

Parental Knowledge of Home Nebulizer Therapy in Children: A Descriptive Cross-Sectional Study

Çocuklarda Evde Uygulanan Nebülizatör Tedavisine Yönelik Ebeveynlerin Bilgi Düzeyi: Tanımlayıcı ve Kesitsel Bir Araştırma

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ABSTRACT

Aim: Study aimed to evaluate the knowledge level of parents administering inhaler therapy to their children via nebulizer at home.

Methods: Study is a cross-sectional and descriptive study. Data were collected from 264 parents in the Emergency Department and Pediatrics Outpatient Clinic of a state hospital from northern Turkey.

Results: Mean age of parents who participated in study was 28.76 ± 5.51 (min: 19, max: 46); 97% were female. Mean score of knowledge scale for inhalation practices of parents was 25.18 ± 2.79 (min: 8, max: 31). According to findings, statistically significant difference was determined between scale scores of parents according to source of information about inhaled drug administration via nebulizer ($p < 0.05$). Statistically significant difference was found between scale scores of parents according to their fear/anxiety about the process of administering medication to their child via inhalation via nebulizer ($p < 0.05$).

Conclusion: It was determined that the scale score was higher in parents whose source of information was a nurse/physician, and who did not have anxiety/fear while administering inhaler therapy. Nurses should assess the knowledge and application methods of parents who will be administering inhaler therapy via nebulizer and provide necessary training before discharge.

Keywords: inhalation therapy, child, parent, emergency

ÖZ

Amaç: Bu araştırmanın amacı ev ortamında çocuklarına nebülizatör aracılığıyla inhaler tedavi uygulayan ebeveynlerin bilgi düzeylerinin değerlendirilmesidir.

Yöntem: Bu çalışma kesitsel ve tanımlayıcı bir araştırmadır. Araştırma verileri Mart-Haziran, 2024 tarihleri arasında Türkiye'nin kuzeyindeki kırsal bir devlet hastanesinin Acil Servis ile Çocuk Sağlığı ve Hastalıkları Polikliniği'nde 264 ebeveyn ile yürütülmüştür.

Bulgular: Araştırmaya katılan ebeveynlerin yaş ortalaması 28.76 ± 5.51 (min:19, maks.: 46) olup, %97'si kadındır. Ebeveynlerin inhalasyon uygulamalarına yönelik bilgi ölçeği puan ortalaması 25.18 ± 2.79 'dur (min:8, maks.: 31). Araştırma bulgularına göre ebeveynlerin nebülizatör aracılığıyla solunum yolu ile alınan ilaç uygulama hakkında bilgi kaynağına göre ölçek puanları arasında istatistiksel olarak anlamlı fark belirlenmiştir ($p < 0.05$). Ebeveynlerin çocuğuna nebülizatör aracılığıyla solunum yolu ile ilaç uygulama işlemi konusunda korku/anksiyete yaşama durumlarına göre ölçek puanları arasında istatistiksel olarak anlamlı fark belirlenmiştir ($p < 0.05$).

Sonuç: Bilgi kaynağı hemşire/hekim olanların ve inhalasyon tedavisi uygularken anksiyete/korkusu olmayan ebeveynlerin ölçek puanlarının daha yüksek olduğu belirlenmiştir. Hemşireler ebeveynlerin nebülizatör aracılığıyla inhalasyon tedavisi uygulayacak ebeveynlerin bilgi düzeyini ve uygulama şeklini değerlendirip ihtiyacı olan eğitimi taburculuk öncesi vermelidir.

Anahtar Kelimeler: inhalasyon tedavisi, çocuk, ebeveyn, acil

Introduction

Respiratory diseases are common in children due to anatomical and physiological differences, and these diseases cause mortality and morbidity,

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especially in children under five years of age (1). According to the Turkey Health Research (2022) report, 31.3% of children aged 0-6 years were diagnosed with upper respiratory tract infections and 6.9% with lower respiratory tract infections in the last 6 months (2). While respiratory tract infections in children continue to be a serious problem in low- and middle-income countries, there is a decrease in the economic and care burden in high-income countries (1).

