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SLEEP BEHAVIORS AND SLEEP PROBLEMS AMONG SAMPLE OF PRIMARY SCHOOLS STUDENTS IN BAGHDAD

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ABSTRACT

Background: Sleep disturbances in children is significantly influences cognitive, psychological, and physical well-being. Sufficient sleep is crucial for overall health, particularly in children under ten years of age. ***Objectives:*** To investigate sleep behaviors, patterns, and common sleep disorders among primary school students, and to determine the association between sleep behaviors and the studied variables. ***Subjects and Methods:*** A cross-sectional study was conducted in Baghdad, from 1st of March 2024 till 1st of September 2024. The *data* from a convenient sample of 738 students from public primary schools were collected using a standardized questionnaire including children's sleep habits questionnaire, in addition to certain chosen variables (both children, parent variables). ***Statistical analysis*:** was done using Chi^2 test and P value < 0.05 was considered as statistically significant. **Results:** The prevalence of abnormal sleep among children was (79.3%). Abnormal children's sleep habits mostly were daytime sleepiness (57.9%), sleep anxiety (39.2%), and bedtime resistance (32.9%), the most common age for children was 10 years (44.7%), were females represents (51.1% of the sample. Abnormal bedtime resistance was significantly associated with children who had epilepsy, *P value*=0.0 Abnormal daytime sleepiness was significantly observed among children who rank third in the family, (P=0.024). **Conclusions:** abnormal sleep pattern was prevalent among primary school children. Abnormal bedtime resistance was notably more common among children with epilepsy. An inter-sectoral intervention regarding sleep behavior is required to attain healthy mental, social and intellectual development of primary school children.

KEYWORDS: children's sleep habits, daytime sleepiness, sleep anxiety, bedtime resistance.

INTRODUCTION

Sleep is a vital opportunity for the body to conserve energy, restore its functions, promote physical growth, and support mental development, it significantly influences cognitive, psychological, and physical well-being.[1] Sleep patterns encompass various aspects, including bedtimes, wake times, total sleep duration, wakefulness after sleep onset, and napping behavior .[2] In children, sleep disturbances are prevalent and, in severe cases, can disrupt daily functioning for both the child and their family. In addition, it can also heighten parental stress and adversely affect family quality of life.[3] Sleep disorders (SD) in children are particularly significant due to their effects on overall health and their common occurrence from infancy to adolescence.[4,5] Despite this, there is limited understanding of sleep habits, disturbances, and the extent of these issues among school-aged children in developing nations.

Sleep-related problems in children are recognized as a global public health concern that is escalating globally. Pediatric sleep issues are associated with various consequences, such as sociocultural challenges, physical health issues (like unhealthy weight), emotional dysregulation, mood swings, behavioral problems (such as hyperactivity and inattention), neurodevelopmental disorders, and accidental injuries, necessitating behavioral interventions, surgical options, or pharmacological treatments.[6-11] Prompt recognition of sleep issues can help avert negative outcomes, including daytime drowsiness, irritability, behavioral issues, learning challenges, and subpar academic performance, it

is vital for primary care physicians to understand normal sleep patterns in children and recognize common sleep disorders. Sleep quality, a key aspect of sleep, is defined as the sensation of feeling refreshed upon waking. Poor sleep quality can lead to sleep insufficiency and various symptoms and signs.[12,13] Decreased engagement in physical activities, increased screen time, and use of electronic media (such as mobile devices, television, video games, and the internet) are factors linked to sleep disorders in children.[14,15] As school-aged children become more engaged with television, computers, and the internet, along with consuming caffeine, they may face challenges like trouble falling asleep, nightmares, and disruptions in sleep. Specifically, watching TV near bedtime has been correlated with bedtime resistance, difficulties in falling asleep, sleep-related anxiety, and reduced sleep duration. However, the spectrum of sleep issues can vary significantly, ranging from transient benign behavioral concerns to more persistent and severe disorders like sleep apnea syndromes.[16,18] It is well-documented that individual sleep habits in children evolve throughout childhood and adolescence. As children age, their bedtimes tend to shift later, and overall sleep duration often decreases. Moreover, specific sleep-related challenges can be linked to particular age groups; younger children commonly experience more bedtime resistance and trouble sleeping through the night, while older children report greater difficulties in falling asleep and increased daytime sleepiness.[19]

