

BIBLIOGRAPHIC INFORMATION SYSTEM

Journal Full Title: Journal of Biomedical Research & Environmental Sciences

Journal NLM Abbreviation: J Biomed Res Environ Sci

Journal Website Link: <https://www.jelsciences.com>

Journal ISSN: 2766-2276

Category: Multidisciplinary

Subject Areas: Medicine Group, Biology Group, General, Environmental Sciences

Topics Summation: 128

Issue Regularity: Monthly

Review Process type: Double Blind

Time to Publication: 7-14 Days

Indexing catalog: [Visit here](#)

Publication fee catalog: [Visit here](#)

DOI: 10.37871 ([CrossRef](#))

Plagiarism detection software: iThenticate

Managing entity: USA

Language: English

Research work collecting capability: Worldwide

Organized by: [SciRes Literature LLC](#)

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RESEARCH ARTICLE

Sleep Patterns and Sleep Difficulties among Saudi Children in Tabuk City

Nazim Faisal Ahmed¹, Laila A Suleiman AlBishi^{2*}, Weded E Albalawi³ and Abrar A Alatawi³

¹Consultant of Pediatrics, Endocrine, King Fahd Specialized Hospital, Tabuk, Saudi Arabia

²Consultant Pediatric Endocrinologist, Pediatric Department, Faculty of Medicine, University of Tabuk, Saudi Arabia

³Faculty of Medicine, University of Tabuk, KSA, Saudi Arabia

ABSTRACT

Introduction: Sleep difficulties are common among children and are pointers to serious physical and mental disorders studies on the same lacks in Saudi Arabia. This is the first study to include children 1-11 years of age. Thus, we aimed to assess the variable sleep patterns and sleep disorders in Saudi children.

Methods: This is a cross-sectional study that enrolled 188 children (1-11 years) from the waiting area in the pediatric outpatient clinic at Maternity and Children Hospital, Tabuk city, Kingdom of Saudi Arabia. The study was conducted in October 2018. A structured questionnaire based on the children's sleep habits was distributed to the parents via one-to-one interview. In the questionnaire, each item described their child's behavior for the recent week's sleep pattern.

Results: There were 188 children, ages 1-11 years. The most common sleep problem was sleep-related anxiety (81.5%) followed by sleep resistance (59.8%) and night waking (56.0%). The least common was sleep-disordered breathing which was observed in 28.3% of children.

Conclusion: Sleep problems were prevalent among children in Tabuk City, Saudi Arabia. The most common sleep problem was sleep-related anxiety followed by sleep resistance and night waking. The least common was sleep-disordered breathing which was observed in more than a quarter of children. Further larger multi-center studies are needed to assess and address the causes of sleep problems.

Introduction

Undoubtedly, sleep plays an important role in children's physical fitness, behavior, and emotional development, as well as in cognitive functioning, learning, and attention [1]. Poor and insufficient sleep duration and quality can lead to significant short and long-term sequelae such as excessive daytime sleepiness, poor academic performance [2], hyperactivity, and an increased vulnerability to accidents or injuries [3]. Sleep problems are prevalent in children, especially among school-aged children, and are reported as 30-62%. Necessitating that Pediatricians should anticipate, recognize, and treat most sleep problems and refer them to a specialist when needed [4].

Sleep behavior such as parasomnias, sleepwalking, sleep talking, and confusional arousals tend to happen mainly early in the night, while nightmares occur late in the night. Behavioral insomnia is characterized

*Corresponding author(s)

Laila A Suleiman AlBishi, Consultant Pediatric Endocrinologist, Pediatric Department, Faculty of Medicine, University of Tabuk, Saudi Arabia

Tel: +966-500-711-130

Email: lalbishi@ut.edu.sa

DOI: 10.37871/jbres1707

Submitted: 15 March 2023

Accepted: 29 March 2023

Published: 30 March 2023

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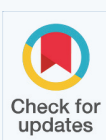
Keywords