Respiratory diseases are treated with many local and systemic drugs (3). These drugs can be administered to children in different ways, such

as oral, IV, and inhalation, by the physician's order (4). Inhalation therapy is frequently used to treat respiratory diseases such as asthma and chronic obstructive pulmonary disease (3,4). Bronchodilators, corticosteroids, and mucolytics are commonly administered via inhalation to relieve airway obstruction and improve ventilation (4,6). However, the effectiveness of inhalation therapy is highly dependent on correct administration technique. Improper device use may result in inadequate pulmonary drug deposition, reduced therapeutic response, increased frequency of exacerbations, and higher healthcare utilization (7-9).

Nebulizers are frequently used in pediatric practice due to their suitability for young children who are unable to coordinate inhalation techniques required for other devices. Although inhalation therapy is a non-invasive, easy, and painless treatment method applied through a nebulizer, it also brings some difficulties. This treatment reduces the comfort of the child and may cause anxiety (4,5). Errors in mask positioning, duration of administration, device cleaning, and maintenance may compromise treatment effectiveness (7-10). For the particles created by the nebulizer to pass through the upper respiratory tract and, reach the lower respiratory tract, and show their effect, a series of procedures must be carefully applied (7-9).

Nurses carefully administer inhalation therapy using a nebulizer to children receiving inpatient or outpatient treatment in the hospital (10). In some cases, parents may need to administer inhalation therapy at home to complete the treatment after the child is discharged. Children are dependent on adults to meet their health needs. The parent who is responsible for the care and medication administration of children at home should be able to provide safe and effective medication administration with a nebulizer (4, 8, 11,12). Therefore, their knowledge and behaviors related to inhalation therapy are important. Especially the correct use of nebulizers, which are frequently used in homes, should be well known by health professionals (11, 12). Improper practices lead to prolonged treatment, unnecessary increases

in treatment costs, and a negative impact on the national economy. To prevent parental errors related to the administration of nebulizer and inhaler drugs to their children in the home environment, evaluating the knowledge requirements on this subject will directly affect the success of the treatment of respiratory diseases in children and child health (4, 12, 13).

When the literature is examined, there are studies conducted to determine family practices in giving oral medication, mothers' knowledge and practices regarding the storage conditions of medicines at home, knowledge and attitude in the use of antipyretics, and antibiotic use for their children (14-16). Studies specifically evaluating parental knowledge regarding nebulizer-based inhalation therapy remain limited, particularly in the Turkish context (13,17,18). Moreover, comprehensive assessments examining the knowledge level of parents responsible for administering inhalation therapy at home are scarce.

Therefore, this study aimed to evaluate the level of knowledge of parents who administer inhalation therapy to their children via nebulizer at home.

Research questions

- What is the level of knowledge of parents who administer inhalation therapy to their children via nebulizer at home?
- Is parental knowledge regarding nebulizer-based inhalation therapy associated with parents' sociodemographic and child-related clinical characteristics?

Material and Methods

Study Type

The study was planned as a cross-sectional, descriptive research.

Study Place and Time

The study was conducted between March and June 2024 in the Emergency Department and Pediatrics Outpatient Clinic of Ayvacık State Hospital in a rural district 75 km south of Samsun

province, Turkey. Ayvacık State Hospital provides treatment and care to approximately 20,000 individuals in the district and nearby villages. An average of 5000 pediatric patients are admitted to the Emergency Department and Pediatrics Outpatient Clinic in one year.

