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Evaluating Sleep Habits and Related Factors in Childhood Cancer Survivors: A Cross-Sectional Study

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Abstract
Background: Sleep habits may play a role in the onset of sleep disorders. Several factors affect sleep habits. This study aimed to investigate sleep habits and related factors in childhood cancer survivors (CCS).
Materials and Methods: This cross-sectional study was performed on 400 children (age range: 5-15 years) who recovered from cancer in Tehran, Iran, in 2020. A 35-item Children's Sleep Habits Questionnaire (CSHQ) was used to determine children's sleep habits. Correlation coefficient test, independent t-test, and one-way analysis of variance (ANOVA) were used to determine the correlation between results.
Results: Participants' mean age was 10.45± 12.3 years (49% males vs. 51% females). The mean total score of the CSHQ was 58.53±7.8. There was a negative and significant relationship between age and the total score of CSHQ (P=0.009). Independent t-test showed that the subscales and the total score of the CSHQ were not significantly different between males and females (P=0.834). There was no significant relationship between the total score of the CSHQ and the duration after recovery (P=0.08).
Conclusions: The CCS are at higher risk of sleep disorders and the possibility of sleep disorders is higher in younger patients. Girls and boys who have survived cancer are equally prone to sleep disorders. There is a possibility of developing sleep disorders at any time during the recovery period. Factors such as the family's socioeconomic status, level of physical health, duration of cancer, and the age of the children should be considered when assessing and treating sleep problems in CCS.
Keywords: Cancer survivors, Child, Habits, Sleep

Introduction

Cancer is one of the most common diseases and the leading cause of death in all age groups (1). Nowadays, the risk of childhood cancer is increasing. The most common childhood cancers are leukemia and brain cancer (1-2). The surging prevalence of cancer imposes high costs on countries' health care systems (3). Recent advances in cancer treatment have significantly improved the percentage of childhood cancer survivors (CCS) (4) so that about 75% of these children experience long-term survival (5). However, children recovering from cancer are more likely to be diagnosed with chronic diseases such as cardiovascular disease, hypertension, dyslipidemia, and psychiatric disorders, affecting their lives (6-7). Recently, a surge in the onset of sleep disorders among children has been witnessed, and numerous studies have reported its prevalence up to about 30%. This is very important in children recovering from cancer (8-10), as sleep disorders in children can impair the functioning of the immune, cardiovascular, and endocrine systems, which can lead to incurable cancer and even affect the function of the child in chronic cases (11-12).

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There are no accurate statistics on the prevalence of sleep disorders in children with cancer or CCS. However, a study on children with cancer found that daytime sleepiness was one of the most common sleep-related problems, occurring in more than 60% of the patients (13). Sleep-related disorders and habits are influenced by biological, psychological, environmental, and social factors (14). The leading causes of sleep disorders in children with cancer include the neurological damage caused by neoplasms, the side effects caused by medical treatment, hospitalization, anxiety, depression, and pain. It should also be noted that some of these children had sleep problems before the onset of the disease (13).

Considering the critical role of culture in children's sleeping habits, the distinction between normal and abnormal sleeping habits and behaviors is affected by the community's culture. Hence, it is essential to have accurate information about children's sleeping habits and behaviors in the communities to assess their sleep problems (15). A qualitative study in the United States on preschoolers in 2018 explored Brazilian immigrant mothers' beliefs, attitudes, and practices related to their children's sleep and bedtime routines. The results showed that most mothers were aware of the importance of sleep and sleep duration for their children's healthy growth and development; they also highlighted the importance of consistent bedtime routines. Nevertheless, many mothers reported inconsistent and suboptimal bedtime routines, including the lack of predictable and orderly bedtime activities such as bath, reading, and using electronics in bed (16).

Jalilolghadr et al. (2012) evaluated the sleep habits of Iranian pre-school children and reported that Iranian children had shorter night sleep duration than expected for their age group. The bedtime of the majority (85%) of nap-takers was 22:00 or later. This might be attributed to cultural characteristics, climate differences, or harmful sleep habits (17).

