

## Sleep Disorders in Children: The Singapore Perspective

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### Abstract

This review article summarises the current available literature on sleep patterns and sleep problems in Singapore children. Co-sleeping is a culturally dependent practice and its prevalence in Singapore has been determined to be 73%. Co-sleeping is not associated with significant sleep problems in Singapore children. Snoring and habitual snoring occur in 28.1% and 6.0% of Singapore children, respectively. Habitual snoring in Singapore children was significantly associated with obesity, allergic rhinitis, atopic dermatitis, maternal smoking and breastfeeding. Atopy was the strongest risk factor for habitual snoring in Singapore, and the effect was cumulative. Children attending psychiatric services in Singapore may also have sleep disorders, the highest prevalence being in children with attention deficit hyperactivity disorder. The knowledge on childhood sleep disorders (including obstructive sleep apnoea) amongst the public, patients, parents and future doctors in Singapore are inadequate and there is an urgent need for increased education in this area given the importance of good sleep in children. There is also a need to change parental attitudes about sleep disorders and encourage early medical consultation.

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### Introduction

Sleep problems are common in children.<sup>1,2</sup> For example, snoring occurs in more than 25% of Singapore children<sup>1</sup> and obstructive sleep apnoea (OSA) occurs in 1% to 3% of children.<sup>2</sup> The majority of sleep disorders in children are treatable. These include medication for narcolepsy, surgery for OSA, and behaviour therapy for night wakings. Many sleep disorders are also preventable with parental education on normal sleep and sleep hygiene.

Sleep is essential for the cognitive and behavioural development of a child. For example, OSA in children affects cognition, behaviour and school performance in children by the process of sleep fragmentation and/or intermittent hypoxaemia.<sup>3</sup> OSA may be the cause for mild attention deficit and hyperactivity symptoms and children with mild attention deficit/hyperactivity should be screened for symptoms of OSA.<sup>4</sup> Following tonsillectomy and adenoidectomy for OSA, children show normalised sleep and respiratory patterns and improved cognitive scores.<sup>5</sup> However, the neurocognitive morbidity may be only partially reversible and a “learning debt” may develop with sleep disordered breathing during early childhood and hamper subsequent school performance.<sup>6</sup>

### Sleep Patterns in Singapore Children

Co-sleeping, or bed sharing, is an accepted cultural and parenting practice in many societies.<sup>7</sup> However, in other cultures, co-sleeping may be a parental response to sleep problems<sup>8</sup> or medical problems<sup>9</sup> in children. Schachter et al<sup>10</sup> sampled 175 cultures and determined that the co-sleeping prevalence in early childhood was markedly different between different cultures and ranged from 10% to 100%.

Mahendran et al<sup>11</sup> undertook a study to determine the prevalence of co-sleeping and sleep problems among a cohort of children and adolescents seen in a child guidance clinic (CGC) in Singapore. The study was conducted in the CGC, which is the largest centre providing psychiatric assessment and treatment for children and adolescents with a wide range of emotional and behavioural conditions in Singapore. Six hundred parents who attended the CGC for the first time were invited to participate and 477 consented, giving a response rate of 79.5%. The mean age (SD) of the children was 10.1 (3.6) years (range, 2 to 19). One hundred and thirty children (27.3%) slept alone but the majority (347, 72.8%) of the children co-slept. The children who co-slept were significantly younger and there was a decrease

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in the practice with increasing age. Sleep starts were reported in 24% of those who co-sleep and in 35.4% of those sleeping alone. More incidences of nightmares ( $P = 0.025$ ) were reported in children who slept alone (44.6%) than in those who co-slept (35.5%). There were no other significant sleep disorders associated with co-sleeping.

The authors concluded that co-sleeping was not associated with significant sleep problems in their Singapore cohort. Co-sleeping may have been initiated in response to an existing sleep problem but eventually resolved the problem. If co-sleeping was not permitted, the sleep problem could be compounded, giving rise to a higher prevalence of sleep starts and nightmares among those in the cohort who slept alone.

