

## Original Article



# Mother's Perception of Sleep Quality and Related Factors in Toddlers Admitted to a Pediatric Medical Ward: A Cross-Sectional Analytical Study

Divyabharathi Thillaikkannu<sup>1</sup> , Vetriselvi Prabakaran<sup>2\*</sup> , Tamil Selvan<sup>3</sup> <sup>1</sup>College of Nursing, Jawaharlal Institute of Post Graduate Medical Education and Research (JIPMER), Puducherry, India<sup>2</sup>Department of Paediatric Nursing, College of Nursing, Jawaharlal Institute of Post Graduate Medical Education and Research (JIPMER), Puducherry, India<sup>3</sup>Department of Pediatrics, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry, India**Article Info****Article History:**

Received: August 31, 2024

Revised: March 10, 2025

Accepted: October 5, 2025

ePublished: March 16, 2026

**Keywords:**

Maternal perception of sleep quality, Toddlers, Related factors, Pediatric medical ward

**\*Corresponding Author:**Vetriselvi Prabakaran,  
Email: [vetriselvijipmer1967@gmail.com](mailto:vetriselvijipmer1967@gmail.com)**Abstract****Introduction:** Hospitalization can cause severe disruption in sleep. This study aimed to assess mother's perception of sleep quality and related factors in hospitalized toddlers.**Methods:** A cross-sectional analytical study was carried out among 384 mothers of toddlers in pediatric medical ward. Convenience sampling technique was used to enrol the mothers of toddlers who met the inclusion criteria. Socio-demographic and clinical characteristics of the toddlers were collected from the mothers by interviewing them and also from medical record. Mother's perception of sleep quality and related factors were assessed through Karolinska sleepiness scale (KSS) and Potential hospital sleep disruption and noises questionnaire (PHSDNQ) respectively. Data were analysed using frequency, percentage, chi-square test, spearman's rank correlation and multiple regression with SPSS software version 20.**Results:** Mother's perception of sleep quality in toddlers showed that 98.2% had poor sleep. Related factors were: 96.1% by nurse physician interruption, 93.0% by cleaning staff interruption, 89.1% by administration of medications, 86.7% by checking vital signs, 85.2% by noises, 79.7% by pain, 75.8% by feeling anxious, 75.0% by disturbance created by neighbouring child, 70.1% by alarms on equipment, 59.9% by staffs conversation, 52.6% by lighting in a hallway (or) room, 25.5% by drawing blood (or) other test, 20.3% by room temperature (warm/cold), 11.7% by continuous pulse oximetry, and 8.6% by poor ventilation. Age of the mother, type of respiratory support and duration of intravenous line days had relationship with sleep quality significantly.**Conclusion:** Mother's perception of sleep quality of toddlers revealed that 98.2% had poor sleep.**Introduction**

Sleep is essential for children's physical and mental well-being.<sup>1</sup> Sleeping is a basic human need for equilibrium as well as for optimal and sufficient biological and psychological functioning. Inadequate sleep has detrimental effects like stress, feeling depressed, and alteration in cognitive and neurological functioning.<sup>2</sup>

Sleep is one of the human behaviours and it is also an important biological need.<sup>3</sup> The quality of sleep is determined by several factors like its duration, number of night time awakenings and sleep onset delay.<sup>4</sup> Sleep hygiene refers to adaptable parenting and child behaviours that allow for enough sleep duration, optimum sleep quality and reduction of daytime sleepiness.<sup>5</sup>

Early life and childhood are critical periods for determining how children develop their sleep patterns and habits.<sup>6</sup> Most often toddlers experience behavioural

sleep problems such as trouble in falling sleep, shows resistance in going to bed and frequent night awakenings.<sup>7</sup> Young children will have long-term effects of sleep disruption and sleep deprivation and this affects their brain development and maturity.<sup>8</sup> For the development of the mind, body and mind body connection as well as for the quality of life sleep is the essential. The National Sleep Foundation (NSF) states that in order to maintain good health toddlers (ages 1-3) should get 11 to 14 hours of sleep every 24 hours.<sup>9</sup>

Childhood sleep deprivation is related to a host of inequalities that manifest in later life which include poor health, early ageing, impaired memory and limited academic achievement.<sup>10,11</sup> Toddlers and infants frequently have sleep disruption. Children between the ages of 0 to 3 years old experience night time awakenings at a rate of 20% to 66%.<sup>12,13</sup>

## Research Highlights

### What is the current knowledge?

- Toddlers experience behavioral sleep problems such as trouble in falling sleep, shows resistance in going to bed and night awakenings. Toddlers frequently have sleep disruption.