In many cases, the presence of a medical illness crisis can form co-sleeping (the need for another person to be present during sleep). One study found that 22% and 8% of parents whose children had recently been diagnosed with epilepsy and diabetes, respectively, slept in their children's bedroom since they were anxious about their children's physical illness (18). Therefore, when examining and treating sleep disorders in children with complex physical diseases such as cancer, it is essential to consider the factors influencing the formation and persistence of sleep disorders and the children's physical illness. It seems that considering the sleep habits of these children can play an important role in identifying sleep problems as accurately as possible. Due to the dependence of sleep habits on various environmental and cultural factors, the results of most non-Iranian studies cannot be generalized to the Iranian population. In addition, so far, no study has examined the sleep habits in Iranian CCS. Hence, no information is available about the role of physical illness and demographic factors affecting sleep habits among Iranian CCS cases. Accordingly, this study aimed to investigate sleep habits in children who recovered from cancer in Tehran, Iran.

Materials and Methods

This cross-sectional descriptive study was performed on 400 children recovered from any type of cancer from March to May 2020 in Tehran, Iran. The research samples consisted of all children referred to Rasool-e-Akram Hospital and the Society to Support Children with Cancer (MAHAK) for cancer treatment. Sampling was done by a simple random method in which the selection of individuals from each treatment center was proportional to the center's share from the total number of patients. First, all eligible individuals were estimated separately in both centers. Then,

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each center's share in the number of referred patients was considered, and the samples were selected from the center. Finally, a list was prepared using the total number of individuals chosen from both centers. The researchers choose samples using random number generator software to minimize any biases.

Inclusion criteria were: under 15 years of age, being diagnosed with cancer at least for five years, and recovery from cancer at the time of participation in the study. Samples were excluded from the study if cancer recurred in participants. The criteria for recovery from cancer were determined by a pediatric oncologist and recorded in patients' records.

After explaining the research objectives to the parents and children and obtaining written consent from parents, the questionnaires were provided to the parents (mother or father), and the research was conducted in a private environment. Parents were also assured that their children's identities would remain confidential. The researchers completed the questionnaires while meeting the parents and children during the interviews. If it was not possible for parents to attend the center and complete the questionnaire, the researchers collected the answers by making phone calls.

The tools used in this study included the Children's Sleep Habits Questionnaire (CSHQ) and a demographic questionnaire. The demographic questionnaire included questions about the children's age; education and occupation of parents; socioeconomic status of the family; type of cancer, duration of recovery from cancer, history of psychiatric disorders, and parental relationship. The CSHQ was used to determine children's sleep habits and patterns. In 2000, Judith Owens first developed this questionnaire in the United States to record American school children's sleep habits and rate their sleep quality based on parents' responses. This questionnaire consists of two parts. The first part contains demographic information, and the second part includes 35 questions about children's sleep habits and patterns. The questions are completed by asking parents how they assess their children's sleep over the past week. Parents have three options to choose from: usually (5-7 nights per week), sometimes (2-4 nights per week), and rarely (0-1 night per week). The answer "usually" has three scores, "sometimes" 2, and "rarely" 1. The questionnaire's 35-item section has eight subsets: bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, frequent nocturnal awakenings, parasomnia, sleep-related respiratory disorders, and daytime sleepiness. The higher scores in each subset indicate a more severe problem. Scoring is from 33 to 99. The two questions in the sub-categories "bedtime resistance" and "sleep anxiety" under the heading "the need for parents to be in the room while sleeping and the fear of sleeping alone" in this set of questions are repeated. A score equal to 41 or higher indicates the possibility of sleep disorders in children (19). The validity and reliability of this questionnaire have been confirmed in several studies (19-22). Fallahzadeh et al. standardized CSHQ in the Persian language and calculated Cronbach's alpha coefficient of the questionnaire as 0.80 (23). In this study, Cochran's formula (n= z2pq/d2) was used to determine the sample size. For this purpose, in line with the research objectives and based on the studies, the P-value for estimating sleep disorders was equal to 0.5, the value of q was equivalent to 0.5, and the accuracy or d at 95% confidence level was equal to 0.05.