### Sleep Disorders in Singapore Children

OSA is a common and important disorder in children. Symptoms include habitual snoring and disturbed sleep. As genetic factors (ethnicity) have been implicated as risk factors for OSA,<sup>12</sup> different societies have performed separate studies to determine the prevalence of snoring, habitual snoring and OSA in their populations.<sup>13-19</sup>

Chng et al<sup>1</sup> performed a large population study to determine the prevalence and factors associated with snoring and habitual snoring in Singapore children. A self-response questionnaire on snoring was administered to parents of children aged 4 to 7 years old in randomly selected preschools and primary schools in Singapore. The overall response rate was 91.3% ( $n = 11,114$ ). Snoring and habitual snoring were reported in 28.1% and 6.0% of the children, respectively. The 28.1% prevalence of snoring in Asian children is comparable to the prevalence from Western studies, with estimates ranging from 16.7% to 30.6%.<sup>13,15,17,19</sup> The 6.0% prevalence of habitual snoring in Asian children is comparable to the prevalence from Western studies, with estimates ranging from 3.2% to 12.1%.<sup>13-19</sup>

Snoring was significantly more prevalent among Chinese, followed by Malays and then Indians. However, there was no significant difference in habitual snoring between races. This lack of relationship between habitual snoring and race is in disagreement with the findings from Western populations. Redline et al<sup>12</sup> reported that African American children were 3.5 times more likely to have sleep-disordered breathing than white American children. Chng et al postulated that Chinese, Malays, and Indians may be less genetically heterogeneous than African and white Americans; this may explain the inability to document a racial difference in habitual snoring in the study.

On multivariate logistic regression analysis, snoring in Singapore school children was significantly associated with male gender, race, atopy (asthma, allergic rhinitis, or atopic dermatitis), maternal atopy (allergic rhinitis or atopic

dermatitis), maternal smoking and breastfeeding. Habitual snoring was significantly associated with obesity [odds ratio (OR), 3.75; 95% confidence interval (CI), 1.67-8.42], allergic rhinitis (OR, 2.90; 95% CI, 2.06-4.08), atopic dermatitis (OR, 1.80; 95% CI, 1.28-2.54), maternal smoking (OR, 2.22; 95% CI, 1.09-4.53), and breastfeeding (OR, 1.49; 95% CI, 1.11-1.98). Atopy was the strongest risk factor for habitual snoring, and the effect was cumulative. The OR of a child with all 3 atopic diseases (asthma, allergic rhinitis, and atopic dermatitis) to have habitual snoring was 7.45 (95% CI, 3.48-15.97).

The above study concluded that snoring and habitual snoring are common in Asian children. Atopy was strongly associated with snoring and habitual snoring. The authors suggested that children who are significantly atopic receive additional attention during screening for snoring, habitual snoring, and other features of obstructive sleep apnoea syndrome.

It is known that children with psychiatric disorders are likely to experience sleep difficulties.<sup>20</sup> The 3 groups of children who have persistent sleep problems seen most commonly in psychiatric practice are children who have attention deficit hyperactivity disorder, autism, and mood/anxiety disorders.<sup>20</sup>

Mahendran et al<sup>21</sup> undertook a study to ascertain the prevalence of sleep problems in children and adolescents attending psychiatric services in Singapore and to identify the correlates of sleep problems in this population. Four hundred and ninety of 600 parents accompanying their children to the CGC consented to complete a questionnaire, which was used to collect both sociodemographic data and the frequency of sleep problems. These included sleep starts, confusional arousal, sleep talking, bruxism, sleep-walking, sleep terrors, nightmares, sleep paralysis and nocturnal enuresis. Psychiatric diagnosis was determined from case record survey of the participating subjects.

62.2% (95% CI, 57.8-66.6) of the children suffered from at least 1 problem. Girls were significantly more likely to suffer from sleep problems when compared with boys ( $P < 0.005$ ). There were significant gender differences associated with 2 sleep problems; while girls suffered significantly more from nightmares ( $P < 0.005$ ) when compared with boys, boys suffered significantly more from nocturnal enuresis ( $P < 0.005$ ).

The highest prevalence of sleep problems was reported in children diagnosed to suffer from ADHD; 77.3% suffered from any 1 sleep problem. Children diagnosed with developmental disorders that included ADHD, autism and speech problems suffered significantly more from sleep problems when compared with children suffering from other disorders ( $P = 0.04$ ). The significant predictors obtained from a logistic regression modelling were female

gender (OR = 2.0), diagnosis of developmental disorders (OR = 1.8) and a family history of sleep problems (OR = 3.7).