### What is new here?

- In this study well-tailored identification of associated factors for disruption of sleep were nurse/ physician interruption, cleaning staff interruption, administration of medications, checking vital signs, noises, pain, feeling anxious and disturbance created by neighbouring child.
- This study adds one more piece of evidence that sleep disruption factors prevention strategies need to be strengthened in pediatric medical ward.

One of the primary ways that parents assess their child's sleep quality is the frequency of night awakenings. Due to a combination of environmental, developmental and carer factors unique to this stage of life, sleep issues including trouble falling and staying asleep are particularly common in toddlerhood. Children with sleep issues have emotional and social difficulties that manifest as loneliness, insecurity, fear, mental instability and anxiety. Aspects of the sleeping environment plays a significant role in determining the sleep habits and issues of children.<sup>14,15</sup> Parental involvement, co-sleeping with a child, breastfeeding and environmental factors are among the parent and child-related factors that have been linked to an increase in nocturnal awakenings.<sup>16</sup>

Children's sleep issues are becoming more serious public health problem. One out of every four child under the age of five experiences sleeps disruption which can result in both health and behavioural disorders. The field of public health gives greater attention to children's sleep. It is critical to recognise and support children sleep habits if you want to improve their health and general well-being. Child health care professionals are crucial in identifying sleep disruptions in children because they frequently interact with young children and their parents. However parents may not support and encourage their children to practise healthy sleep habits if they are unaware of the warning signs and consequences of sleep disturbances.<sup>17</sup>

Children aged 1-3 years had the highest proportion of admission (35%) to tertiary care hospital. Respiratory conditions and diseases of digestive system were the most common reasons for their hospitalization. During their hospitalization they experienced sleep disturbances mainly due to noise, light, and care interventions and also because of strange environment. Only few studies have been conducted to identify the sleep quality among children. Herbert et al conducted an observational study in Westmed children hospital, Australia among 107 children under age group of 1 to 18 years during two week period in inpatient area and revealed that 52.3% had

poor sleep.<sup>18</sup> Erondu et al reported that 77% of parents reported inadequate sleep duration for their children.<sup>19</sup> So far studies conducted to identify the caregivers, nurses and physician perception on sleep disruptive factors among children. Only in our study mother's perception of sleep quality and related factors in toddlers admitted to a pediatric medical ward was assessed. Pierce et al revealed that checking vital signs, nurse/physician interruption, use of continuous pulse oximetry were the most frequent sleep disruptors.<sup>20</sup> In our study apart from common sleep disruptors other factors like lighting, ventilation of the room and disturbance due to other staff of the hospital were also included.

Since children of toddler age group (1-3 years) were not able to express their quality of sleep and related factors, mothers of the toddlers were included in the study as participants to express their perception. Since nurses are involved in planning nursing care for children, she can discuss with mothers on their perception of sleep quality of their children and related factors and this will aid her in avoiding the sleep disruptors, hence this study aims to assess the mother's perception on sleep quality and related factors in hospitalized toddlers.

## Materials and Methods

A cross-sectional study was adopted to assess the mother's perception of sleep quality and related factors in toddlers admitted to a pediatric medical ward. This study was conducted in pediatric medical ward in a tertiary health care hospital during September 2023 to April 2024. In pediatric medical ward, 62 children were hospitalized and 8 children were in each cubic. Mostly children with bronchiolitis, pneumonia, meningitis, nephrotic syndrome and diarrhea were admitted in this ward. Based on the prevalence of sleep disruption in toddlers in pediatric medical ward as 52% at 5% absolute precision and 96% confidence level 384 mothers of toddlers were enrolled in the study.<sup>18</sup> Mothers of toddlers admitted in pediatric medical ward who gave willingness were included in the study. Mothers of toddlers with orogastric tube, nasogastric tube, tracheostomy tube, chest tube, continuous bladder drainage, on analgesics (or) sedative medications and mothers of toddlers admitted in pediatric special ward were excluded from the study. Everyday mothers of toddlers who met the inclusion criteria were selected through convenience sampling method. Informed consent was obtained from the mothers of toddlers.