Data analysis was performed using SPSS software version 18. Quantitative findings were reported as mean and standard deviation, and qualitative findings were reported as frequency and percentage frequency. The correlation coefficient, independent t-test, and one-way analysis of variance (ANOVA) were used to determine the relationship between the

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items. The significance level was considered less than 0.05 (P<0.05).

Ethical Consideration

The Research Ethics Committee approved the study of Iran University of Medical Sciences (IR.IUMS.REC.1399.281).

Results

This study was performed on 400 children aged 5 to 15 years old. The mean age of children was 10.45±3.12 years (49% (n=196) males and 51% (n=204) females). The mean age of mothers was 37.48±6.72 years, and the mean age of fathers was 41.09±9.37 years. The study population had been treated for cancer for an average of 23.19±11.95 months, and at the time of the study, an average of 33.68±11.92 months had passed since the cure of cancer.

According to the results, leukemia (n= 94, 23.5%) and brain cancer (n=91, 22.8%) were the most common cancers in the study population. Other cases included cancer in other parts of the body. The frequency distribution of socioeconomic status variables in the CCS is shown in Table I.

The distribution of CSHQ scores and their subscales in pediatric cancer survivors are presented in Table II.

The comparison of the mean total score of the CSHQ in the CCS based on the parents' educational status, the children's birth order, and the family's economic status is presented in Table III. Based on one-way ANOVA results, the total score of the CSHQ was not significantly different between the groups of mothers and fathers in terms of educational status (P>0.05). However, the mean total score of CSHQ based on children's birth order and economic status was significantly different (P<0.05).

The correlation between the subscales and the total score of the CSHQ with the age of the CCS is shown in Table IV. Based on the results of the correlation coefficient test, there was a negative and significant relationship between age and the total score of the CSHQ and the bedtime resistance, sleep onset delay, and sleep anxiety (P<0.05).

Also, based on the results of the correlation coefficient test, there was a negative and significant relationship between the total score of the CSHQ and the duration of cancer treatment (months) (P<0.05). However, there was no significant relationship between the total score of the CSHQ and the duration after recovery (P=0.08). A comparison of the mean of the subscales and the total score of the CSHQ in the CCS by gender is shown in Table V. Based on the independent t-test, subscales and total score of CSHQ were not significantly different between females and males (P>0.05).

Also, the independent t-test showed that the mean score of CSHQ in the CCS based on the history of psychiatric illness, history of marital conflict, and having a separate bedroom did not differ significantly (P>0.05).

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Table I: Frequency distribution of variables of socioeconomic status in the CCS

Variable		N=400	
		N	**Percentage**
Place of birth	City	210	52.5
	Village	190	47.5
Fathers' occupation	Unemployed	37	9.3
	Employed	363	90.7
Mothers' occupation	Housewife	366	91.5
	Employed	34	8.5
Fathers' level of education	Illiterate	20	5.0
	Elementary	149	37.3
	Diploma	119	29.8
	University	112	27.9
Mothers' level of education	Illiterate	17	4.3
	Elementary	126	31.5
	Diploma	175	43.8
	University	82	20.4
House ownership status	Owner	187	46.8
	Tenant	213	53.2
Insurance status	No	35	8.8
	Yes	365	91.2
Separate bedroom	No	357	89.3
	Yes	43	10.7
Marital conflict	No	287	71.7
	Yes	133	28.3
Birth order	1st	191	47.8
	2nd	137	34.3
	3rd	53	13.3
	4th	12	3.0
	5th	7	1.8
A history of psychiatric illness in children	Yes	44	11.0
	No	356	89.0
Economic status of the family	Low	129	32.3
	Middle	255	63.8
	High	16	3.9

Table II: Distribution of CSHQ scores and their subscales in the CCS

Variable	N = 400			
	Min	**Max**	**Avg.**	**SD**
Bedtime Resistance	6	17	11.31	1.97
Sleep Onset Delay	1	3	2.52	0.71
Sleep Duration	3	9	6.11	1.11
Sleep Anxiety	4	12	8.01	2.21
Nocturnal Awakenings	3	9	4.47	1.47
Parasomnia	7	20	9.34	2.30
Sleep-Disordered Breathing	3	9	3.59	1.17
Daytime Sleepiness	8	22	13.15	2.79
Total Score	37	96	58.53	7.80

Min; minimum, Max; maximum, Avg; average, SD; standard deviation

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Table III: Comparison of the mean total score of CSHQ in the CCS based on parents' educational status, children's birth order, and economic status.