The updated third edition of the ICSD, 2023 categorizes sleep disorders based on symptomatology, their effects on individuals (pathophysiology), and the bodily systems they influence. Insomnia, Sleep-Related Breathing Disorders, Central Disorders of Hyper somnolence, Circadian Rhythm Sleep-Wake Disorders, Parasomnias, Sleep-Related Movement.[20-22] Sleep diaries are also popular for evaluating sleep but require consistent logging by parents or guardians over extended periods. This method can provide valuable insights into various aspects of sleep, such as bedtimes, sleep durations, sleep onset latency, and night awakening. Children's sleep diaries may include the following information.[23,24] Time the child went to bed, Time the lights were turned off, estimated time the child woke up, Time the child got out of bed, Duration required for the child to fall asleep, Daytime naps, Nighttime awakenings, difficult behaviors around bedtime. Inadequate sleep poses a significant public health issue, underscoring the necessity to explore children's sleep habits, accurately define sleep problems, identify factors influencing sleep health, and implement appropriate interventions.

Objectives

- Investigate sleep behaviors and sleep problems among primary school students
- Assess sleep patterns and common sleep disorders, such as sleepwalking, sleep talking, nightmares, sleep terrors, bruxism, and sleep-disordered breathing
- Find out if there is association between sleep behaviors in primary school students and the studied variables.

Methods

A cross-sectional study with analytical component that was conducted from 1st of March 2024 till 1st of September 2024, at eight public primary schools that were chosen conveniently from Baghdad Educational directorate/ Iraq. A 1000 primary school's students, was conveniently recruited to this study, to obtain more valid results.

Inclusion criteria: Students of fourth, fifth and sixth grade public primary schools who were presented at time of collecting data and approved being part of the study by consent.

Exclusion criteria: Students with developmental disorder and those who refuse to participate.

However, the sample was reducing to 738 students due, to absence of students, incomplete questionnaire, or not providing consent.

Data was collected from primary schools by using a standardized questionnaire, informed consent was obtained from the families of the participating students. The questionnaires were distributed to the students by the *Mentor Teacher* of the class and were filled out by the parent/s and then were collected one week later. The data was divided into two parts:

Studied variables

Students' information: Age, Gender, Grade, The sequence of the child in the family, the presence of a chronic disease.

The Questionnaire: Children's Sleep Habits Questionnaire (CSHQ) is a Standardized questionnaire, it's a retrospective 33-item parent questionnaire to examine sleep behavior in young children aged 4 to 12 years. The CSHQ assesses the sleep habits and disorders of the school-aged children within the last week or a "typical" recent week. *Scoring:* Items were rated on a three-point scale: Usually (5 to 7 times/week) scored as 3 points, sometimes (2 to 4 times/week) scored as 2 points, rarely (0 to 1 time/week) scored as 1 point. A total sleep disturbance scores higher than 41 indicates a pediatric sleep disorder, based on a neurotypical sample (score range: 33-99). As this cutoff accurately identifies 80% of children with a clinically diagnosed sleep disorder.[25,26] The items of the questionnaire were grouped into eight subscales:

Bedtime Resistance (items 1, 3, 4, 5 and 8), Sleep Onset Delay (item 2), Sleep Duration (items 9, 10 and 11), Sleep Anxiety (items 5, 7, 8 and 21), Night Waking's (items 16, 24 and 25), Parasomnias (items 12, 13, 14, 15,

17, 22 and 23), Sleep-Disordered Breathing (items 18, 19 and 20), Daytime Sleepiness (items 26, 27, 28, 29, 30, 31, 32 and 33).[27]

There were additional non- scorable questions about the child's wake time and bedtime on weekdays and on weekends, the total time of daily sleep, and whether the parents consider the child to have a sleep or falling asleep problem.[28] Sensitivity of the questionnaire was 0.80 and Specificity was 0.72.[25]

Statistical analysis: Data were submitted to Statistical Package of Social Science (SPSS) version (26), descriptive statistics was presented in (tables, and graphs) while inferential statistic was represented using Chi-square test to show the association between dependent variables and certain sociodemographic variables. *P value* is considered significant at level $\geq$0.05.