Population and Sample

The study sample consisted of parents who volunteered to participate in the study between the specified dates, and the sample was determined using the formula for sample calculation from the known population. In this direction, the number of children admitted to the Emergency Department and Pediatrics Outpatient Clinic was considered based on the 3 months prior to the study's start (N=637). It was calculated that 237 parents would be sufficient using the formula for sample calculation from the known population. The study was completed with 264 parents. Calculation Cochran Formula was added.

$$n = \frac{N \cdot Z^2 \cdot P \cdot (1 - P)}{d^2 \cdot (N - 1) + Z^2 \cdot P \cdot (1 - P)}$$

Inclusion criteria

The study population consisted of parents who had children aged 0–6 years and administered medication via a nebulizer at home. Inclusion criteria required that participants had no communication barriers, were fluent in speaking and understanding Turkish, and provided voluntary informed consent to participate in the study.

Exclusion criteria

Participants were excluded from the study if the child had a chronic respiratory illness or if the parents had prior experience administering medication via a nebulizer at home. Additionally, parents who left research forms incomplete were excluded from the final analysis.

Data Collection Tools

Researchers used the Individual Descriptive Form and Parental Knowledge Scale for Inhalation Practices to collect data during the research process.

Individual Descriptive Form: The researchers prepared this to obtain information about the parents' socio-demographic characteristics. The form includes 13 questions to determine the characteristics of parents and children, such as age, educational status, employment status, income status, etc. (19- 22).

Parental Knowledge Scale for Inhalation Practices: Developed by Şahin et al. in 2023, the 33-item scale are answered as true and false (Şahin & Kurudirek, 2023). Since correct answer=1 point and incorrect answer=0 point, the highest score a participant can get from the scale is 33 and the lowest score is 0. The measurement tool has a unidimensional structure. There are reverse expressions in the scale. Reverse statements are items 1, 2, 3, 4, 5, 6, 9, 10, 12, 13, 14, 15, 16, 21, 24, 26, 27, 32 and 33. The higher the score obtained from the scale, the higher the parents' knowledge about inhalation practices.

It is recommended that pediatric nurses use the scale to evaluate the knowledge level of parents of children aged 0-6 receiving inhalation therapy. The Cronbach's alpha reliability coefficient of the Parental Knowledge Scale for Inhalation Practices was calculated as 0.81; in this study, it was 0.46.

Conducting the Study

The researchers informed the parents about the study and invited them to participate. After the consent of the parents who agreed to participate in the study was obtained, they were taken to a quiet clinic room in the emergency room where face-to-face data could be collected and data collection tools were applied. The application of the research data collection tools took 15-20 minutes.

Analysis

Statistical analysis of the data was performed using the IBM SPSS Statistics 22.00 program. Descriptive statistical methods such as frequency, percentage, mean, standard deviation, and median were used to evaluate the study data. Skewness-Kurtosis values were examined to analyze the suitability of the data for normal distribution, and it was determined that the data did not show normal distribution and were not homogeneous. Therefore, Mann Whitney U test and Kruskal Wallis test were used to compare quantitative data in terms of socio-demographic characteristics. The results are interpreted at a 95% confidence interval and significance level of $p < 0.05$.

Ethics

The study was conducted following the Declaration of Helsinki. Ethical permission (Date: 26.01.2024, No: 2024/14) was obtained from Ondokuz Mayıs University, Social and Human Sciences Ethics Committee to conduct this study. In addition, institutional permission was obtained from the institution where the research data would be collected, and written and verbal consent was obtained by providing explanatory information about the research in person before the research began. Participants were guaranteed their right to withdraw from the interview at any time and told that participation in this study or refusal to take part would not affect their ability to access health services or any other services. No names or other personal information that would compromise the confidentiality of the study participants were collected or documented. All information was kept private.

Results

The mean age of the parents who participated in the study was 28.76 ± 5.51 ; 97% were female, 51.10% were primary school graduates, and 83.00% were not working. 54.20% of the parents stated that their economic situation was poor, and 56.80% said they did not receive social support. The mean age of the children was 3.84 ± 1.84 years, and 53% were male (Table 1).