Variable		*N = 400*				
		SS	**df**	**MS**	**F**	***Sig***
Children's birth order	Between groups	77.051	36	2.140	3.001	< 0.001
	In groups	258.859	363	0.713		
	Total	335.910	399			
Mothers' education	Between groups	417.53	4	69.58	1.145	0.336
	In groups	23893.90	395	60.79		
	Total	24311.43	399			
Fathers' education	Between groups	457.27	4	66.75	1.097	0.364
	In groups	23844.16	395	60.82		
	Total	24311.43	399			
Economic status	Between groups	17.371	36	0.483	1.830	0.003
	In groups	95.707	363	0.264		
	Total	113.077	399			

N; Number, SS; Sum of Squares, df; degrees of freedom, MS; Mean Square, F; F value, Sig; Significance.

Table IV: The correlation between subscales and total score of CSHQ with the age of the CCS

Variable	*N = 400*	
	r	**Sig**
Bedtime Resistance	- 0.228	< 0.001
Sleep Onset Delay	- 0.191	< 0.001
Sleep Duration	- 0.041	0.413
Sleep Anxiety	- 0.239	< 0.001
Nocturnal Awakenings	0.060	0.228
Parasomnia	- 0.073	0.145
Sleep-Disordered Breathing	0.064	0.200
Daytime Sleepiness	0.061	0.221
Total Score	- 0.131	0.009

r; Pearson Correlation, Sig; Significance.

Table V: The comparison of the mean of subscales and total score of CSHQ in the CCS by gender

Variable	Gender	*N*=400				
		M	**SD**	**t**	**df**	***Sig***
Bedtime Resistance	Male	11.24	1.91	- 0.671	398	0.503
	Female	11.37	2.03			
Sleep Onset Delay	Male	2.57	0.69	1.409	398	0.160
	Female	2.47	0.73			
Sleep Duration	Male	6.15	1.11	0.668	398	0.504
	Female	6.07	1.11			
Sleep Anxiety	Male	7.98	2.16	- 0.245	398	0.807
	Female	8.04	2.26			
Nocturnal Awakenings	Male	4.43	1.39	- 0.581	398	0.562
	Female	4.51	1.55			
Parasomnia	Male	9.43	2.35	0.797	398	0.426
	Female	9.25	2.25			
Sleep-Disordered Breathing	Male	3.59	1.23	0.032	398	0.974
	Female	3.59	1.12			
Daytime Sleepiness	Male	13.02	2.80	- 0.907	398	0.365
	Female	13.27	2.79			
Total Score	Male	58.45	7.55	- 0.209	398	0.834
	Female	58.61	8.05			

N; Number, M; Mean, SD; Standard Deviation, t; t Value, df; degrees of freedom, Sig; Significance.

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Discussion

This study was performed on the CCS to examine their sleep habits. The mean total score of the CSHQ was estimated to be 58.53±7.8, which indicates the possibility of sleep disorders.

The mean scores of daytime sleepiness, bedtime resistance, and parasomnia were higher than other subscales. This might be attributed to the fact that these cases are the most common sleep disorders in this age group. In a study by Shoghy et al. (2005) to determine children's sleep habits aged 6 to 11 years in Tehran, the subscales insomnia, bedtime resistance, and parasomnia were identified as the most common sleep habits (24). On the other hand, a study by Surani et al. (2015) on Japanese students' sleep habits in Texas, bedtime resistance, sleep onset delay, and nocturnal awakenings in elementary school students and daytime sleepiness in high school students school students were the most common sleeping habits (25). In a study by Yoshitaka Iwadare (2012) on the sleep habits of Japanese students, the mean age of participants was 9.3±1.7 years, and it was found that bedtime resistance and sleep anxiety were more common in younger students (26).