Socio-demographic variables of mothers and clinical characteristics of toddlers were collected by interviewing the mother and from medical record. Mothers noticed their child sleep status from 8 pm to 7 AM and around 10 AM their perception of sleep quality was assessed through a structured interview using Karolinska Sleepiness Scale (KSS). Mother's perception of factors associated with disruption of sleep was assessed through a structured interview using Potential Hospital Sleep Disruption and Noises Questionnaire (PHSDNQ). It took 30 minutes to collect the data from each mother.

Data collection instrument had four sections. The first section included socio-demographic data of mothers and toddlers. It comprised of age of the mother, educational status of the mother, occupation, domicile, family income per month, age of the child, gender, and date of admission and duration of hospital stay.

Second section had data on clinical characteristics of the child. It comprised of provisional diagnosis, vital signs on the day of interview (such as temperature, pulse rate, respiratory rate, blood pressure), type of respiratory support (such as room air, nasal prongs, face mask, high flow nasal cannula, continuous positive airway pressure (CPAP), bi-level positive airway pressure (BIPAP), presence of intravenous line and duration of intravenous line.

Third section had data on mother's perception on sleep quality of toddlers which was assessed by Karolinska sleepiness scale (KSS). It comprised of 10 items and they were scored as extremely alert (1), very alert (2), alert (3), rather alert (4), neither alert nor sleepy (5), some signs of sleepiness (6), sleepy, but no effort to keep awake (7), sleepy, but some effort to keep awake (8), very sleepy, great effort to keep awake, fighting sleep (9) and extremely sleepy, can't awake (10). Score of more than 5 indicated good sleep and score of 5 & < 5 indicated poor sleep. This scale has well established reliability value ( $r = 0.6$ ).<sup>21</sup>

Fourth section had data on mother's perception of related factors of disruption of sleep in toddlers was assessed by Potential hospital sleep disruption and noise questionnaire (PHSDNQ). This tool was designed by Mila N Grossman in 2017. It comprised of 15 items including checking vital signs, Continuous use of pulse oximetry, administration of medications, drawing blood (or) other test, pain, feeling anxious, noises, staff conversation, alarms on equipment, room temperature (warm/ cold), nurses/ physician interruption, cleaning staff interruption, disturbance created by neighbouring child, lighting in hallway (or) room and poor ventilation. This scale has well established reliability value ( $r = 0.71$ ).<sup>22</sup>

The study was approved by institute scientific advisory committee (JIP/CON/ NRMC/M.Sc./2022/PN/3) and ethics committee (JIP/CON/ IEC/M.Sc./2022/PN/3). Informed consent was obtained from mothers of toddlers under the study. Confidentiality of the data, right to withdraw from the study and anonymity of the subjects were explained prior. The content validity of the four sections of the tool was obtained from the experts of pediatric department and nursing department.

Data were analyzed using SPSS version 20 (SPSS Inc., Chicago, Ill., USA). Both descriptive and inferential statistics were used for analysis of data. Descriptive statistics (frequency, percentage) were used to describe the socio demographic variables, clinical characteristics of child, mother's perception on sleep quality & factors associated with the disruption of sleep. Inferential statistics (Chi-square test) was used to identify the association of mother's perception of sleep quality with socio-demographic variables and clinical characteristics

of toddlers. Spearman's rank correlation was used to identify relationship between mother's perceptions of sleep quality and sleep disruption. Multiple regression analysis was used to explore the relationship between the sleep disruption and socio-demographic variables and clinical characteristics of toddlers.

## Results

Most of the mothers were between 26–30 years, 27.3% of mothers had high school education, 88% were unemployed, 76.8% were residing in rural area and 32% had a monthly income of  $\leq$  Rs. 5000. Most of children were aged 1 year and majority were male. All children were hospitalized for 2 days and most of the children had normal temperature, pulse, blood pressure and respiration. Most of the children had room air as their respiratory support and majority of them had intravenous line (Table 1).

Mother's perception on sleep quality in toddlers showed that 98.2% had poor sleep. Majority of mothers perceived that their toddlers sleep was disrupted by related factors like nurse physician interruption, cleaning staff interruption, administration of medications, checking vital signs, noises, pain, feeling anxious, disturbance created by neighbouring child and alarms on equipment. More than half of the mothers thought staff conversation disrupted their child's sleep. Only limited number of mothers perceived that their toddlers sleep was disrupted by lighting in a hallway (or) room, drawing blood (or) other test, room temperature (warm/cold), continuous use of pulse oximetry and poor ventilation (Table 2).