- Sleep patterns
- Sleep-related difficulties
- Children
- Saudi Arabia

MEDICINE GROUP

SLEEP DISORDERS

VOLUME: 4 ISSUE: 3 - MARCH, 2023



How to cite this article: Ahmed NF, Suleiman AlBishi LA, Albalawi WE, Alatawi AA. Sleep Patterns and Sleep Difficulties among Saudi Children in Tabuk City. 2023 Mar 30; 4(3): 535-542. doi: 10.37871/jbres1707, Article ID: JBRES1707, Available at: <https://www.jelsciences.com/articles/jbres1707.pdf>

by the inability to fall asleep. Delayed sleep time disorder is defined as difficulty in falling asleep and is common in adolescence. There is a wide variation in sleep behavior among the children population which might be due to cultural or genetic differences [5]. Parents usually underreport sleep difficulties in their children worldwide. Sleep problems varied widely ranging from transient benign behavioral problems to more persistent and severe conditions such as sleep apnea syndromes [6,7].

The relationship between age, sex, and sleep problems was discussed controversially, some reported no sex difference, and oppositely, some reviews reported more frequent sleep problems among girls than boys [8,9].

In Saudi Arabia, studies on sleep problems among children lack. A recent study showed that the most common sleep problems in children were difficulty getting out of bed in the morning (63.1%), sleeping too little (40.2%), and restless sleep (34.4%) in which a conclusion raised that sleep problems are prevalent among 94.4% of 5-13 age school-aged children [10]. This is the one of the few studies to assess sleep problems in children in Tabuk City, Saudi Arabia. Therefore, the present study aimed to investigate sleeping patterns, determine the prevalence of sleep-related problems, and analyze the effects of age, gender, and Socioeconomic Status (SES) on sleep habits and sleep-related problems among children from the age of 1-11year.

Methods

Sample

This is a cross-sectional study that enrolled 188 children from the waiting area in the pediatric outpatient clinic at Maternity and Children Hospital (MCH), Tabuk city, Kingdom of Saudi Arabia. The inclusion criteria were: children from 1-11 years, of Saudi origin, and living in Tabuk city. Those who are known to have medical or psychiatric problems and/or are on chronic medications were excluded from the study. The study selected the parents' children and specifically requested them to involve their healthy children, not the ones who is visiting the clinic at the time of recruitment. The questionnaire was answered by the child's parent or guardian after asking their permission to participate in the study. The study used one-to-one interview questionnaire items done by trained medical students in the pediatric clinic daily (5 days a week from 8-12 PM and 1- 4 PM) for one month in October 2018. A questionnaire consists of 2

types: a multiple choice of always (5-7), sometimes (3-5), and never (zero) with scoring marks of 1, 2, and 3 respectively. The other type of question is an open question for a quant. A total of 190 parents requested to answer the questions.

Measure

The study interview used the children's Sleep Habits Questionnaire (CSHQ) checklist which involved a 45- item parent questionnaire focusing on sleep behavior in children and was used in many studies worldwide(add references). CSHQ is designed primarily to be a screening tool to delineate sleep habits and identify problematic sleep domains in school-aged children. The sleep domains are reflected in eight of the CSHQ subscales. The CSHQ domains used in the study are 1) bedtime resistance, 2) sleep onset delay, 3) sleep duration, 4) sleep anxiety, 5) night walking, 6) sleep-disordered breathing, 7) parasomnias, and 8) daytime sleepiness. In addition, demographic data such as age, sex, and socioeconomic status (focused mainly on the level of education and accommodation area) were added. For each question, parents' answers are given a three-point scale for each behavior as "rarely" (0-1 times), "sometimes" (2-4 times), or "usually" (5-7 times) per week. The scoring of some items reversed (items 1, 2, 3, 10, 11 and 26) indicating higher score for a more disturbed sleep. The subscales are Bedtime Resistance (Q 1, 3, 4, 5, 6 and 8), Sleep Onset Delay (Q 2), Sleep Duration (Q 9, 10 and 11), Sleep Anxiety (Q 5, 7, 8 and 21), Night Wakings (Q 16, 24 and 25), Parasomnias (Q 12, 13, 14, 15, 17, 22 and 23), Sleep-Disordered Breathing (Q 18, 19 and 20) and Daytime Sleepiness (Q 26, 27, 28, 29, 30, 31, 32 and 33). Parents requested to recall their sleep patterns over one month in which they were also asked to state their habitual bedtime, the morning wake-up time, and the usual sleep duration (day and night).