The effect of culture on children's sleep habits and behaviors can be considered as one of the reasons for the difference between the results of different studies. The norms and beliefs that society has about health and sleep status can be influenced by culture and race, which vary from one society to another (27). Previous studies indicated that Asian children, in general, have higher total CSHQ scores than those in Western countries. Asian preschoolers sleep more in their parents' beds and bedrooms than children in Western countries. In a study by Takahashi et al. (2018) on Japanese and Chinese preschoolers, bedtime resistance was more severe in Japanese children, and Chinese children had more severe nighttime awakenings and sleep-disordered breathing; such differences may be due to differences in co-sleeping practices, bedtime routines, and/or environmental conditions (28). In our study, bedtime resistance and parasomnia were the most common behaviors, consistent with the study by Shoghy et al. (2005); this might be attributed to study location because both studies were conducted in Tehran, Iran (24).

The presence of chronic physical illness in children can increase the risk of behavioral and emotional problems, which play a role in forming sleep patterns. In some studies, symptoms of depression and anxiety were reported to be more pronounced in the CCS; these people had more complaints of fatigue, sleep problems, and daytime sleepiness. Therefore, it seems that in addition to the role of cancer history and the type of treatment in the CCS, such factors as health status, sleep patterns, and fatigue also greatly impact their psychological performance (27-30).

In the present study, leukemia and brain cancer were identified as the most common cancers. According to the results of previous studies, the most common sleep-related complaint in children with brain cancer is daytime sleepiness. In a study by Rosen et al. (2011), daytime sleepiness was the most common sleep-related complaint, which is in line with the present study results. In these patients, the possibility of damage to the hypothalamic/pituitary glands can be one of the causes of daytime sleepiness (13, 31).

On the other hand, many cancer patients suffer from fatigue and cannot differentiate between "fatigue" and "sleepiness." Fatigue is considered a lack of energy and can even be a complication of cancer treatment and continue for a long time after treatment. Although fatigue and sleepiness can be related, they have different definitions and causes (32). In our study, the inability of children's parents to distinguish between these two

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symptoms may be considered one of the possible reasons for reporting a higher prevalence of sleepiness during the day. Besides, daytime sleepiness has a variety of causes that should be determined in the differential diagnosis. A study conducted in 2016 on children's sleep habits with controlled asthma reported that daytime sleepiness among these children is significantly different from healthy children (33). Therefore, when examining daytime sleepiness, one should consider other causes like obstructive sleep apnea, psychiatric illnesses (such as depression, taking sleeping pills, circadian rhythm disorders, and insomnia), and any other causes that may interfere with nighttime sleep (34).

However, according to our results, it seems that sometimes children with cancer suffer from a wide range of sleep-related problems such as insomnia and daytime sleepiness. They suffer from these problems even months after the cancer treatment. In this study, the mean recovery time from cancer was 33.86±11.92 months, and there was no significant relationship between the total score of the CSHQ and the duration after cancer recovery. One of the reasons for this result could be the evaluation of samples at different times of cancer recovery because the prevalence and severity of cancer-related sleep disorders are highly dependent on the time of patient evaluation. For example, assessment before the diagnosis of cancer, after the diagnosis of cancer, during the treatment, and even different times after the recovery can produce different results (32). On the other hand, it may indicate that children's sleep disorders after cancer recovery are similar to adults'. (35-37).

Many studies have highlighted the role of socioeconomic status of the family in the formation of sleep habits. Low socioeconomic status is more prevalent, especially in children with cancer (38). Studies have shown that economic problems also cause many sleep problems. Although the underlying mechanism of this relationship has not been clearly established yet, factors such as low income, lack of independent sleeping rooms for children, poor management of physical illness, and psychological stresses can play an important role in shaping children’s sleeping habits (27). On the other hand, economic problems cause marital conflicts (39). Some studies revealed that the number of nocturnal awakenings increases with increasing family quarrels and marital discord (40,41). In our study, only 3.9% of households were in good financial conditions, and 89.3% of children did not have a separate bedroom. Also, 28.3% of families clearly mentioned marital conflicts.