The authors in the above study highlighted the need for child and adolescent psychiatrists to enquire about sleep problems. Clinicians should also be alert to signs of attendant psychiatric disorders in children suffering from sleep problems. While it is possible that treating the sleep problem may eliminate behaviour problems in some children, the underlying psychiatric condition in others may provide explanation for the sleep disorder.

It is important to note that quality of life (QoL) improves after treatment of childhood sleep disorders. Chng et al<sup>22</sup> evaluated the QoL before and after surgery in children in Singapore with OSA. The validated QoL survey of OSA, the OSA-18 form, was used in children with OSA proven by nocturnal polysomnography and who received tonsillectomy with/without adenoidectomy. Cases with underlying craniofacial, metabolic or other abnormalities were excluded. The study found that there was a moderate to large impact on QoL in 85% of children with nocturnal polysomnography-proven OSA. Postoperatively, there was significant improvement in global QoL after curative surgery for childhood OSA. There were also significant improvements in all domains of QoL, except for emotional symptoms. Improvements were largest in the domains of sleep disturbance, and caregiver concerns.

### Knowledge and Attitudes of Sleep Disorders

There have been several studies conducted in Singapore on the knowledge and attitude of the public, parents, patients and medical students on childhood sleep disorders.

Chng et al<sup>23</sup> surveyed 1950 parents of children aged 7 to 8 years old in randomly selected primary schools in Singapore. One thousand seven hundred and sixty-two responses were returned, giving a response rate of 90.3%. Of the parents surveyed, only 13.5% had heard of OSA syndrome.

Tang et al<sup>24</sup> evaluated the knowledge of patients and caregivers in Singapore attending a paediatric OSA clinic. Only 50.8% had heard of obstructive sleep apnoea hypopnea syndrome (OSAHS) with the majority from medical professionals, friends and relatives. Knowledge score prior to education was poor with a mean of  $12.3 \pm 9.9$  out of a maximum of 45. Knowledge of OSAHS was most deficient in the risk factors for the disease. Also, the majority did not know that a child with OSAHS may appear well with a normal history and physical examination. Score was significantly related to whether one knew someone with the disease. The majority knew that snoring is a symptom of OSA but thought that it could be normal, though most would consult the family doctor or sleep specialist if

snoring was loud and habitual. Only 62.8% would agree to a sleep study if recommended.

Soh et al<sup>25</sup> performed a study to determine the attitudes of parents in Singapore to childhood sleep disorders. A questionnaire survey was administered to 300 parents of children who were attending the paediatric specialist outpatient clinics. Only 69.2% of parents would bring their child to consult with a doctor if they thought their child had OSA, whilst the remainder chose to observe their child or to seek alternative therapy.

The above 3 studies suggest that knowledge on childhood sleep disorders (including OSA) amongst the public, patient and parents in Singapore can be improved. There is also a need to change parental attitudes about sleep disorders and encourage early medical consultation.

Mahendran et al<sup>26</sup> conducted a study to assess the knowledge of medical students in Singapore on sleep medicine. Two hundred and forty (96%) of 250 medical students consented to taking part in the study and were surveyed over a period of 2 years. The MED Sleep Survey, which is an inventory to assess behaviour, attitudes and knowledge about sleep, was used for the survey. There were 149 male and 91 female medical students. In terms of their basic sleep knowledge, 46.7% scored between 1 and 10 points, 51.7% scored between 11 and 20 points, and 1.7% scored between 21 and 30 points. There was no significant difference between the different groups in their scores on basic sleep knowledge. This last study reflects the deficiency in knowledge on sleep medicine amongst our future doctors and highlights the need for including sleep medicine education in the medical students' curriculum.

### Conclusions

Sleep problems, including snoring and habitual snoring, are common in Singapore children. Singapore children who have psychiatric disorders may also have sleep disorders. The knowledge and attitudes of the public, parents, patients and future doctors in Singapore towards sleep disorders are inadequate and there is an urgent need for increased education in this area given the importance of good sleep in children.

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