Original Article

The Effectiveness of Using Lullaby and Massage Alone and Together in Assisting Kindergarten Students to Fall Asleep

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Abstract

Aims: The aim of this study is to determine the effectiveness of using lullaby and massage alone and together in assisting kindergarten students to fall asleep for their noon sleep. **Materials and Methods:** The research was performed semi-experimentally in cross-sectional between May 9, 2017 and June 6 2017. Thirty children were included. Data were obtained through a question form prepared. The researcher was interviewed four times in total. After the application, the children were evaluated for their transition to sleep, sleep duration, and participation in postsleep activities. **Results:** When massage was applied, the duration of transition to sleep was shorter when massage and lullaby were used both separately and together, which produced longer sleeping times and higher participation rates in after-sleep activities. **Conclusions:** Appliying massage to children makes sleeping easier, and massage and lullaby both prolong sleep duration when used alone or in combination and increase participation rates in postsleep activities. Both methods can be used to enhance sleep quality and support participation in activities of kindergarten children.

Keywords: Kindergarten child, lullaby, massage, sleep

Introduction

Sleep affects the physiologic and mental functions of individuals of all ages. It is a period of active unconsciousness in which mental and biologic activity is temporarily and partially stopped.[1,2] Biologic activities in the body slow down during sleep so that body energy is maintained. Sleep renews the body and mind and strengthens memory.[3]

One of the most effective factors in the healthy development of a child is regular sleeping habits.[3] In general, the preschool age group sleeps for 11–13 h within 24 h; children sleep 9–10 h at night and 2–3 h during the daytime.[4] Some 33.56% of 4-year-old children in Turkey and 35.86% children in Karaman spend daytime sleep periods in kindergartens.[5]

Preschool education is known to support the physical, mental, and emotional development of children.[6] Professionals who work in kindergartens play an important role in the day-to-day sleep routines of children with the sleeping room and environment regulation, and daytime sleep time.[7,8]

Inadequate sleep in children is associated with many undesired health conditions such as reduced impulse control, cognitive, and behavioral problems.[7-9] One of the methods used to help children pass to sleep more easily, prolong sleep periods, and provide high quality sleep is music.[10-13]

In the literature, a few studies have investigated the effects of music and massage on sleepiness in different age groups, but no studies have determined the effect of applying these two methods together or separately in kindergarten children. This research was peformed to determine the effectiveness

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of using lullaby and massage alone and together in assisting kindergarten students to fall asleep for their noon sleep.

Materials and Methods

Population and sample

The research was performed semi-experimentally in cross-sectional between May 9, 2017 and June 6, 2017. The population of the study comprised 4-year-old children who were educated in kindergartens located in the central province of Karaman. There are a total of 9 kindergartens in the central district and a total of 540 children aged 4–6 years receiving education. Four-year-old children who were enrolled in the two study kindergartens were selected by simple random sampling. Each kindergarten had 20 children aged 4 years. Children who did not attend kindergarten at the time of the application of at least one sleeping method among data collection dates were excluded from the study. Accordingly, four children from one kindergarten and six from the other were excluded from the study. A total of 30 children completed the study.

Criteria for inclusion in research

- Being 4-year-old
- The lack of any chronic disease, hearing problems, vision problems, any sleep problems
- Having and living both parents
- To continue nursery throughout the study
- Be willing to participate in the study.

Data collection tool

The data collection form included 10 questions that assessed the demographic characteristics of the students and their families, 13 questions about children's sleeping habits and sleep techniques used such as night total sleeping time and duration of sleeping, night sleeping problem living situation, daily total sleeping time, duration of sleeping, day sleeping problem living situation, sleeping technique applied to child, sleeping time, total sleeping time, sleeping after sleeping state, sleeping after sleeping activities method of children's most preferred. After the data collection form was prepared, opinions were obtained from three lecturers who were experts in the field. Pilot practice was peformed with 10 children in kindergartens who were not included in the scope of the study.

Collection of data

Data were collected between May 9, 2017 and June 6, 2017. It took 4 weeks to collect the data. Information regarding the demographic characteristics was obtained by telephoning the children's families before the first interview. Each interview was conducted by the researcher, and the duration of sleeping and total sleeping time of the children were recorded, and the children were observed in terms of their participation in postsleep activities.