Therefore, by combining these findings, it is expected that the study population scores high in the CSHQ, and the possibility of sleep disorders is high in them. Our study showed a negative and significant relationship between age and total score of CSHQ and subscales of bedtime resistance, sleep anxiety habits, and sleep onset delay. A previous study found an association between age and bedtime resistance, nocturnal awakenings, and more sleep problems (19). Shoghy et al. (2005) also showed that with aging, bedtime resistance, frequent nocturnal awakenings, and sleep anxiety decrease (24). It seems that autonomy and independence in the sleep process are age-dependent and play a role in forming sleep habits. In this context, the children’s cognitive level and development are important. In younger children, sleep anxiety is more common due to separation from parents and the perception of scary objects in the room. Also, bedtime resistance during infancy is about 14%, and about 50% in children up to 5 years old. Then, as the child gets older, bedtime resistance gradually tends to sleep late. However, some studies have not found an age difference for sleep onset delay (26).

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Parents whose children have a chronic physical illness often change their sleep patterns to take more care of their children; for example, they are more inclined to sleep in the same environment with their children. This issue, along with children's age, can be useful in forming children's sleep habits (27).

One of the strengths of this study is that it simultaneously considered demographic, social, biological, and physical health issues in forming sleep habits. Meanwhile, the main limitation is the lack of knowledge about the population's sleep habits and behaviors before cancer. Future studies might investigate whether some of these habits already existed in the children before the onset of cancer or intensified or decreased with the onset of the disease. The absence of a control group and the possibility of confounding factors are other limitations of the present study. Another limitation of this study is the lack of considering the ethnicity of the study population. In Tehran, numerous ethnic groups with different cultural backgrounds live together. Determining and comparing the likelihood of these differences affecting children's sleep habits can be valuable. Another limitation of the study is the lack of consideration for the parents' sleep habits of these children. Since this was a cross-sectional study, we can conclude an association between sleep habits and cancer. However, we cannot have a cause-and-effect relationship because of the study design. Hence, it is suggested to have a control group in future studies. This group can include siblings of patients with cancer. It is recommended that this study be performed on a larger scale and children receiving cancer treatment or those with other chronic physical illnesses to compare the results. The possibility of sleep disorders is higher in younger patients, so it is suggested that more serious measures and more research be done to be aware of other emotional problems of these ages. It is recommended that in future studies, more risky and vulnerable age groups be identified.

Conclusion

According to our results, sleep problems have several negative outcomes in all children. The CCS are at higher risk of sleep disorders, and the possibility of sleep disorders is higher in younger patients. Girls and boys who have survived cancer are equally prone to sleep disorders. Also, there is a possibility of developing sleep disorders at any time during the recovery period. In each periodic visit, clinicians treating CCS should routinely screen the patients for sleep problems. Factors such as the family's socioeconomic status, level of physical health, duration of cancer, and the age of the children should be considered when assessing and treating sleep problems in CCS. Further studies are needed to address the limitations of this study.

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Conflict of interest

The authors declare no conflict of interest.

References

1. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2015. CA Cancer J Clin 2015; 65(1):5-29.

2. Phillips SM, Padgett LS, Leisenring WM, Stratton KK, Bishop K, Krull KR, et al. Survivors of childhood cancer in the United States: prevalence and burden of morbidity. Cancer Epidemiol Biomark Prev 2015; 24(4):653-663.

[DOI: 10.18502/ijpho.v12i2.9077]