Ethical approval

Ethical permission for this study was granted by the Ethics Committee of the ministry of health at Tabuk city (IRB Protocol No: TU-077/022/172). The approval included the research protocol data, collection sheets that constitute the consent for participant agreement progress, and the final report submitted at the end of the study.

Statistical analysis

The different types of sleep patterns encompassed within the groups of items used to measure the eight domains of sleep-related difficulties with the CSHQ

were compared by examining the grouped median scores. Each Median (Mdn) score represented the 50th percentile, implying that the score for 50% of the respondents was below the median, whilst the score for 50% of the respondents was above the median. The 95% CI reflected the uncertainty of the median scores, with the widest CI reflecting the highest level of uncertainty. However, most of the CI was narrow, implying that most of the items appeared to be reliably measured. Some of the 95% CI captured zero, implying that in at least 95 out of 100 cases, the response was “Never”.

The demographic and categorical variables measured with the CSHQ measured with single items. Other variables operationalized by aggregating the 4-point item scores for the groups of two to seven items used to measure seven dimensions of sleep difficulties, where: 0 = Never, 1 = one or two times per week; 2 = three or four times and week; and 3 = five to seven times per week. Daytime sleepiness was measured with a 3-point scale, where: 0 = Awake; 1 = Sleepy; 3 = Asleep. Each group of item scores was averaged to create a continuous or interval level scale with an adequate to a good level of internal consistency reliability (Cronbach’s alpha = 0.61 to 0.80). Higher scores indicated that the children experienced a greater frequency of sleep-related difficulties.

The different types of sleep patterns encompassed within the groups of items used to measure the eight domains of sleep-related difficulties with the CSHQ were compared by examining the grouped median scores. Each median (Mdn) score represented the 50th percentile, implying that the score for 50% of the respondents was below the median, whilst the score for 50% of the respondents was above the median. The 95% CI reflected the uncertainty of the median scores, with the widest CI reflecting the highest level of uncertainty. However, most of the CI was narrow, implying that most of the items appeared to be reliably measured. Some of the 95% CI captured zero, implying that in at least 95 out of 100 cases, the response was “Never”.

The data analysis was conducted using IBM SPSS v. 24.

Results

The total number of respondents was $n = 189$ of which $n = 5$, 2.7% of respondents failed to complete the CSHQ. All respondents providing missing values were excluded so that the sample size was reduced

to $n = 184$. The proportion of male children ($n = 100$, 54.4%) is slightly more than female children ($n = 84$, 46.6%) (Table 1). The children ranged in age from 1 to 11 years (Mean = 6.13, 95% CI = 5.78, 6.47). The ages of the male children (Mean = 5.95, 95% CI = 5.47, 6.43) overlapped with the ages of the female children (Mean = 6.33, 95% CI = 5.83, 6.83).

Tables 2,3 present the ranked median item scores measuring the eight domains of sleep-related difficulties. Bedtime resistance item showed that the three most frequent patterns of resistance (between one and four times a week) were: the child needs to have parents or someone in their place (Mdn = 1.82); the child fears sleeping alone (Mdn = 1.56), and the child fears sleeping in the dark (Mdn = 1.64). However, the daytime sleepiness item pointed out that the child tended to look sleepy while riding care (Median =

Table 1: Demographical and categorical variables measured with single items.

Domain	Variable	Number of Items	Measures
1	Age of children	1	Years
3	Gender of children	1	1 = Male; 0 = Female
4/Sleep duration per day including naps	How long does the child sleep per day?	1	Hours
5/Waking up	Time after 5 am when the child wakes up	1	Hours
6/Amount of Sleep	How often will the child’s sleep be sufficient and well (the right amount?)	1	0 = Never; 1= One to two times a week; 2 = Three to four times a week; 3 = Five to seven times a week

Table 2: Sleep-related difficulty scales measured by averaging groups of item scores.