The mean score of the knowledge scale for inhalation practices of the parents was 25.18 ± 2.79 . The scale score of 98.20% of the parents was between 17-33. 18.90% of the parents agreed with the item, "The inhalation mask should be washed and left to dry after each use.", 3.40% agreed with the item "The air flow rate should be adjusted according to the doctor/nurse recommendation.", 51.10% agreed with the item "The child's face should be washed after the inhaler medication is finished.", 53.30% correctly answered the item "If the inhaler drug is taken with a mask, breathing should be done through the nose.", 51.10% correctly answered the item "If inhaler drug intake lasts longer than 10 minutes, the procedure should be terminated." (Table 2).

According to the study's findings, a statistically significant difference was found between the scale scores of the parents according to the source of information about inhaled drug administration via nebulizer ($p < 0.05$). The mean score of those whose source of information was neighbor/friend/relative was 22.94 ± 5.39 and 25.26 ± 2.45 for those whose source of information was nurse/physician. A statistically significant difference was found between the scale scores of the parents according to whether they thought that they had sufficient knowledge about administering inhaled medication to their child via nebulizer ($p < 0.05$). The scale score of the parents who thought their knowledge was sufficient was 25.30 ± 2.64 , while the scale score of those who thought their knowledge was not sufficient was 21.62 ± 4.80 . A statistically significant difference was found between the scale scores of the parents according to their fear/anxiety about the process of administering medication to their child via inhalation via nebulizer ($p < 0.05$). The scale score of the parents without anxiety/fear was 21.70 ± 4.29 , while the scale score of the parents with anxiety/fear was 25.32 ± 2.64 (Table 3).

Table 1. Descriptive Characteristics of Parents and Children, Samsun, 2024

Descriptive Characteristics			
Age $X \pm SS$ (Min-Max)		28.76 $\pm$ 5.51 (19-46)	
		n	%
Gender	Female	256	97.00
	Male	8	3.00
Education Status	Primary School	18	6.8
	Secondary School	135	51.20
	High School	85	32.20
	University	26	9.80
Working Condition	Working	45	17.00
	Unworking	219	83.00
Economic Condition	Low	143	54.20
	Medium	121	45.80
Financial Social Support	Yes	114	43.20
	No	150	56.80
Childre Age $X \pm SS$ (Min-Max)		3.84 $\pm$ 1.84 (1-6)	
Children Gender	Female	124	47.00
	Male	140	53.00
Source of information about the application of inhaled medication with nebuliser	Neighbours, friends, relatives	19	7.20
	Nurse, physician	208	78.80
	Other	37	14.00
Thinking that he/she has sufficient knowledge about administering inhaled medication to his/her child with a nebuliser	Yes	256	97.00
	No	8	3.00
Experiencing fear/anxiety about the process of administering medication to the child by inhalation via nebuliser	Yes	10	3.80
	No	254	96.20
Total		264	%100

Table 2. Mean Scores of Parents' Knowledge Scale for Inhalation Practices and Correct Response Rates of Items, Samsun, 2024

Mean Score of Parent Knowledge Scale for Inhalation Practices	25.18 $\pm$ 2.79
$X \pm SD$ (Min-Max)	(8-31)
Points	n(%)
Parents with 0-16 points	2 (0.80)
Parents with 17-33 points	262 (%98.20)
Scale Items	
1. Inhaled medications should be stored in daylight.	229 (%86.70)
2. Inhaled medications should be given immediately after a meal.	196 (%74.20)
3. If there is more than one inhaled medication dose, they should be given one after the other without a break between doses.	227 (%86.00)
4. If the inhaled medications are different from each other, they should be mixed and given.	200 (%75.80)
5. Inhaled medications should be prepared 1 hour before use.	190 (%72.00)
6. Inhalation mask should be changed every day.	187 (%70.80)
7. Inhalation mask should be washed and left to dry after each use.	50 (%18.90)
8. Air flow rate should be adjusted according to doctor/nurse recommendations.	9 (%3.40)