There was no significant association between mother's perception of sleep quality of toddlers with socio-demographic variables and clinical characteristics (Table 3 & 4).

Mothers of younger age, children who were on room air and children with Intravenous line for more days were associated with poor sleep quality (Table 5).

## Discussion

This cross-sectional analytical study included 384 mothers of toddlers in a pediatric medical ward. In our study mother's perception of sleep quality of toddlers revealed that 98.2% had poor sleep.

In contrary to this a study by Herbert et al, in Australia reported that only 52.6% of children had poor sleep.<sup>18</sup> In accordance with this a survey done by Erundu et al, in Chicago also revealed that only 77% had sleep deficit.<sup>19</sup> In consistent to this Kim et al, conducted a study in South Korea also reported that only 57.6% of children had poor sleep.<sup>23</sup> Relatively studies by Smaldone et al, and Gutierrez-Colina et al, also reported that only less percentage of children (31.9% and 42% respectively) had poor sleep.<sup>24,25</sup> Similarly Cassanello et al, in Spain and Sundell et al, in Sweden also reported that only 39% and 25% of children had inadequate sleep respectively.<sup>26,27</sup>

This discrepancy may be due to inclusion of more (47.1%) younger children (1 year of age) in our study and

**Table 1.** Socio-demographic variables of mothers of toddlers & Clinical characteristics of toddlers (N=384)

Socio-demographic variables of mothers of toddlers		Clinical characteristics of toddlers	
Variable	N (%)	Variable	N (%)
Age of the mothers (in years)		Age of the child (in years)	
≤25	142 (37.0)	1	181(47.1)
26 – 30	175 (45.6)	2	106(27.9)
31 – 35	57 (14.8)	3	91(25.0)
>35	10 (2.6)	Gender of the child	
Education of mother		Male	223 (58.1)
Illiterate	3 (0.8)	Female	161 (41.9)
Primary school	13 (3.4)	Duration of hospital stay (in days)	
Middle school	34 (8.9)	1	-
High school	105 (27.3)	2	384(100.0)
Higher secondary	103 (26.8)	Temperature	
Intermediate / Diploma	15 (3.9)	Normal (35.9-36.8)	317 (82.6)
Undergraduate	89 (23.2)	Abnormal (<35.9-35.8)	67 (17.4)
Post graduate	22 (5.7)	Pulse rate	
Occupation		Normal (80-130)	346 (90.1)
Unemployed	338 (88.0)	Abnormal (<80 or> 130)	38 (9.9)
Employed	46 (12.0)	Respiratory rate	
Domicile		Normal (24-40)	342 (89.1)
Rural	295 (76.8)	Abnormal (<24 or>40)	42 (10.9)
Urban	89 (23.2)	Blood pressure	
Income in Rs.		Normal (80/55-110/79)	321 (83.6)
≤5,000	123 (32.0)	Abnormal (<80/55 or> 110/79)	63 (16.4)
5,001 to 10,000	108 (28.1)	Type of respiratory support	
10,001 to 15,000	60 (15.6)	Room air	269 (70.1)
15,001 to 20,000	37 (9.6)	Nasal prongs	79 (20.6)
>20,000	56 (14.6)	Face mask	9 (2.3)
		High flow nasal cannula	13 (3.4)
		Continuous positive airway pressure	11 (2.9)
		Bi-level positive airway pressure	3 (0.8)
		Presence of intravenous line	
		Yes	302 (78.6)
		No	82 (21.4)
		Duration of intravenous line (in days)	
		1	78 (25.8)
		2	226 (74.2)

moreover they were not in separate room. In each cubical 8 children were admitted. This may be the reason for increased percentage of poor sleep.