Sleep-related Difficulty Scale	Number of Items	Cronbach’s Alpha
Bedtime resistance	6	0.75
Daytime sleepiness	2	0.62
Night waking	3	0.62
Parasomnia	7	0.68
Sleep-disordered breathing	3	0.80
Sleep onset delay	3	0.60
Sleep-related anxiety	6	0.68
Total sleep-related difficulties	30	0.77

Table 3: Ranked median item scores used to measure the eight domains.

Item	Median	95% CI	
Bedtime Resistance			
How many times does the child need to have parents or someone in their place so he can sleep	1.82	1.50	1.85
How often does the child fear sleeping alone?	1.56	1.36	1.71
How often does the child fear sleeping in the dark?	1.47	1.28	1.64
How often does the child resist staying in his bed (crying, refusing to stay in bed, etc.)	1.24	1.14	1.46
How often does the child sleep in the parent's bed or their place?	0.88	0.43	1.27
Daytime Sleepiness			
Last week, how did your child look while riding a car?	0.63	0.49	0.79
Last week, how did your child seem to be watching TV?	0.45	0.33	0.59
Night Waking			
How often does the child wake up once a night?	1.16	1.05	1.29
How often does the child move to another bed (parents or non-residents)	0.79	0.52	1.12
How often does the child wake up more than once at night?	0.76	0.73	0.99
Parasomnia			
How often the child moves and is anxious during sleep?	1.39	1.28	1.53
How often does the child speak during sleep?	0.80	0.76	1.02
How often does the child wake up during the night by screaming, sweating, or wailing?	0.54	0.00	0.76
How many times does the child wake up terrified of nightmares or scary dreams?	0.56	0.00	0.75
How often does the child urinate involuntarily while sleeping?	0.43	0.00	0.51
How often does the child push teeth during sleep (a dentist may tell you this)?	0.28	0.00	0.51
How often does the child walk while sleeping at night?	0.13	0.00	0.24
Sleep Duration			
How often do you have very little sleep?	2.50	2.37	2.57
How often will the child's sleep be the right amount?	1.18	1.08	1.31
Sleep Disordered Breathing			
How often does the child snore or cough during sleep?	0.67	0.00	1.00
How often does the baby snore during sleep?	0.51	0.00	0.78
How often does the child's breathing stop during sleep?	0.12	0.00	0.28
Sleep Onset Delay			
How many times does the child sleep alone in his bed?	3.22	3.06	3.37
How often does the child go to bed at the same time?	3.00	2.86	3.14
How often does the child sleep 20 minutes after arriving in bed?	0.93	0.80	1.05
Sleep-Related Anxiety			
How many times does the child wake up by himself?	1.74	1.60	1.88
How often does the child wake up in a bad mood?	1.38	1.26	1.49
How often do parents wake up or in their place the child sleeps	1.55	1.39	1.70
How often does the child have difficulty getting up from bed when waking up?	1.30	1.15	1.45
How often do you show signs of fatigue and fatigue on the child	1.26	1.13	1.38
How many times when waking up take the child a long time to be in full consciousness	1.15	1.01	1.29

0.63).

Night waking items showed that the most frequent pattern of waking up was once a night, which occurred between one and four times a week (Mdn = 1.16). Parasomnia item showed that the most frequent parasomnia between one and four times a week, was the child moving and being anxious during sleep (Mdn = 1.39) followed by speaking (Mdn = 0.80); waking up screaming, sweating, or wailing (Mdn = 0.54); waking

up with nightmares or scary dreams (Mdn = 0.56) in sleep less than one or two times a week.

For the sleep duration item, 50% of the parents thought that their child slept very little sleep for more than three to four times a week (Mdn = 2.50) and 50% of the parents believed that their child slept the right amount for more than one or two times a week (Mdn = 1.15).