3. Jemal A, Center MM, DeSantis C, Ward EM. Global patterns of cancer incidence and mortality rates and trends. Cancer Epidemiol Biomarkers Prev 2010; 19(8):1893-1907.
4. Miller KD, Siegel RL, Lin CC, Mariotto AB, Kramer JL, Rowland JH, et al. Cancer treatment and survivorship statistics, 2016. CA Cancer J Clin 2016; 66(4):271-289.
5. Iughetti L, Bruzzi P, Predieri B, Paolucci P. Obesity in patients with acute lymphoblastic leukemia in childhood. Ital J Pediatr 2012; 38(1):1-11.
6. Zhang FF, Parsons SK. Obesity in Childhood Cancer Survivors: Call for Early Weight Management. Adv Nutr 2015; 6(5):611-619.
7. Brown AL, Lupo PJ, Danysh HE, Okcu MF, Scheurer ME, Kamdar KY. Prevalence and predictors of overweight and obesity among a multiethnic population of pediatric acute lymphoblastic leukemia survivors: A cross-sectional assessment. J Pediatr Hematol Oncol 2016; 38(6):429-436.
8. Singh GK, Kenney MK. Rising Prevalence and Neighborhood, Social, and Behavioral Determinants of Sleep Problems in US Children and Adolescents, 2003-2012. Sleep Disord 2013; 2013: 2003–2012
9. Kim DS, Lee CL, Ahn YM. Sleep problems in children and adolescents at pediatric clinics. Korean J Pediatr 2017; 60(5):158-165.
10. Wang G, Xu G, Liu Z, Lu N, Ma R, Zhang E. Sleep patterns and sleep disturbances among Chinese school-aged children: Prevalence and associated factors. Sleep Med 2013; 14(1):45-52.
11. Hawkins SS, Takeuchi DT. Social determinants of inadequate sleep in US children and adolescents. Public Health 2016; 138:119-126.
12. Dewald JF, Meijer AM, Oort FJ, Kerkhof GA, Bogels SM. The influence of sleep quality, sleep duration and sleepiness on school performance in children and adolescents: A meta-analytic review. Sleep Med Rev 2010; 14(3):179-189.
13. Rosen G, Brand SR. Sleep in children with cancer: case review of 70 children evaluated in a comprehensive pediatric sleep center. Support Care Cancer 2011; 19(7):985-994.
14. Jenni OG, Werner H. Cultural issues in children's sleep: a model for clinical practice. Pediatr Clin North Am 201158(3):755-763.
15. Jenni OG, Werner H. Cultural issues in children’s sleep: a model for clinical practice. Pediatric Clinics 2011; 58(3):755-763.
16. Lindsay AC, Moura Arruda CA, Tavares Machado MM, De Andrade GP, Greaney ML. Exploring Brazilian immigrant mothers’ beliefs, attitudes, and practices related to their preschool-age children’s sleep and bedtime routines: A qualitative study conducted in the United States. Int J Environ Res Public Health 2018; 15(9):1923-1927.
17. Jalilolghadr S, Hashemi S, Javadi, M.. Sleep habits of Iranian pre-school children in an urban area: Late sleeping and sleep debt in children. Sleep Biol. Rhythms 2012; 10 (2):154–156.
18. Larson AM, Ryther RC, Jennesson M, Geffrey AL, Bruno PL, Anagnos CJ, et al. Impact of pediatric epilepsy on sleep patterns and behaviors in children and parents. Epilepsia 2012; 53(7):1162-1169.
19. Sneddon P, Peacock GG, Crowley SL. Assessment of sleep problems in preschool aged children: an adaptation of the children's sleep habits questionnaire. Behav Sleep Med 2013; 11(4):283-296.
20. Mavroudi A, Chrysochoou EA, Boyle RJ, Trypsianis G, Xinias I, Cassimos D, et al. Validation of the Children's Sleep Habits Questionnaire in a sample of Greek children with allergic rhinitis. Allergol Immunopathol 2018; 46(4):389-393.
21. Loureiro HC, Pinto TR, Pinto JC, Pinto HR, Paiva T. Validation of the Children Sleep Habits Questionnaire and the Sleep Self Report for portuguese children. Sleep Sci 2013; 6(4):151-158.
22. Lucas-de la Cruz L, Martinez-Vizcaino V, Alvarez-Bueno C, Arias-Palencia N,

[DOI: 10.18502/ijpho.v12i2.9077]