Pilot study: Twelve's students were participated in a pilot study and was excluded from main study sample to identify if there were any language barriers of the questions and to discover if there was any obstacle in the flow of distribution and collection of data. It took (10 - 15) minutes to answer the questions.

Ethical Approval: Approval was obtained from the Scientific Committee of Iraqi Board for Medical Specializations, research and development center of ministry of health and written consent from parents was taken before filling the questionnaire with explanation that the collected data will be kept confidential with no names, and not be divulged except for the study purpose.

RESULTS

A total of 738 students were recruited in the study. *Children information*: The age of children was mostly 10 years 330 (44.7%), there were 361 (48.9%) males and 377 (51.1%) females. Stages of children were fourth 304 (41.2%), fifth 204 (27.6%), and sixth 230 (31.2%). The sequence of the children in the family was mostly first 315 (42.7%). There were 33 (4.5%) children who had a chronic disease; out of them, DM was found among 15 (45.5%) children, asthma among 13 (39.4%), epilepsy among 3 (9.1%), and celiac disease 2(6%) (Fig 1).

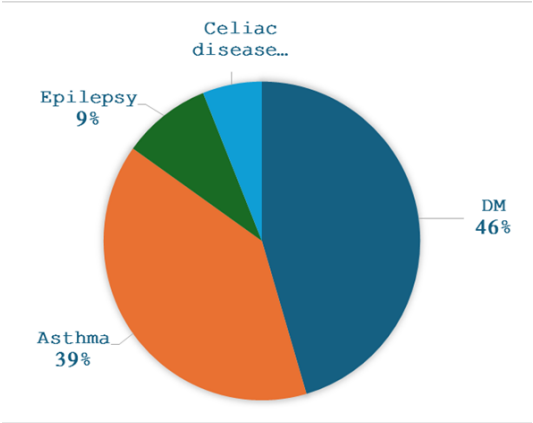

Figure 1: Distribution of chronic diseases among children.

Abnormal children's sleep habits were as following: daytime sleepiness 427 (57.9%), sleep anxiety 289 (39.2%), bedtime resistance 243 (32.9%), sleep duration 171 (23.2%), night waking's' 99 (13.4%), Parasomnias 76 (10.3%), and sleep disordered breathing 72 (9.8%), as shown in (Figure 2).