Sleep-disordered breathing showed that the child snored or coughed during sleep for less than one or two times a week (Mdn = 0.67); the baby snored during sleep for less than one or two times a week (Mdn = 0.52) and the least frequent pattern was the child's breathing stopped during sleep (Mdn = 0.12).

Regarding the sleep onset delay item, 50% of the children slept in their bed (Mdn = 3.22), and went to bed at the same time (Mdn = 3.00) for more than five to seven times a week; however, 50% of the children did not sleep within 20 minutes of going for less than one or two times a week (Mdn = 0.93).

Sleep-related anxiety showed that the three most frequent patterns of sleep-related anxiety (between one and four times a week) were: the child waking up by himself (Mdn = 1.74); parents waking up or in their place when the child sleeps (Mdn = 1.55), and the child waking up in a bad mood (Mdn = 1.38). Less frequent symptoms of sleep-related anxiety included the child having difficulty getting up from bed (Mdn = 1.30); the child showing signs of fatigue (Mdn = 1.26), and the child taking a long time to be in full consciousness (Mdn = 1.15).

Prevalence of sleep-related difficulties

Figure 1 displays the normal frequency distribution of the average scores for the CSHQ items, reflecting the prevalence of sleep-related difficulties in the sample of Saudi children.

The average scores for the 30 items ranged from 0.3 to 2.2 (Mean = 1.02; 95% CI = 0.97, 1.07) implying that, on average, the children experienced sleep-related difficulties one or two times a week. The scores ranging from 0.3 to 0.9 (n = 82, 44.4%) indicated that, in under half of the sample, the average frequency of sleep-related difficulties was less than one or two times a week. The scores ranging from 1.0 to 2.2 indicated that in the majority of the sample (n = 102, 55.6%) the average frequency of sleep-related difficulties was up to three or four times a week. This finding supports H1: Sleep disorders are prevalent among Saudi children [10,11].

Table 4 presents the frequency distributions of the prevalence of sleep-related difficulties based on the scores for seven domains measured with the CSHQ. The most prevalent difficulties, (indicated by average scores ranging from 1.0 to 2.2) reported

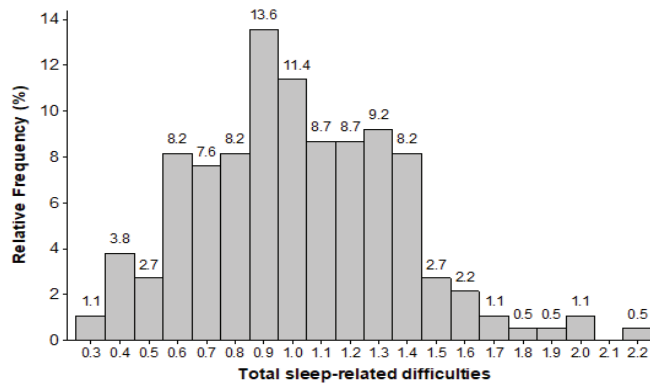


Figure 1 Frequency distribution of average scores for total sleep-related difficulties.

Table 4: Prevalence of Sleep-Related Difficulties.

Scale	Average score			
	0.0 to 0.9		1.0 to 2.2	
	n	%	n	%
Sleep-related anxiety	34	18.5%	150	81.5%
Bedtime resistance	74	40.2%	110	59.8%
Night waking	81	44.0%	103	56.0%
Sleep onset delay	99	53.8%	85	46.2%
Daytime sleepiness	105	57.1%	79	42.9%
Parasomnia	128	69.6%	56	30.4%
Sleep-disordered breathing	132	71.7%	52	28.3%

in over one-half of the sample, were sleep-related anxiety (81.5%); bedtime resistance (59.8%); and night waking (56.0%). The less prevalent sleep-related difficulties, reported in less than one-half of the sample, were sleep onset delay (46.2%); daytime sleepiness (42.9%); parasomnia (30.4%); and sleep-disordered breathing (28.3%).