9. Inhaled medication should be given through the mask from a distance of 5-10 cm.	239 (%90.50)
10. Inhaled medication should be given through the mask while the child is sleeping.	195 (73.90)
11. Inhaler medication should be given at the hours recommended by the doctor.	253 (%95.80)
12. If an inhaler dose is missed, it should be added to the second dose and given together.	236 (%89.40)
13. If the inhaler medication causes side effects (heart palpitations, facial redness), the medication should be continued.	259 (%98.10)
14. If the child coughs violently when the inhaler medication is given, the medication should be continued.	157 (%59.50)
15. If the child shivers when the inhaler medication is given, the medication should be continued.	252 (%95.50)
16. If the child vomits after the inhaler medication is given, the medication should be given again immediately.	260 (%98.50)
17. The child's face should be washed after the inhaler medication is finished.	135 (%51.10)
18. The child's face should be wiped with a damp cloth after the inhaler medication is finished.	197 (%74.60)
19. The child's mouth should be rinsed with water after the inhaler medication is finished.	170 (%64.40)
20. The child should be allowed to breathe calmly until the inhaler medication is finished (approximately 10 minutes).	254 (%96.20)
21. If the inhaler is taken with a mask, the nose should be inhaled.	140 (%53.30)
22. If the inhaler is taken with a mask, the mouth should be inhaled.	188 (%71.20)
23. If the inhaler takes longer than 10 minutes, the procedure should be terminated.	135 (%51.10)
24. If the inhaler mask drips, the procedure should be continued.	216 (%81.80)
25. The inhaler mask should be personalized.	256 (%97.00)
26. Inhaler medications are diluted with tap water.	247 (%93.60)
27. The inhaler medication should have a strong odor.	226 (%85.60)
28. The inhaler medication should be emptied into the mask chamber.	256 (%97.00)
29. After the inhaler medication is finished (1 minute after the buzzing sound), the air flow should be turned off.	256 (%97.00)
30. If the inhaler mask does not fit the face properly, the medication will not be taken in sufficiently.	256 (%97.00)
31. The child should be given plenty of fluids after taking the inhaler medication.	175 (%66.30)
32. The inhaler (nebulizer) should be cleaned once a month.	198 (%75.00)
33. The inhaler (nebulizer) should only be cleaned with tap water.	204 (%77.30)

Table 3. Mean Score Comparisons of Knowledge Scale for Inhalation Practices According to Descriptive Characteristics of Parents, Samsun, 2024

Descriptive Characteristics			
		Scale Score X±SD (Min-Max) Mean/MR	Analysis
Gender	Female	25.21±2.80 (8-31) 25/133.10	U=871.000 p=0.468
	Male	24.37±2.38 (19-26) 25/113.38	
Education Status	Primary School	23.38±3.95 (11-27) 25.50	X ² =4.772 p=0.189
	Secondary School	25.26±2.39 (18-31) 25	
	High School	25.51±2.27 (18-31) 25	
	University	24.96±4.54 (2-31) 26	
Working Condition	Working	25.17±3.52 (8-31) 26/140.81	U=4.553 p=0.419
	Unworking	25.19±2.63 (11-31) 25/130.79	
Economic Condition	Low	25.04±2.67 (11-31) 25/129.44	U=9.088 p=0.476
	Medium	25.35±2.93 (8-31) 25/136.11	
Receiving Social Support	Yes	25.35±2.67 (18-31) 26/137.87	U=7.938 p=0.315
	No	25.06±2.88 (8-31) 25/128.42	
Children Gender	Female	24.93±3.11(8-31) 25/127.51	U=9.299 p=0.313
	Male	25.41±2.46 (18-31) 25/136.92	
Source of information about the application of inhaled medication with nebuliser	Neighbours, friends, relatives	22.94±5.39 (8-28) 24	X ² =6.777 p=0.034*
	Nurse, physician	25.26±2.45 (18-25) 25	
	Other	25.89±2.20 (18-30) 26	
Thinking that he/she has sufficient knowledge about administering inhaled medication to his/her child with a nebuliser	Yes	25.30±2.64 (8-31) 25/134.71	U=459.500 p=0.007
	No	21.62±4.80 (11-26) 23/61.94	
Experiencing fear/anxiety about the process of administering medication to the child by inhalation via nebuliser	Yes	21.70±4.29 (11-25) 23/57.70	U=2.018 p=0.001
	No	25.32±2.64 (8-31) 25/135.44	