In our study majority of the mothers (96.1%) had perceived that their toddlers sleep was disrupted by nurse/physician interruption. In contrary to this a survey-based study conducted by Peirce et al, in Comer's children hospital, Chicago reported that only 48.7% had sleep disruption due to physician interruption.<sup>20</sup> Similarly, a cross-sectional study conducted by Oliveira et al, in Academic medical centre of Lisbon, Portugal among children admitted in five pediatric wards also revealed that only 26% had sleep disruption due to physician interruption.<sup>28</sup>

In our study most of the mothers (86.7) perceived that checking vital signs disrupted their child's sleep which is contrary to the study by Pierce et al, who reported only 52% of disruption.<sup>20</sup>

In our study most of the mothers had perceived that their toddlers sleep was disrupted by noises (85.2%) and pain (79.7%). In contrary to this Pierce et al, and Oliveira et al, revealed that by noise only 15% and 38% were disrupted respectively and for pain only 28.5% and 38.5% were disrupted respectively.<sup>20,28</sup>

Feeling anxious was quoted as one of the sleep disruptive factors by majority of the mothers (75.8%) in our study. In contrary to this a research done by Pierce et al and oliveira et al, reported that only 21.5% and 19.2% were

**Table 2.** Mother’s perception on factors associated with sleep disruption of toddlers (N=384)

Sleep Disruptive Factors	N (%)
Checking vital signs	333 (86.7)
Continuous use of pulseoximetry	45 (11.7)
Administration of medications	342 (89.1)
Drawing blood (or) other test	98 (25.5)
Pain	306 (79.7)
Feeling anxious	291 (75.8)
Noises	327 (85.2)
Staff conversation	230 (59.9)
Alarms on equipment	269 (70.1)
Room temperature (warm/cold)	78 (20.3)
Nurse/ physician interruption	369 (96.1)
Cleaning staff interruption	357 (93.0)
Disturbance created by neighbouring child	288 (75.0)
Lighting in a hallway (or) room	202 (52.6)
Poor ventilation	33 (8.6)

**Table 3.** Association of mother’s perception on sleep quality with socio-demographic variables of mothers (N=384)

Variables	N (%)		Chi-Square & P value <sup>a</sup>
	Sleep quality		
	Poor	Good	
Age of the mothers			
≤25	140 (36.5)	2 (0.5)	
26 – 30	170 (44.3)	5 (1.3)	2.426 & 0.489
31 – 35	57 (14.8)	0 (0)	
>35	10 (2.6)	0 (0)	
Education of mother			
Illiterate	3 (0.8)	0 (0)	
Primary school	13 (3.4)	0 (0)	
Middle school	33 (8.6)	1 (0.3)	
High school	102 (26.6)	3 (0.8)	4.185 & 0.758
Higher secondary	100 (26.0)	3 (0.8)	
Intermediate / Diploma	15 (3.9)	0 (0)	
Undergraduate	89 (23.2)	0 (0)	
Post graduate	22 (5.7)	0 (0)	
Occupation			
Unemployed	332 (86.5)	6 (1.6)	0.036 & 0.850
Employed	45 (11.7)	1 (0.3)	
Domicile			
Rural	291 (75.8)	4 (1.0)	1.551 & 0.213
Urban	86 (22.4)	3 (0.8)	
Income in Rs.			
≤5,000	123 (32.0)	0 (0)	
5,001 to 10,000	106 (27.6)	2 (0.5)	
10,001 to 15,000	58 (15.1)	2 (0.5)	4.166 & 0.384
15,001 to 20,000	36 (9.4)	1 (0.3)	
>20,000	54 (14.1)	2 (0.5)	

<sup>a</sup>Chi- square test.

**Table 4.** Association of mother’s perception on sleep quality with clinical characteristics of toddlers (N=384)

Variable	N (%)		Chi- Square & P value <sup>a</sup>
	Sleep quality		
	Poor	Good	
Age of the child(in years)			
1	177 (46.1)	4 (1.0)	
2	105 (27.3)	2 (0.5)	0.480 & 0.787
3	95 (24.7)	1 (0.3)	
Gender of the child			
Male	219 (57.0)	4 (1.0)	0.003 & 0.960
Female	158 (41.1)	3 (0.8)	
Duration of hospital stay (in days)			
1	-	-	-
2	377 (98.2)	7 (1.8)	
Temperature			
Normal (35.9 – 36.8)	312 (81.2)	5 (1.3)	0.612 & 0.434
Abnormal (<35.9 or>36.8)	65 (16.9)	2 (0.5)	
Pulse rate			
Normal (80 – 130)	339 (88.3)	7 (1.8)	0.783 & 0.376
Abnormal (<80 or>130)	38 (9.9)	0	
Respiratory rate			
Normal (24 – 40)	335 (87.2)	7 (1.8)	0.876 & 0.349
Abnormal (<24 or>40)	42 (10.9)	0	
Blood pressure			
Normal (80/55 – 110/79)	316 (82.3)	5 (1.3)	0.769 & 0.380
Abnormal (<80/55 or>110/79)	61 (15.9)	2 (0.5)	
Type of respiratory support			
Room air	262 (68.2)	7 (1.8)	
Nasal prongs	79 (20.6)	0	
Face mask	9 (2.3)	0	3.048 & 0.693
High flow nasal cannula	13 (3.4)	0	
Continuous positive airway pressure	11 (2.9)	0	
Bilevel positive airway pressure	3 (0.8)	0	
Presence of Intravenous line			
Yes	298 (77.6)	4 (1.0)	1.963 & 0.161
No	79 (20.6)	3 (0.8)	
Duration of Intravenous line (in days)			
1	77 (25.5)	1 (0.3)	0.028 & 0.986
2	221 (73.2)	3 (1.0)	