Discussion

The current data showed that from 28.3% (sleep-disordered breathing) up to 81.5% (Sleep-related anxiety) of children in Tabuk City, Saudi Arabia were suffering from sleep problems.

A recently published study showed that 4-11% of children in Spain were suffering from sleep-disordered breathing (SDB). Importantly, SDB was negatively associated with academic grades [12]. The current results were nearly triple (28.3% of children had SDB). An urgent interventional measure is needed to investigate the causes of SDB in Tabuk City and introduce timely management. Internet addiction and high body mass index are important associations of SDB that can be addressed and prevented [13]. In the present study, night awaking was reported in 56% of children, a previous study published in Riyadh Saudi Arabia [10] found lower rates (22.1%). Participants' age and the small sample of the previous study are plausible explanations for the observed discrepancy. Daytime sleepiness was found in 42.9% of the present sample and was higher than Alafifi N [10] study, which reported a prevalence of 35%, while a study conducted in China [14], found higher rates (75.3%). However, bedtime resistance, sleep anxiety, and sleep onset delay were higher among the current sample (59.8% versus 47.2%), 81.5% versus 54.3%, and 45.2% versus 22.2% respectively. Interestingly, parasomnia was higher among the Chinese results (55.1% versus 30.4%). Sleep duration during weekdays and weekends, chronotype, and the age of the participants (we included children from 1-13 years of age) are plausible explanations [15]. It is important to note that, insomnia and chronotype are associated with neuropsychiatric problems, food addiction, smoking, and obesity [16]. Urgent measures are needed to investigate the causes of sleep problems among children in Tabuk to prevent serious consequences. Insomnia and daytime sleepiness deserve special attention as major health concerns because of their impact on neurocognitive skills and school performance [16]. The current findings showed higher rates of sleep problems among Saudi Children

compared to their counterparts from Asia [17] and the United States of America [18]; genetic and cultural factors might explain the differences across countries [19]. A study conducted in Egypt found similar results regarding daytime sleepiness and parasomnia with lower rates of other sleep parameters [20]. Parents' awareness of sleep disorders, social and cultural factors, and associated physical and mental disorders are plausible explanations. Despite the association of sleep problems with various preventable physical and mental disorders [21,22]. However, few researchers addressed this important issue in Saudi Arabia [10,11]. Although some sleep problems including parasomnia are common among the young and can resolve spontaneously, they can negatively affect the quality of life and are associated with serious physical and mental disorders [23]. Raising awareness about good sleep hygiene among the community is highly needed in Tabuk City, Saudi Arabia. Pediatricians may need to screen children for sleep problems and refer them for early management to avoid their deleterious consequences.

Limitations

The main limitations of this study are the small sample size ($n = 184$). The total population of Saudi Arabia is about 35.5 million, of which the target population of children between 1 and 11 years old represents about 7.0 million (O'Neill, 2021). The sample size should be at least $n = 385$ to achieve 95% confidence that the scores measured in the sample are within $\pm 5\%$ of the real scores in the population.

Another limitation related to the statistical internal validity of single-item measures as "multiple-item measures have better psychometric properties than single-item measures"; however, "though multiple-item measures are preferable from a psychometric standpoint, in some circumstances single-item measures can provide useful information.

Conclusion

Sleep problems were prevalent among children in Tabuk City, Saudi Arabia. The most common sleep problem was sleep-related anxiety followed by sleep resistance and night waking. The least common was sleep-disordered breathing which was observed in more than a quarter of children. Further larger multi-center studies are needed to assess and address the causes of sleep problems.

Declarations

Informed consent

All patients agreed individually indicated via a written consent form.

Conflict of interest

The authors stated that they have no conflict of interest.

Funding

No funding body played a role in this study design, analysis, or writing of the manuscript.

Author contribution

Nazim Ahmede formulated the study design and outline of the data for analysis wrote the initial and final drafts of the paper and organized the references L. A. Albishi contributed statistical analysis, results in parts, responsible for determining the focus, type, and analysis of data to be extracted, contributed to the design and presentation of the data, reviewed the contribution of the statistician, and to the revision of the final manuscript.