- In the 1st week, children were observed in terms of the predetermined parameters without using any sleep technique and the data were recorded on the data collection form (sleeping time, total sleeping time). Both researchers observed three children each day. Thus, a total of 6 children were observed everyday. A total of 30 children were observed in 5 days. After the children wake up, they were observed resting and participating in nursery activities
- In the 2nd week, all children had the same lullabies until they slept: The children listened to "dandini dandini dastana" and the "the fizzy whistler" as lullabies. The recorded lullabies were played to the children from a computer in the sleeping room with moderate volume. More information about the lullabies can be found on the web page. Both researchers observed three children each day. Thus, a total of 6 children were observed every day. As soon as the lullaby began, the children measured their time to fall asleep. Then they measured the time spent asleep. A total of 30 children were observed in 5 days. After the children wake up, they were evaluated resting and participating in nursery activities
- In the 3rd week, each child was massaged on the back and head by two researchers before sleep. In the massage practice, the effloration technique was used. Starting from the area around the children, flushing with the efloration technique was performed to the back. Each day, two practitioners massaged 3 children each and recorded observations after the massage. Thus, a total of 6 children were massaged every day. As soon as the massage began, the children measured their time to fall asleep. Then they measured the time spent asleep. A total of 30 children were observed in 5 days. After the children wake up, they were evaluated resting and participating in nursery activities
- In the 4th week, the children were given the same lullaby before sleeping and massaged until they were asleep. At the end of the application, the observed data was recorded in the data collection form. Each day, two practitioners massaged 3 children each and recorded observations after the massage. Thus, a total of 6 children were massaged every day. As soon as the massage and lullaby began, the children measured their time to fall asleep. Then they measured the time spent asleep. A total of 30 children were observed in 5 days. After the children wake up, they were evaluated resting and participating in nursery activities.

Ethics

Ethical permission was obtained from X University Health Sciences Faculty Noninterventional Ethics Committee (Date: 28.02.2018, No: 02). Verbal approval was obtained from all children and their families before the application.

Statistics

Statistical Software for Numbers Cruncher Statistical System 2007 Statistical Software (Utah, USA) was used for the statistical analysis. The Friedman test was used to examine the variance of variables with nonnormal distribution, and the Wilcoxon signed-rank test with Bonferroni correction was used in the *post hoc* comparisons, as well as descriptive statistical methods (mean, standard deviation, median, frequency, ratio). The results were evaluated with a confidence interval of 95% and a significance level of $P < 0.05$.

Limitations of the research

The study was limited to children aged 4 years who were enrolled in day nursery. In addition, in this study, every method that facilitates falling asleep was not observed and only the effect of lullaby and massage was examined.

Results

Sixty percent of the children were girls. The siblings ranged in age from 0 to 5 years with an average of 0.63 ± 1.18 years, and 40% (n = 12) had two siblings; 46.7% (n = 14) of the children were firstborn. The mean age of the mothers was 32.93 ± 4.01 years (range, 26–41 years); the mean age of the fathers was 35.50 ± 3.97 years (range, 29–43 years); 86.7% of the mothers were working; 93.4% of the fathers had high school and above education [Table 1].

The sleeping hours of the children in the study ranged from 7 to 12 h with an average of 9.05 ± 1.04 h; bedtime at night ranged from 20:00 PM to 23:00 PM, and the average was 21.80 ± 1.02. The children complied with the institutional practices due to their presence in day kindergarten. The daytime sleeping time was 13:00 PM and the average sleeping time was 87.86 ± 12.79 min. It was determined that 20% of the children woke frequently at night and 6.7% had nightmares [Table 2].