U=Mann Whitney U Test; X²:Kruskal Wallis Test

Discussion

Education and compliance of the child and family are important for the success of nebulizer medication, and negative feelings and approaches should be tried to be corrected (24). This study evaluated the knowledge levels of parents who administer inhalation therapy to their children via nebulizer. In the study, it was determined that the parents' knowledge level was high. In some studies, it was determined that parents had sufficient knowledge about nebulization treatment, while in some studies, their knowledge and skills were

not sufficient (25- 27). In a study, when parents were asked about their knowledge of inhalation therapy, 91.5% stated that they knew about it, but only 40% answered correctly (28). In another study, the training given to parents of hospitalized children about nebulizer medication was observed to be effective, and parents' knowledge and skills increased (29). In China, parents of children with wheezing were found to have inadequate knowledge of aerosol therapy, unsatisfactory attitudes, and low medication adherence (27). It has also been observed in studies that disease management of children with asthma is affected

by parents' lack of adequate knowledge about drug treatment, including inhaler medications (25, 30). Kanik et al. (2015) determined that there was an increase in asthma control and a significant decrease in asthma symptom scores of children after inhaler treatment training given to parents (31). In a study comparing smartphone-based training about nebulizer therapy and training using verbal and written materials for parents caring for their children with respiratory diseases, it was found that smartphone-based training was effective in increasing parents' knowledge and confidence in providing care to their children and their satisfaction with the learning method was higher (32). When the studies in the literature are evaluated, it can be said that the trainings given to parents about nebulizer drug therapy increase the knowledge levels of individuals and are also effective in providing positive skills (19, 29, 31). In this context, it is thought that it is important to inform parents about inhalation therapy via nebulizer, especially with different learning methods. In this study, the mean scores for nebulizer administration techniques were remarkably high, indicating that the participants possessed a high level of competency and knowledge. This positive outcome can be attributed to the specific characteristics of the sample group. The high educational background observed in the sample may have contributed to their ability to manage chronic respiratory care effectively at home.

When the knowledge status of the parents regarding inhalation practices was examined in the study, it was observed that the most common misinterpretations were 'The inhalation mask should be washed and left to dry after each use (item 7) and 'The air flow rate should be adjusted according to the doctor/nurse recommendation (item 8)'. Again in the study, the statements that parents answered incorrectly with a rate of 50% were related to the duration of the procedure and post-procedure applications, and this shows that the families did not receive comprehensive information from the healthcare team about inhalation treatment with nebulizer. In a study conducted with parents of children

with uncontrolled asthma, it was found that approximately 65% of parents knew how to use inhalers and that parents had myths about asthma, such as "children with asthma should use asthma control medications (inhaled corticosteroids) only when they have symptoms" and "it is not good for children to use inhalers for too long" (33). Kanik et al. (2015) determined that providing standardized inhaler device use training in children with asthma increased the rate of correct performance of nebulizer use steps by the child patient and his/her mother (31). In a study conducted with parents of children aged 5-12 years with chronic asthma, it was found that most of the families considered inhalers as an effective treatment option. However, they had concerns about side effects and long-term use of inhalers, and their cultural beliefs affected their willingness to adopt inhaler treatment (26).

This study observed that parents who received information about nebulizer drug administration from the healthcare team and who found their knowledge about this application sufficient had higher mean scores on the knowledge scale for inhalation applications. In a study conducted to determine the application skills, self-efficacy and anxiety levels of mothers whose children received inhalation treatment via nebulizer, it was determined that 78.3% of the mothers scored at a moderate level on the "Nebulized Inhalation Application Checklist" and the mean scores of mothers who received training from a doctor were significantly higher than those of mothers who received training from a nurse (23). Another study conducted in our country determined that written and visual content training provided by the healthcare team to parents with children aged 1-15 years with asthma and wheezing increased the nebulizer training score (31).