Acknowledgment

We would like to acknowledge the parents of the participants.

Data and materials availability

All data associated with this study are present in the paper.

References

- Holdaway AS, Becker SP. Children's sleep problems are associated with poorer student-teacher relationship quality. *Sleep Med.* 2018 Jul;47:100-105. doi: 10.1016/j.sleep.2017.12.001. Epub 2017 Dec 20. PMID: 29783160; PMCID: PMC5993579.
- Moreira GA, Pradella-Hallinan M. Sleepiness in Children: An Update. *Sleep Med Clin.* 2017 Sep;12(3):407-413. doi: 10.1016/j.jsmc.2017.03.013. Epub 2017 May 23. PMID: 28778238.
- Zamani Sani SH, Fathirezaie Z, Sadeghi-Bazargani H, Badicu G, Ebrahimi S, Grosz RW, Sadeghi Bahmani D, Brand S. Driving Accidents, Driving Violations, Symptoms of Attention-Deficit-Hyperactivity (ADHD) and Attentional Network Tasks. *Int J Environ Res Public Health.* 2020 Jul 20;17(14):5238. doi: 10.3390/ijerph17145238. PMID: 32698490; PMCID: PMC7400088.
- Chen X, Ke ZL, Chen Y, Lin X. The prevalence of sleep problems among children in mainland China: a meta-analysis and systemic-analysis. *Sleep Med.* 2021 Jul;83:248-255. doi: 10.1016/j.sleep.2021.04.014. Epub 2021 May 11. PMID: 34049044.
- Carter KA, Hathaway NE, Lettieri CF. Common sleep disorders in children. *Am Fam Physician.* 2014 Mar 1;89(5):368-77. PMID: 24695508.
- van de Langenberg SCN, Kocevaska D, Luik AI. The multidimensionality of sleep in population-based samples: a narrative review. *J Sleep Res.* 2022 Aug;31(4):e13608. doi: 10.1111/jsr.13608. Epub 2022 Apr 15. PMID: 35429087; PMCID: PMC9339471.
- Afsharpaiman S, Bagheri Hagh A, Kolbadi Nejad M, Amirsalari S, Torkaman M. Sleep Problems Under-Reported by Parents in Iranian Children. *Acta Med Iran.* 2015;53(9):582-4. PMID: 26553088.
- Uebergang LK, Arnup SJ, Hiscock H, Care E, Quach J. Sleep problems in the first year of elementary school: The role of sleep hygiene, gender and socioeconomic status. *Sleep Health.* 2017 Jun;3(3):142-147. doi: 10.1016/j.sleh.2017.02.006. Epub 2017 Apr 8. PMID: 28526250.
- Schlarb AA, Gulewitsch MD, Weltzer V, Ellert U, Enck P. Sleep duration and sleep problems in a representative sample of German children and adolescents. *Health.* 2015;7:1397-1408. doi: 10.4236/health.2015.711154.
- Alaiff N. Prevalence of common sleep problems in school-aged Saudi students. *International Journal of Advanced and Applied Sciences.* 2020;7(12):100-104. doi: 10.21833/ijaas.2020.12.011.
- BaHammam A, AlFaris E, Shaikh S, Bin Saeed A. Prevalence of sleep problems and habits in a sample of Saudi primary school children. *Ann Saudi Med.* 2006 Jan-Feb;26(1):7-13. doi: 10.5144/0256-4947.2006.7. PMID: 16521868; PMCID: PMC6078542.
- Torres-Lopez LV, Cadenas-Sanchez C, Migueles JH, Esteban-Cornejo I, Molina-Garcia P, H Hillman C, Catena A, Ortega FB. Does sleep-disordered breathing add to impairments in academic performance and brain structure usually observed in children with overweight/obesity? *Eur J Pediatr.* 2022 May;181(5):2055-2065. doi: 10.1007/s00431-022-04403-0. Epub 2022 Feb 10. PMID: 35142932; PMCID: PMC9056447.
- Sakamoto N, Kabaya K, Nakayama M. Sleep problems, sleep duration, and use of digital devices among primary school students in Japan. *BMC Public Health.* 2022 May 18;22(1):1006. doi: 10.1186/s12889-022-13389-1. PMID: 35585595; PMCID: PMC9116694.
- Zhang Z, Chen T, Jin X, Yan C, Shen X, Li S. Sleep patterns, sleep problems and associations with reported sleep quality in Chinese School-aged children. *American Journal of Public Health Research.* 2013;1(4):93-100. doi: 10.12691/ajphr-1-4-3.
- Najem J, Saber M, Aoun C, El Osta N, Papazian T, Rabbaa Khabbaz L. Prevalence of food addiction and association with stress, sleep quality and chronotype: A cross-sectional survey among university students. *Clin Nutr.* 2020 Feb;39(2):533-539. doi: 10.1016/j.clnu.2019.02.038. Epub 2019 Mar 1. PMID: 30878156.