<sup>a</sup>Chi- square test.

disrupted respectively.<sup>20,28</sup> Administration of medication was stated as one of the disruptive factors by majority of the mothers (89.1%) in our study. Contradicting this Pierce et al, reported only 28.5% .<sup>20</sup>

In our research only 11.7% of mothers had perceived that their toddlers sleep was disrupted by use of continuous pulse oximetry. Contradicting this study by Pierce et al reported 37.5%.<sup>20</sup>

In our study, age of the mother showed significant association with sleep quality. In our study, mothers of younger age group (<25 years) were more so that their

**Table 5.** To identify the factors associated with sleep quality (N = 384)

Variables	Unstandardized Coefficients		Standardized Coefficients	t	P value <sup>a</sup>	95.0% CI for B	
	B	SE	Beta			Lower Bound	Upper Bound
Age of the mother (≤25 years)	0.085	0.040	0.119	2.127*	0.034*	0.006	0.163
Education of Mother (Illiterate)	-0.006	0.019	-0.019	-0.325	0.746	-0.043	0.031
Occupation (Unemployed)	-0.102	0.096	-0.065	-1.054	0.293	-0.291	0.088
Domicile (Rural)	0.009	0.070	0.008	0.135	0.893	-0.128	0.147
Income (≤Rs. 5000)	-0.004	0.023	-0.012	-0.197	0.844	-0.049	0.040
Age of the Child (1year)	-0.021	0.036	-0.034	-0.588	0.557	-0.092	0.049
Gender (Male)	-0.042	0.058	-0.041	-0.727	0.468	-0.158	0.073
Temperature (Normal)	-0.092	0.082	-0.065	-1.124	0.262	-0.254	0.069
Pulse (Normal)	0.186	0.112	0.100	1.658	0.098	-0.035	0.408
Respiratory Rate (Normal)	-0.051	0.114	-0.027	-0.451	0.652	-0.275	0.173
Blood pressure (Normal)	0.134	0.078	0.101	1.729	0.085	-0.019	0.288
Type of respiratory support (Room air)	0.088	0.030	0.176	2.946*	0.003*	0.029	0.146
Presence of intravenous line (Yes)	-0.367	0.522	-0.041	-0.703	0.482	-1.394	0.660
Duration of intravenous line (1 day)	-0.211	0.070	-0.184	-3.040*	0.003*	-0.348	-0.074

R<sup>2</sup> Change – 11.5%

SE: standard error; CI: confidence interval, B: beta coefficient, \*Significant, <sup>a</sup>Multiple regression.

perception may vary. In contrast, a study by Bardosono et al, revealed no significant association.<sup>29</sup> Type of respiratory support and duration of intravenous line showed a significant association with sleep quality but no studies were in accordance with this.

In future a similar study can be conducted in pediatric surgical ward and also in pediatric casualty. It has to mentioned that extreme caution should exercised in generalizing the findings of the study to other population because the current study was conducted in one region only, moreover toddlers in pediatric medical ward were only included in the study.

Pediatric nurses play a major role in assessing sleep quality and related factors in children who are hospitalized and thus they can identify the disruptive factors and can plan preventive strategies. Moreover completion of all nursing care interventions before bedtime and by minimising procedures during night time will helps to improve sleep quality among toddlers who were hospitalized.

**Conclusion**

The findings of the study showed that among toddlers admitted in pediatric medical ward 98.2% had poor sleep quality. Health care providers have a significant role to enhance the sleep quality of toddlers in hospital by identifying each child's disruptive sleep factors and rectify them.