In the study, it was observed that the mean scores of the knowledge scale for inhalation applications of the parents who did not experience fear/anxiety about the process of administering medication to their child by inhalation via nebulizer were at a higher level. In a study, it was determined that the anxiety and self-efficacy levels of mothers whose children received inhalation treatment

were at a moderate level, and mothers who had previously applied nebulization treatment had higher anxiety levels (23). In children aged 6 to 11 years with mild to moderate persistent asthma, it was found that the mothers of patients who were noncompliant with treatment did not have sufficient information, had high anxiety levels, and had negative attitudes toward the disease (30). Volerman et al. (2023) found that parents of children without psychosocial symptoms in children hospitalized for asthma treatment had high communication and satisfaction levels during inhaler treatment (34). In other studies, it has been observed that the perceptions and concerns of parents of children with chronic diseases such as asthma about inhalation treatment affect their compliance with the disease and disease control (28, 35). In addition, in many studies, it was determined that fear and anxiety significantly decreased in children receiving inhaler treatment with therapeutic toys and also positively affected the satisfaction of parents (19-22). It was concluded that inhaler treatment applied with a therapeutic nebulizer designed with three-dimensional printing technology in children aged 2-7 years reduced psychosocial symptoms and positively affected parental satisfaction (36).

Nurses, who are in therapeutic communication with the child and his/her family the most, should first increase their own knowledge level and develop correct application skills in order to treat respiratory system diseases correctly, reduce frequent and repeated hospitalizations due to respiratory system diseases and contribute to economic and care power. As a matter of fact, there are different findings in the literature on this subject. While some studies have determined that the level of knowledge and implementation skills of health professionals on this issue are at medium or high levels, some studies have the opposite findings (6, 8, 37, 38). Nurses with adequate knowledge and skills are recommended to plan, implement, and follow up training with different learning methods on the application of inhaler drug therapy through nebulizers in accordance with the age and education level of parents and children.

High level of proficiency represents a significant strength of the study, as it demonstrates that well-informed parents can manage complex medical procedures with high adherence. Based on these findings, it is recommended that future healthcare policies should focus on maintaining this high standard through continuous education. Additionally, peer-to-peer training programs could be developed, where these high-performing parents support those who are newer to chronic disease management

Limitations

The primary limitation of this study was that it was conducted in a single tertiary care hospital, which may limit the generalizability of the findings to all parents in different geographical regions or healthcare settings. Another limitation was the reliance on self-reported data from parents regarding their medication administration practices. This might have introduced social desirability bias, where participants could have reported more favorable practices than their actual daily routines. Due to the cross-sectional design of the research, a definitive causal relationship between economic social support and nebulizer administration competency could not be established.

Conclusion

This study determined that although the knowledge level of the parents who administered inhaler treatment to their children via nebulizer was high, they had deficiencies in terms of procedure duration and post-procedure applications. In addition, it was observed that parents who found their knowledge about nebulizer drug application sufficient, received information from the healthcare team, and did not experience fear/anxiety had a higher level of knowledge about inhalation applications.

Although training on nebulizer treatment are primarily given in pediatric emergency departments and by the healthcare team in our country, parents' knowledge and skills regarding this treatment at home should be improved. In particular, providing psychological and educational support to the

families of children with respiratory diseases will increase their compliance with and effectiveness of treatment and reduce their fear and anxiety related to the procedure. Family-centered care to be implemented in this context is critical in terms of facilitating cooperation between healthcare professionals and the family-child, using effective coping mechanisms in solving the problems they experience, identifying the defective aspects of nebulization treatment, increasing the effectiveness of the treatment by involving employees in the care of the child, supporting the child's self-confidence, strengthening communication within the family and experiencing this acute or chronic nebulization treatment period effectively.

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