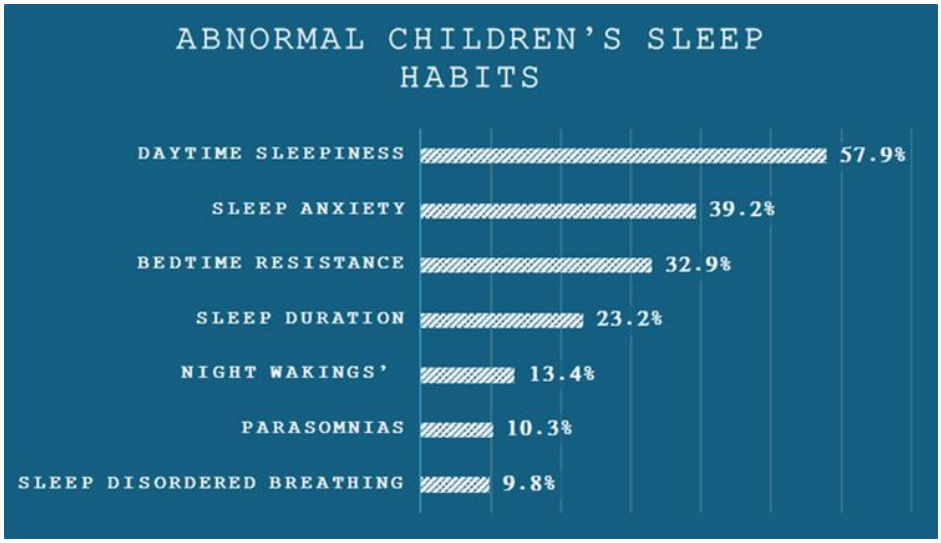

Figure.2: Distribution of Children's Abnormal Sleep Habits.

Out of the total; 585 (79.3%) children had abnormal sleep while 153 (20.7%) had normal sleep, as shown in (Figure .3)

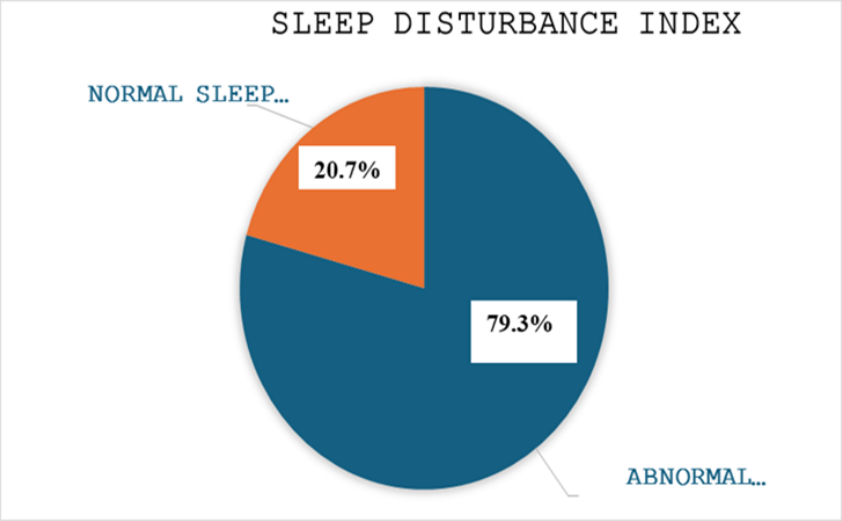

Figure 3: Distribution of sleep disturbance index among children.

Children bed time resistance: Normal bedtime resistance was significantly observed among children aged 11 years, at fifth grade, his sequence in the family second, and without chronic diseases, P<0.05. Abnormal bedtime resistance was significantly associated with children who had epilepsy, P=0.01, as shown in table (1).

Table (1): Distribution of Sociodemographic data of child regarding Bedtime Resistance.

Childs' information		Bedtime Resistance				P* value
		Normal		Abnormal		
		No.	%	No.	%	
Age of child/ years	9-10	196	59.0%	136	41.0%	<0.001
	11	143	76.5%	44	23.5%	
	12	156	71.2%	63	28.8%	
Sex of child	Male	258	71.5%	103	28.5%	0.008
	Female	237	62.9%	140	37.1%	
Stage of child	Fourth	170	55.9%	134	44.1%	<0.001
	Fifth	159	77.9%	45	22.1%	
	Sixth	166	72.2%	64	27.8%	
The sequence of the child in the family	First	197	62.5%	118	37.5%	0.01
	Second	146	74.9%	49	25.1%	
	Third	92	71.3%	37	28.7%	
	Fourth or more	60	60.6%	39	39.4%	
The presence of a chronic Disease	Yes	15	45.5%	18	54.5%	0.01
	No	479	68.0%	225	32.0%	
If yes, what it is?	DM	5	33.3%	10	66.7%	0.01
	Asthma	10	76.9%	3	23.1%	
	Epilepsy	0	0.0%	3	100.0%	
	Celiac disease	1	50.0%	1	50.0%	

*Chi^2 or fisher's exact test

Sleep duration: Normal sleep duration was significantly observed among children who rank second in the family (P=0.008), as shown in (Table 2).