**Acknowledgements**

The authors would like to express their gratitude to all the mothers of toddlers who were participated in the study.

**Authors' Contribution**

Conceptualization: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan

Data curation: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan  
 Formal analysis: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan  
 Investigation: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan  
 Methodology: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan  
 Project administration: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan  
 Resources: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan  
 Software: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan  
 Supervision: Vetriselvi Prabakaran  
 Validation: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan  
 Visualization: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan  
 Writing-original draft: Divyabharathi Thillaikkannu, Vetriselvi Prabakaran, Tamil Selvan  
 Writing-review & editing: Vetriselvi Prabakaran

**Competing Interests**

The authors declare no conflict of interest in this study.

**Data Availability**

The datasets are available from the corresponding author on reasonable request.

**Ethical Approval**

The current study is a part of MSc thesis approved by the ethics committee of JIPMER. The objectives of the study were explained to mothers of toddlers and all of them signed written informed consent forms. Mothers were also assured about the confidentiality of the data.

**Funding**

The authors have declared that there was no funding.

**References**

1. Ilter Bahadur E, Zengin Akkus P, Coskun AN, Karabulut

- E, Ozmert EN. Sleep and social-emotional problems in preschool-age children with developmental delay. *Sleep Biol Rhythms* 2022;20(2):201–10. doi:10.1007/s41105-021-00354-5
2. Gomes AM, Martins MC. Child perception and parent's perception about child sleep quality. *Sleep Sci* 2021;14(4):342–7. doi:10.5935/1984-0063.20200107
  3. Fadzil A. Factors Affecting the Quality of Sleep in Children. *Children (Basel)* 2021;8(2):122. doi:10.3390/children8020122
  4. Yisahak SF, Boone KM, Rausch J, Keim SA. The timing and quality of sleep was associated with dietary quality and anthropometry in toddlers born preterm. *Acta Paediatr* 2023;112(7):1453–60. doi:10.1111/apa.16750
  5. Mindell JA, Meltzer LJ, Carskadon MA, Chervin RD. Developmental aspects of sleep hygiene: findings from the 2004 National Sleep Foundation Sleep in America Poll. *Sleep Med* 2009;10(7):771–9. doi:10.1016/j.sleep.2008.07.016
  6. Lin X, Chen X, Chen Y, Xu P, Chen S. Sleep initiation patterns and sleep quality among toddlers in the southeast of China: initial study results. *BMC Pediatr* 2024;24(1):298. doi:10.1186/s12887-024-04786-z
  7. Bates RA, Singletary B, Yacques A, Justice L. Sleep and stress in mother-toddler dyads living in low-income homes. *Dev Psychobiol* 2021;63(5):1635–43. doi:10.1002/dev.22077
  8. Klapp JM, Hall TA, Riley AR, Williams CN. Sleep disturbances in infants and young children following an acquired brain injury. *J Clin Sleep Med* 2022;18(10):2387–95. doi:10.5664/jcsm.10116
  9. Hirshkowitz M, Whiton K, Albert SM, Alessi C, Bruni O, DonCarlos L, et al. National Sleep Foundation's updated sleep duration recommendations: final report. *Sleep Health* 2015;1(4):233–43. doi:10.1016/j.sleh.2015.10.004
  10. Bates RA, Singletary B, Dynia JM, Justice LM. Maternal Mental Health Symptoms and Clusters Predict Toddler Sleep in Low-Income Homes. *J Genet Psychol* 2021;182(4):252–68. doi:10.1080/00221325.2021.1910125
  11. Dionne G, Touchette E, Forget-Dubois N, Petit D, Tremblay RE, Montplaisir JY, et al. Associations between sleep-wake consolidation and language development in early childhood: a longitudinal twin study. *Sleep* 2011;34(8):987–95. doi:10.5665/sleep.1148