Table 1: Distribution of demographics of children, siblings, and parents

	Minimum-maximum (median)	Mean±SD
Sibling age (years)	0-5 (0)	0.63±1.18
Mother age (years)	26-41 (33.50)	32.93±4.01
Father age (years)	29-43 (34.50)	35.50±3.97
	***n* (%)**	
Sex		
Girl	18 (60.0)	
Boy	12 (40.0)	
Working status of mother		
Working	26 (86.7)	
Notworking	4 (13.3)	
Education of mother		
Middle school and under	3 (10)	
High school and above	27 (90)	
Education of father		
Middle school and under	2 (6.6)	
High school and above	28 (93.4)	
Number of siblings		
0/1	10 (33.3)	
2	12 (40.0)	
3	6 (20.0)	
4	2 (6.7)	
Number of children		
1	14 (46.7)	
2	12 (40.0)	
3	3 (10.0)	
4	1 (3.3)	
Age of the sibling (years)		
0	21 (70.0)	
1	3 (10.0)	
2	4 (13.3)	
3	1 (3.3)	
5	1 (3.3)	

SD: Standard deviation

Children participating in the study

When the sleep transition times and sleep duration of children were examined according to the methods, there was a statistically significant difference in sleep transition times ($P < 0.01$). When massage was applied, the children's sleep transition period was statistically significantly shorter than that of the control group ($P < 0.01$). There was no statistically significant difference between sleep transition periods according to other procedures ($P > 0.05$).

Sleeping times of children showed a statistically significant difference according to the method used ($P < 0.01$). The sleep duration of children with massage, lullaby, and massage and lullaby were statistically significantly longer compared with the control group ($P < 0.01$). There were no significant differences between methods in terms of sleep time ($P > 0.05$).

Participation in the postsleep activities of children in the study showed a statistically significant difference according to the technique used ($P < 0.01$). When no technique was applied, the participation rates of children in postsleep activities were found statistically significantly lower than massage, lullaby, and massage and lullaby ($P < 0.01$). There was no significant difference in postsleep activity participation between massage, lullaby, and massage and lullaby ($P > 0.05$) [Table 3].

When children's favorite methods were examined, 20% of the children prefered that no technique was used, 33% preferred massage, 26.7% prefered lullaby, and 20% of children prefered lullaby and massage. More than half (63.3%) of children who participated in the study reported that they did not use any technique at home, 23.3% said lullaby, 10% indicated lullaby and massage use, and 3% of the children reported that massage was used [Table 4].

Discussion

The research was performed semi-experimentally in order to determine the effectiveness of using lullaby and massage alone and together in assisting kindergarten students to fall asleep for their noon sleep.

Sleep is an inactive period of time when an individual is not aware of the world around them.[14] Crabtree and Williams defined sleep in a way that was consistent with the definition used for naptime, a period of rest and quiet time for children. Naptime prepares children for afternoon learning activities by increasing their ability to perform tasks and digest information.[15] Balanced levels of serotonin and an increase in adenosine produce the relaxed, sleepy state of mind required for successful sleep.[16] Sleep improves the quality of life in young children, and poor or inadequate sleep may result in

Table 2: Distribution of the children's nighttime and daytime sleeping times, sleeping hours, and sleeping problems

	Night		Day	
	Minimum-maximum (median)	Mean±SD	Minimum-maximum (median)	Mean±SD
Sleep time*	7-12 (9)	9.05±1.04	63-112 (90)	87.86±12.79
Bedtime	20:00-23:00 (22)	21.80±1.02	13:00	-
	n (%)		*n* (%)	
Sleep troubles				
None	22 (73.3)		28 (93.3)	
Frequent waking	6 (20.0)		2 (6.7)	
Nightmares	2 (6.7)		0	

*Sleep duration is given in hours for night and minutes for day. SD: Standard deviation

Table 3: Evaluation of sleep, rest, and participation in activities according to groups

	No technique[1]	Massage[2]	Lullaby[3]	Lullaby and massage[4]	*P*[a]	*Post hoc test*[b]
Falling asleep (min)						
Minimumn - maximum (median)	4-52 (24)	5-120 (17.5)	7-120 (15)	4-52 (24)	0.004**	0.004**,[1-2]
Mean±SD	28.33±12.52	23.70±21.15	26.76±29.50	28.33±12.52		
Sleeping time (min)						
Minimum - maximum (median)	63-112 (90)	0-134 (104.5)	0-135 (115)	63-112 (90)	0.001**	0.003**,[1-2]
Mean±SD	87.86±12.79	98.60±28.92	103.50±32.54	87.86±12.79		0.002**,[1-3]
						0.002**,[1-4]
Participation in activities, *n* (%)						
Very good	7 (23.3)	18 (60.0)	19 (63.3)	7 (23.3)	0.001**	0.001**,[1-2]
Good	11 (36.7)	8 (26.7)	8 (26.7)	11 (36.7)		0.001**,[1-3]
Midle	9 (30.0)	3 (10.0)	3 (10.0)	9 (30.0)		0.001**,[1-4]
Bad	3 (10.0)	1 (3.3)	0	3 (10.0)		

