their children from boarding schools. They may even have to first stop and buy food for dinner and before they pick up their children. This ability as a habit draws on the executive functions and helps us to formulate and maintain plans while overcoming any learned habits and powerful emotions.

In a variety of simple laboratory tasks, we witness that Executive functions (EF) are profoundly underdeveloped in preschool-aged children. For example, in a multi-location search task, a 2- year-old child retrieves a small reward hidden in 1 of 3 different hiding locations. On the first trial, he does it very well, but, later when the reward is hidden at a new location, the child by repeatedly struggle searching for the reward at the first location. Thus we see that Instead of adopting the new rules, he persists on using the old rules, itself. Thus, his difficulties pertain to the regulatory demands of the task. He has a little trouble learning to find hidden.

These tasks assess self-regulation under conditions in which motivation is enhanced and emotions are aroused. Strong emotional responses may make it more difficult to use EF skills to act in socially appropriate ways and may lead children to act in ways they know are "wrong" (e.g., a child may fail to wait his/her turn in a game when excited, even when he/she knows the rule and will wait in other situations). As illustrated by better performance in rule-use tasks, EF shows continued development into early adulthood, and a greater capacity to withstand delays with increasing age. These cognitive developmental changes are related with age-related changes [10].

These developmental changes in structure occur in a region of the brain that is well-known from adult neuro imaging and neuropsychology studies linked with EF. For example, Lateral prefrontal cortex tends, to be more active that require response inhibition and mental elasticity. On the same hand, damage or dysfunction in lateral prefrontal cortex leads to pronounced performance deficits in inhibitory control and mental flexibility.

Thus, it is a fact that behavioral sleep problems occur with great frequency at a point when age-related change calls for children's sleep and their neurobehavioral development is related.

IV. CHILD SLEEP AND EF DEVELOPMENT: A NECESSITY

Several associations between behavioral sleep problems and EF in early development suggest a number of research directions useful for closer empirical examination. By designing studies on the childhood sleep problems and EF function in multidisciplinary teams, Child development can be measured from many perspectives. It can be behavioral, social, cognitive, neurological, physiological, and emotional. Sleep as a complex process is studied with different approaches to bring together evidence from the neurological, pediatric sleep, and child cognitive-developmental literatures. Fundamental associations between behavior and sleep problems have now been well established. Still we need to advance our knowledge based on the evidence of other fields to research associations and study *how* and *why* sleep problems impact child functioning. The underlying mechanisms EF skills and sleep are important conclusion for the upcoming scholars and researchers. These skills affect child's everyday performance and self-regulation, and resulting to course of development, or else these skills are vulnerable to inadequate sleep. It's evident that an optimal sleep plays in maintaining behavioral control through. Further relational study between EF and sleep in early childhood is necessary, as to explain how inadequate sleep affects children's ability to function adaptively.

V. CONCLUSION

With a gathering high pace of technology Advancement a moribund life, in modern society have critical impact on sleep in even humans of all ages. Taking of the children in industrialized countries are now sleeping less than their preceding generations [11]. The universal issue of screen technology-television and mobiles sufficiently play a vital role in washing away the overall sleep times in new children.

The practice of late to bed and late to rise results in affected sleep duration, especially in children makes it more disguising a factor that bless a poor health, and mental development. On the other hand, the children who spend a good time towards sleep and doing cognitive skills and self-regulation activities are developing well. It thus, signifies that sleep serves a number of vital functions that support every neurological development. Finally, to the guardians of children, the more they know about the specific functions of sleep in children, the better they can encourage the timely treatment of underlying sleep problems and procure a safe childhood.

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