Table 2: Distribution of Sociodemographic data of child regarding Sleep Duration.

Child's information		Sleep Duration				P* value
		Normal		Abnormal		
		No.	%	No.	%	
Age of child/ years	9-10	252	75.9%	80	24.1%	0.32
	11	151	80.7%	36	19.3%	
	12	164	74.9%	55	25.1%	
Sex of child	Male	274	75.9%	87	24.1%	0.60
	Female	293	77.7%	84	22.3%	

Stage of child	Fourth	229	75.3%	75	24.7%	0.17
	Fifth	167	81.9%	37	18.1%	
	Sixth	171	74.3%	59	25.7%	
The sequence of the child in the family	First	245	77.8%	70	22.2%	0.008
	Second	161	82.6%	34	17.4%	
	Third	97	75.2%	32	24.8%	
	Fourth or more	64	64.6%	35	35.4%	
The presence of a chronic disease	Yes	22	66.7%	11	33.3%	0.20
	No	544	77.3%	160	22.7%	
If yes, what it is?	DM	11	73.3%	4	26.7%	0.19
	Asthma	11	84.6%	2	15.4%	
	Epilepsy	0	0.0%	3	100.0%	
	Celiac disease	1	50.0%	1	50.0%	

*Chi^2 or fisher's exact test

Sleep anxiety: Normal sleep anxiety was significantly observed among children aged 12 years and in sixth stage (0.001, < 0.001 respectively), as shown in (Table 3).

Table 3: Distribution of Sociodemographic data of child regarding Sleep Anxiety.

Child's information		**Sleep Anxiety**				**P* value**
		Normal		**Abnormal**		
		No.	**%**	**No.**	**%**	
Age of child/ years	9-10	178	53.6%	154	46.4%	0.001
	11	122	65.2%	65	34.8%	
	12	149	68.0%	70	32.0%	
Sex of child	Male	233	64.5%	128	35.5%	0.51
	Female	216	57.3%	161	42.7%	
Stage of child	Fourth	157	51.6%	147	48.4%	<0.001
	Fifth	133	65.2%	71	34.8%	
	Sixth	159	69.1%	71	30.9%	
The sequence of the child in the family	First	177	56.2%	138	43.8%	0.08
	Second	129	66.2%	66	33.8%	
	Third	85	65.9%	44	34.1%	
	Fourth or more	58	58.6%	41	41.4%	
The presence of a chronic disease	Yes	16	48.5%	17	51.5%	0.14
	No	433	61.5%	271	38.5%	
If yes, what it is?	DM	8	53.3%	7	46.7%	0.31
	Asthma	8	61.5%	5	38.5%	
	Epilepsy	0	0.0%	3	100.0%	
	Celiac disease	1	50.0%	1	50.0%	

*Chi^2 or fisher's exact test

Night waking: Normal night waking was significantly observed among children without chronic disease (P=0.03), as shown in (Table 4).

Table 4: Distribution of Sociodemographic data of child regarding Night waking.

Child's information		**Night waking**				**P* value**
		Normal		**Abnormal**		
		No.	**%**	**No.**	**%**	
Age of child/ years	9-10	280	84.3%	52	15.7%	0.27
	11	166	88.8%	21	11.2%	
	12	193	88.1%	26	11.9%	
Sex of child	Male	319	88.4%	42	11.6%	0.19
	Female	320	84.9%	57	15.1%	
Stage of child	Fourth	254	83.6%	50	16.4%	0.13
	Fifth	182	89.2%	22	10.8%	
	Sixth	203	88.3%	27	11.7%	
The sequence of the child in the family	First	274	87.0%	41	13.0%	0.35

	Second	171	87.7%	24	12.3%	
	Third	114	88.4%	15	11.6%	
	Fourth or more	80	80.8%	19	19.2%	
The presence of a chronic disease	Yes	24	72.7%	9	27.3%	0.03
	No	614	87.2%	90	12.8%	
If yes, what it is?	DM	11	73.3%	4	26.7%	0.49
	Asthma	11	84.6%	2	15.4%	
	Epilepsy	3	100.0%	0	0.0%	
	Celiac disease	1	50.0%	1	50.0%	

*Chi^2 or fisher's exact test

Normal Parasomnias were significantly observed among children who rank second in the family (P<0.001), (Table 5)

Table (5): Distribution of Sociodemographic data of child regarding Parasomnias.