16. Macchitella L, Marinelli CV, Signore F, Ciavolino E, Angelelli P. Sleepiness, Neuropsychological Skills, and Scholastic Learning in Children. *Brain Sci.* 2020 Aug 7;10(8):529. doi: 10.3390/brainsci10080529. Erratum in: *Brain Sci.* 2021 Jul 06;11(7): PMID: 32784660; PMCID: PMC7464965.
17. Safarzade S, Tohidinik H. The sleep quality and prevalence of sleep disorders in adolescents. *J Research & Health.* 2019;9(6):479-471. doi: 10.32598/jrh.9.6.471.
18. Mersky JP, Lee CP, Gilbert RM, Goyal D. Prevalence and Correlates of Maternal and Infant Sleep Problems in a Low-Income US Sample. *Matern Child Health J.* 2020 Feb;24(2):196-203. doi: 10.1007/s10995-019-02852-y. PMID: 31834605.
19. Mainieri G, Montini A, Nicotera A, Di Rosa G, Provini F, Loddo G. The Genetics of Sleep Disorders in Children: A Narrative Review. *Brain Sci.* 2021 Sep 23;11(10):1259. doi: 10.3390/brainsci11101259. PMID: 34679324; PMCID: PMC8534132.
20. Abou-Khadra MK, Ahmed D, Sadek SA, Mansour HH. Sleep patterns, problems, and habits in a sample of Egyptian preschoolers. *Sleep Sci.* 2022 Jan-Mar;15(Spec 1):164-171. doi: 10.5935/1984-0063.20220016. PMID: 35273763; PMCID: PMC8889965.
21. Sherrey J, Biggs S, Dorrian J, Martin J, Gold M, Kennedy D, Lushington K. Allergic disease, sleep problems, and psychological distress in children recruited from the general community. *Ann Allergy Asthma Immunol.* 2022 Sep;129(3):366-372. doi: 10.1016/j.anai.2022.05.008. Epub 2022 May 19. PMID: 35598883.
22. Gunes S, Aldemir R, Gunes A, Ekinci O. Parent-reported sleep problems in children and adolescents with sickle cell disease: relationship to health-related quality of life. *Arch Med Sci.* 2021 Jan 26;18(3):659-665. doi: 10.5114/aoms/124154. PMID: 35591824; PMCID: PMC9103506.
23. Sundell AL, Angelhoff C. Sleep and its relation to health-related quality of life in 3-10-year-old children. *BMC Public Health.* 2021 Jun 2;21(1):1043. doi: 10.1186/s12889-021-11038-7. PMID: 34078330; PMCID: PMC8173783.

How to cite this article: Ahmed NF, Suleiman AlBishi LA, Albalawi WE, Alatawi AA. Sleep Patterns and Sleep Difficulties among Saudi Children in Tabuk City. 2023 Mar 30; 4(3): 535-542. doi: 10.37871/jbres1707, Article ID: JBRES1707, Available at: <https://www.jelsciences.com/articles/jbres1707.pdf>