**P*<0.05, [a]Friedman-test, [b]Benforroni correction Wicoxon signed-rank test. SD: Standard deviation

Table 4: Rating from activities and implementation at home

Activites	Favorite methods of children, *n* (%)	The methods used at home, *n* (%)
No tecnic	6 (20.0)	19 (63.3)
Massage	10 (33.3)	1 (3.3)
Lullaby	8 (26.7)	7 (23.3)
Lullaby and massage	6 (20.0)	3 (10.0)

decreased physical, social, and emotional function, and overall health.[17]

It is known that massage has a calming effect. When we looked at studies that conducted massage in children, it was generally used in the context of pain, anxiety, and stress reduction,[18] mental electrical activity of the brain,[19] and mother-baby interaction.[20] Studies that determined the effect of massage on sleep were generally made during infancy. Kelmanson and Adulas (2006) investigated the effect of massage on sleep behaviors in low-birth-weight neonates and found that massage increased sleep quality and reduced the rate of irregular breathing in sleep.[13] Another study reported that children aged between 8 months and 3 years who had problems with drowsiness, and uncomfortable behaviors decreased when massage was applied before sleeping, and the children fell asleep more quickly.[11] The finding that children fell asleep sooner than when no massage was applied in their study supports our results and suggests that massage makes it easier for a child to fall asleep through relaxation.

Music is known to be particularly effective in reducing pain and anxiety during the neonatal period (painful procedures, life signs, oxygen saturation),[21] and in children during medical practices.[22]

Music prepares an the sleeper's environment and restful mood.[23,24] Music can also be used to improve many aspects related with sleep. Harmat *et al*. demonstrated statistically significant improvements in sleep quality in a group 19–28-year-olds after they listened to 45 min of classical music.[25] Lai and Good investigated the effect of relaxing music on sleep in people aged sixty and over and found significant improvements in sleep onset time, sleep quality, efficiency, and quantity, in addition to improved daytime behavior and alertness.[26] Similar results have been shown with children with relaxing music with regards reduced sleep onset time, and increased quality and duration of sleep.

In addition, mothers who sing lullabies to their babies reduce the stress associated with baby care,[27] which regulates oxygen saturation in babies.[28] Studies that investigated the relationship between music and sleep in children are limited. Tan determined that sleep quality, and duration of sleep was improved in children who listened to music before and

during day and night sleep for 3 weeks.[29] Field reported that music versus silence shortened the time to falling asleep in children.[10] In our study, we found that the time to falling asleep was shorter when massage was applied, but the sleep duration was longer when massage and lullaby were applied both separately and together [Table 3]. These results suggest that both massage and lullaby are effective in prolonging the sleeping period when used alone or together.

Children who have insufficient sleep may have decreased ability to attend to tasks and process information.[15] Significant correlations were found between decreased quality of sleep and decreased neurobehavioral functioning in school-age children in a follow-up study.[30] Similarly, other researchers found that children with higher instances of daytime fatigue also had significantly lower scores for cognitive performance evaluation.[31]

Conclusions

The results of our study show that the use of massage and lullaby, both separately and together, increases participation in postsleep activities [Table 3]. This result supports findings of other studies.

The majority (63.3%) of the children indicated that their parents did not use any technique for facilitating sleep transition in their homes. The majority (80%) of the children said that they wanted to apply massage or lullaby alone or together before sleeping. We suggest that it would be useful for parents and caregivers if they were informed about massage and lullaby for facilitating sleep.

What this study adds

This study determined the effect of both lullaby and massage on sleep. It also shows the effect of sleeping technique on postsleep activities. Massage practice facilitates the transition to sleep in kindergarten children, and the use of massage and lullaby, both separately and together, prolongs sleep duration and increases participation in postsleep activities. The methods can be used to promote kindergarten school children's sleep quality and support their participation in postsleep activities.

What is already known

Massage has been shown to be an effective sleeping technique. Lullaby or singing is also used as a sleep technique.

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Conflicts of interest

There are no conflicts of interest.

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