Child's information		**Parasomnias**				**P* value**
		Normal		**Abnormal**		
		No.	**%**	**No.**	**%**	
Age of child/ years	9-10	302	91.0%	30	9.0%	0.39
	11	163	87.2%	24	12.8%	
	12	197	90.0%	22	10.0%	
Sex of child	Male	322	89.2%	39	10.8%	0.71
	Female	340	90.2%	37	9.8%	
Stage of child	Fourth	273	89.8%	31	10.2%	0.84
	Fifth	181	88.7%	23	11.3%	
	Sixth	208	90.4%	22	9.6%	
The sequence of the child in the family	First	286	90.8%	29	9.2%	<0.001
	Second	187	95.9%	8	4.1%	
	Third	113	87.6%	16	12.4%	
	Fourth or more	76	76.8%	23	23.2%	
The presence of a chronic disease	Yes	29	87.9%	4	12.1%	0.76
	No	633	89.9%	71	10.1%	
If yes, what it is?	DM	13	86.7%	2	13.3%	0.08
	Asthma	13	100.0%	0	0.0%	
	Epilepsy	2	66.7%	1	33.3%	
	Celiac disease	1	50.0%	1	50.0%	

*Chi^2 or fisher's exact test

Normal sleep disordered breathing was significantly observed among females students with chronic diseases (P value: 0.018) and who had chronic diseases (P. value: 0.003) (Table 6).

Table 6: Distribution of Sociodemographic data of child regarding Sleep Disordered Breathing.

Childs information		**Sleep Disordered Breathing**				**P* value**
		Normal		**Abnormal**		
		No.	**%**	**No.**	**%**	
Age of child/ years	9-10	296	89.2%	36	10.8%	0.69
	11	171	91.4%	16	8.6%	
	12	199	90.9%	20	9.1%	
Sex of child	Male	316	87.5%	45	12.5%	0.018
	Female	350	92.8%	27	7.2%	
Stage of child	Fourth	270	88.8%	34	11.2%	0.58
	Fifth	186	91.2%	18	8.8%	
	Sixth	210	91.3%	20	8.7%	
The sequence of the child in the family	First	287	91.1%	28	8.9%	0.78
	Second	176	90.3%	19	9.7%	
	Third	116	89.9%	13	10.1%	
	Fourth or more	87	87.9%	12	12.1%	
The presence of a chronic disease	Yes	24	72.7%	9	27.3%	0.003
	No	642	91.2%	62	8.8%	

If yes, what it is?	DM	12	80.0%	3	20.0%	0.71
	Asthma	10	76.9%	3	23.1%	
	Epilepsy	2	66.7%	1	33.3%	
	Celiac disease	1	50.0%	1	50.0%	

*Chi^2 or fisher's exact test

DISCUSSION

Due to their impact on children's health and close relationship to behavioral issues, sleep disturbances are a significant issue among pediatric patients.[29] In this study, more than three-quarters of children had abnormal sleep and the most common abnormal children's sleep habit was daytime sleepiness. Those findings agreed with other studies, the first study was done by İnci et al., 2020[30] where (71.2%) of participants experienced a sleep disorder. Dogrul et al., 2024[31] stated that (69.1%) of their sample displayed signs of sleep disorders. Jalilolghadr et al., 2018[32] found that (89.6%) had sleep problems. In contrast to Alafif 2020[33] and Durmuş et al., 202[34] where (94.4%) and (59.0%) of samples respectively were found to have sleep problems. The reasons for this variance between studies might include social and cultural influences and related physical and mental illnesses.