Sanchez-Lopez M, Notario-Pacheco B. Reliability and validity of the Spanish version of the Children's Sleep Habits Questionnaire (CSHQ-SP) in school-age children. Child Care Health Dev 2016; 42(5):675-682.
23. Fallahzadeh H, Etesam F, Asgarian FS. Validity and reliability related to the Persian version of the children's sleep habits questionnaire. Sleep Biol Rhythms 2015; 13(3):271-278.
24. Shoghy M, Khanjari S, Farmany F, Hosseini F. Sleep habits of school age children. Iran J Nurs 2005; 18(41):131-138.
25. Surani S, Hesselbacher S, Surani S, Sadasiva S, Surani Z, Surani SS, et al. Sleep habits of elementary and middle school children in south Texas. Sleep disorders 2015; 2015: 179103-179103.
26. Iwadare Y, Kamei Y, Oiji A, Doi Y, Usami M, Kodaira M, et al. Study of the sleep patterns, sleep habits, and sleep problems in Japanese elementary school children using the CSHQ. Kitasato Med J 2013; 43(1):31-37.
27. Boergers J, Koinis-Mitchell D. Sleep and culture in children with medical conditions. J Pediatr Psycho 2010; 35(9):915-926.
28. Takahashi M, Wang G, Adachi M, Jiang F, Jiang Y, Saito M, et al. Differences in sleep problems between Japanese and Chinese preschoolers: a cross-cultural comparison within the Asian region. Sleep medicine 2018; 48:42-8.
29. Lown EA, Hijiya N, Zhang N, Srivastava DK, Leisenring WM, Nathan PC, et al. Patterns and predictors of clustered risky health behaviors among adult survivors of childhood cancer: A report from the Childhood Cancer Survivor Study. Cancer 2016; 122(17):2747-2756.
30. Gianinazzi ME, Rueegg CS, Wengenroth L, Bergstraesser E, Rischewski J, Ammann RA, et al. Adolescent survivors of childhood cancer: are they vulnerable for psychological distress?. Psycho-Oncol 2013; 22(9):2051-2058.
31. Mandrell BN, Wise M, Schoumacher RA, Pritchard M, West N, Ness KK, et al. Excessive daytime sleepiness and sleep-disordered breathing disturbances in survivors of childhood central nervous system tumors. Pediatr Blood Cancer 2012; 58(5):746-751.
32. Walter LM, Nixon GM, Davey MJ, Downie PA, Horne RS. Sleep and fatigue in pediatric oncology: A review of the literature. Sleep Med Rev 2015; 24:71-82.
33. Madulara GM. A Survey On Sleep Behaviors And Sleep-Related Problems Among Asthmatic Children Ages 6-12 Years Old In University of Santo Tomas Hospital-Outpatient Division Using The Filipino Version Of The Children's Sleep Habits Questionnaire (CSHQ). J Allergy Clin Immunol 2018; 141(2):AB101-AB105.
34. Pagel J. Excessive daytime sleepiness. Am Fam Physician 2009;79(5):391-396.
35. Gordijn MS, Van Litsenburg RR, Gemke RJ, Huisman J, Bierings MB, Hoogerbrugge PM, et al. Sleep, fatigue, depression, and quality of life in survivors of childhood acute lymphoblastic leukemia. Pediatr Blood Cancer 2013; 60(3):479-485.
36. Irwin MR, Olmstead RE, Ganz PA, Haque R. Sleep disturbance, inflammation and depression risk in cancer survivors. Brain Behav Immun 2013; 30 (l):58-67.
37. Otte JL, Davis L, Carpenter JS, Krier C, Skaar TC, Rand KL, et al. Sleep disorders in breast cancer survivors. Support. Care Cancer 2016; 24(10):4197-4205.
38. Warner EL, Kirchhoff AC, Nam GE, Fluchel M. Financial burden of pediatric cancer for patients and their families. J Oncol Pract 2015; 11(1):12-18.
39. Randall AK, Bodenmann G. Stress and its associations with relationship satisfaction. Curr Opin Psychol 2017; 13:96-106.

[DOI: 10.18502/ijpho.v12i2.9077]

40. Zhang J, Li AM, Fok TF, Wing YK. Roles of parental sleep/wake patterns, socioeconomic status, and daytime activities in the sleep/wake patterns of children. J Pediatr 2010; 156(4):606-612.
41. Kelly RJ, El-Sheikh M. Marital conflict and children's sleep: Reciprocal relations and socioeconomic effects. J Fam Psychol 2011; 25(3):412-422.

[DOI: 10.18502/ijpho.v12i2.9077]