  12. Sun W, Li SX, Jiang Y, Xu X, Spruyt K, Zhu Q, et al. A Community-Based Study of Sleep and Cognitive Development in Infants and Toddlers. *J Clin Sleep Med* 2018;14(6):977–84. doi:10.5664/jcsm.7164
  13. Bates RA, Singletary B, Dynia JM, Justice LM. Temperament and sleep behaviors in infants and toddlers living in low-income homes. *Infant Behav Dev* 2021;65:101657. doi:10.1016/j.infbeh.2021.101657
  14. Sam G, Naif M, Zinaf S, Hamoud M, Inad N. Socioemotional behaviour of toddlers influenced by the sleep patterns: Prevalence study. *J Family Med Prim Care* 2022;11(3):941–7. doi:10.4103/jfmpc.jfmpc\_340\_21
  15. Williamson AA, Leichman ES, Walters RM, Mindell JA. Caregiver-perceived sleep outcomes in toddlers sleeping in cribs versus beds. *Sleep Med* 2019;54:16–21. doi:10.1016/j.sleep.2018.10.012
  16. Mäkelä TE, Kylliäinen A, Saarenpää-Heikkilä O, Paavonen EJ, Paunio T, Leppänen JM, et al. Signaled night awakening and its association with social information processing and socio-emotional development across the first two years. *Sleep* 2021;44(12). doi:10.1093/sleep/zsab179
  17. Angelhoff C, Johansson P, Svensson E, Sundell AL. Swedish translation and validation of the Pediatric Insomnia Severity Index. *BMC Pediatr* 2020;20(1):253. doi:10.1186/s12887-020-02150-5
  18. Herbert AR, de Lima J, Fitzgerald DA, Seton C, Waters KA, Collins JJ. Exploratory study of sleeping patterns in children admitted to hospital. *J Paediatr Child Health* 2014;50(8):632–8. doi:10.1111/jpc.12617
  19. Erondur AI, Orlov NM, Peirce LB, Anderson SL, Chamberlain M, Hopkins K, et al. Characterizing pediatric inpatient sleep duration and disruptions. *Sleep Med* 2019;57:87–91. doi:10.1016/j.sleep.2019.01.030
  20. Peirce LB, Orlov NM, Erondur AI, Anderson SL, Chamberlain M, Gozal D, et al. Caregiver and Staff Perceptions of Disruptions to Pediatric Inpatient Sleep. *J Clin Sleep Med* 2018;14(11):1895–902. doi:10.5664/jcsm.7488
  21. Akerstedt T, Gillberg M. Subjective and objective sleepiness in the active individual. *Int J Neurosci* 1990;52(1-2):29–37. doi:10.3109/00207459008994241
  22. Grossman MN, Anderson SL, Worku A, Marsack W, Desai N, Tuvilla A, et al. Awakenings? Patient and Hospital Staff Perceptions of Nighttime Disruptions and Their Effect on Patient Sleep. *J Clin Sleep Med* 2017;13(2):301–6. doi:10.5664/jcsm.6468
  23. Kim HJ. Importance of sleep quality in functional abdominal pain disorder in pediatric patients. *Sleep Biol Rhythms* 2022;20(1):81–5. doi:10.1007/s41105-021-00342-9
  24. Smaldone A, Honig JC, Byrne MW. Sleepless in America: inadequate sleep and relationships to health and well-being of our nation's children. *Pediatrics* 2007;119 Suppl 1:S29–37. doi:10.1542/peds.2006-2089F
  25. Gutierrez-Colina AM, Quast LF, Eaton CK, LaMotte J, Stolz MG, Mee L, et al. Sleep quality is associated with psychosocial functioning and health-related quality of life in pediatric transplant recipients. *Pediatr Transplant* 2019;23(8):e13577. doi:10.1111/ptr.13577
  26. Cassanello P, Ruiz-Botia I, Díez-Izquierdo A, Cartanyà-Hueso À, Martínez-Sánchez JM, Balaguer A. How do infants and toddlers sleep in Spain? A cross-sectional study. *Eur J Pediatr* 2021;180(3):775–82. doi:10.1007/s00431-020-03786-2
  27. Sundell AL, Angelhoff C. Sleep and its relation to health-related quality of life in 3-10-year-old children. *BMC Public Health* 2021;21(1):1043. doi:10.1186/s12889-021-11038-7
  28. Oliveira L, Gomes C, Bacelar Nicolau L, Ferreira L, Ferreira R. Environment in pediatric wards: light, sound, and temperature. *Sleep Med* 2015;16(9):1041–8. doi:10.1016/j.sleep.2015.03.015
  29. Bardosono S, Santosa E, Lada CO, Chandra DN, Wibowo Y, Basrowi RW, et al. The contribution of nutrition and quality of sleep and happiness in under-five-year-old children. *J Family Med Prim Care* 2022;11(7):3528–31. doi:10.4103/jfmpc.jfmpc\_2308\_21