Bedtime Resistance

This study revealed that *Normal bedtime resistance* was dominant among children aged 11 years, and those in fifth grade, which aligned with Jalilolghadr et al., 2018.[32] who noted that bedtime resistance was inversely correlated with grade. Higher school grades exhibit less resistance to going to bed since they are more accustomed to the school setting and thus feel less stressed, which in turn decreases resistance to going to bed. School grade serves as a stand-in for age. Thus, the reason for this association could be attributed to aging. However, the current study disagreed with Al Eidan et al., 2023.[35] who showed that bedtime resistance was not correlated with age. Different sample sizes could be the cause of the difference between studies, moreover, normal bedtime resistance was associated with male children and those who ranked second. That was matched by others, Li et al., 2023[36] stated that compared to boys, girls had a 1.36 times higher likelihood of sleep problems. The meta-analysis[37] also reported that girls had a higher likelihood of sleep disturbances than boys, which is in line with the theory that girls are often more likely to experience mental health issues[38,39] and might have more interpersonal stressors. *Normal bed time resistance* had also a significant association with children without chronic diseases, while *abnormal bedtime resistance* was associated with children with epilepsy. That was in line with a study by Muslu et al., 2024[40] where it was realized that, in comparison to children without chronic illnesses and those not taking any medication, Children with these conditions showed more bedtime resistance, suggesting that they had more sleep disorders. Chronic illnesses might interfere with sleep because of nighttime symptom worsening, discomfort associated with the illness, hospital stays, medication side effects, etc.

Sleep Duration: It was observed that normal sleep duration was more likely observed among children who rank second in the family. This is explained by the reason that parents can overcome the difficulties that occurred in the first child and correct their mistakes when raising a second one.

Sleep Anxiety: In the present study, it was observed that normal sleep anxiety had a significant association with children aged 12 years and those who were in the sixth stage. Those results were in agreement with other studies, one of them was done by Jalilolghadr et al., 2018[32] who revealed an inverse relationship between sleep anxiety and school grades. On the other, Bruni et al., 2022[41] found that the younger age groups had more problems falling asleep, anxiety before bed, nightmares, and sleep terrors. Hashem et al., 2023[42] demonstrated that younger age was significantly related to a higher score of sleep anxiety.

Night Waking: It was noticed that normal night waking's' were significantly observed among children without chronic disease. Those observations disagreed with a study by Muslu et al.,[40] 2024 where night waking's were not associated with the existence of chronic diseases in children. This dissimilarity between studies was attributed to different sociodemographic characteristics and different sample sizes.

Parasomnias: It was found in this study that normal Parasomnias were likely observed among children who rank second in the family. Those were against Muslu et al., 2024[40] who claimed that the Parasomnias subscale mean scores of children with two siblings were greater than those of only one sibling. The variance among studies could be due to the presence of confounding factors (physical activity, screen exposure, and diet).

Sleep Disordered Breathing: *It* was shown that normal sleep-disordered breathing was dominant among female children and those without chronic disease. Conflicting observations were reported by different studies. Muslu et al., 2024[40] noted that sleep-disordered breathing was more common in male children than in female children, and there was no correlation between the two conditions and the prevalence of chronic illnesses. Lewien et al., 2021[43] described a higher prevalence of sleep-related difficulties among males in children and among females in adolescents. Curatola et al., 2022[44] showed there were no gender differences in sleep-related difficulties either among children or adolescents. The dissimilarity

between studies could be due to the existence of risk factors for sleep-disordered breathing like excess weight among samples.

CONCLUSIONS

Abnormal sleep pattern was prevalent among Iraqi primary school children. Abnormal bedtime resistance was notably more common among children with epilepsy. An inter-sectorial intervention regarding sleep behavior is required to attain healthy mental, social and intellectual development of primary school children.

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