

## Effectiveness of Interventional Program on Mothers' Practices about Using of Nebulizer Therapy for their Children with Asthma

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### Abstract

*Objectives: This study aimed at evaluating the mothers practices about using nebulizer therapy of their children with asthma, determining the effectiveness of the program on mothers practices and to identify relationship between the sociodemographic and mothers practices about using nebulizer therapy for their children with asthma*

*Methodology: Quasi-experimental (pre-test and post-test) design for two group( study group and control group) was carried out at Ibn-Albaladi children and maternal hospital, Central Pediatric Teaching Hospital, Al-Elwya Pediatric Teaching Hospital and Welfare Pediatric Teaching Hospital in Baghdad City for period 30 November 2022 to 30 April 202. Non –probability (Purposive sample) of 50 mothers participant for their children with asthma classified in two groups (25) mother study group and (25) mother for control group . The study tools has been designed and constructed based on books, literature review and studies related to subject. Panels of (10 experts) have experience in their pediatric field to determine the validity of instrument and clarity and adequacy of information about subject. The reliability of the present study is employed for the determination of the study instrument's adequacy. Cronbach alpha correlation coefficient is computed on responses of (10) mothers of children with asthma was admitted in the medical ward at the Pediatric Teaching Hospital ,this computation indicates that the correlation coefficient is approving that the instrument is adequately reliable measure for the phenomenon underlying the present study. Data were collected through utilization of the study instrument and application interview and application the program after them. Description and inferential statistics was employed to analyze the present study.*

*Results: Analysis of the present study data indicates the most mothers in study have moderate level of evaluation related to practices about using of nebulizer therapy for their children with asthma in pre- test in both groups 15(60%) for the study group and 21(84%) of control group, with arithmetic mean and standard division (1.94+ 0.528), (2.02+ 0.0.290) respectively. The results after application of interventional program shows better improvement in the study group than control group for all items related to mothers practices about using of nebulizer therapy for their children with asthma.*

*Conclusion: The present study concluded that the application of the intervention program to all ages , educational level and marital status and occupation of mothers to improve the practices about the using of nebulizer therapy for their children with asthma.*

*Recommendation: It is possible to expand the knowledge and practices of mothers by giving them through lectures during admission to the medical unit, or booklets or through social media about how to use the nebulizer therapy and its benefit for a child with asthma to improve mothers practices toward nebulizer therapy.*

**Keywords:** *Interventional program, Nebulizer therapy, Asthma.*

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## Introduction

Asthma is one of the most common chronic diseases of childhood; it can be associated with a significant burden of disease, affecting normal sleep and activity levels, there by influencing physical and social development(1).

Asthma is a common and serious inflammatory illness of the airways characterized by fluctuating expiratory flow, respiratory symptoms and exacerbation (flare-ups)that can lead to hospitalization and even death (2).

Approximately 358 million individuals are affected by asthma globally, placing a tremendous disease burden worldwide and impacting asthmatic individuals. A total 26.2 million disability adjusted life years are attributed to asthma and 0.4 million people per year die from asthma globally (3).

The international and national asthma management guidelines for children frequently implemented in Thailand are Global Initiative for Asthma (GINA) guidelines and the acute asthma guidelines for Thai children, However, these guidelines do not mention using any severity scoring systems for assessing the severity of acute asthma in emergency department(ED) (4)

The inhalation of therapeutic aerosols for the treatment of asthma is described in the writing of influential Indian physicians. Charaka and Sushruta which date back to 600 BC. These writings provide detailed instructions for preparing herbal compositions including Datura that could be smoked in a pipe or in a cigarette to relive asthma symptoms (5).

Inhalation therapy is the best option for lung disease such as asthma, cystic fibrosis and chronic obstructive pulmonary disease (COPD). These local therapies allow the use of smaller doses and reduce systemic side effects. The effectiveness of aerosol therapy is largely depended on how much of the medication will reach the intended site of deposition (6).

Respiratory system disease are common in children due to their anatomy and physiology , considering the conditions that cause death in children under 5 years of age in the world. The nebulization (Inhalation) treatment is to send drugs in liquid form to the airways and lungs by means of the devices called nebulizer (7).

Nebulizers are most commonly used for bronchodilator administration and it is well established that nebulizer bronchodilators are relatively inexpensive, there is little market pressure to improve nebulizer performance. Nebulizers are used to convert liquids into aerosol of a size that can be inhaled into the lower respiratory tract (8).

Nebulizers transform liquid formulations into droplets suspended in gas. Can be classified into three categories : jet nebulizer, mesh nebulizer and ultrasonic nebulizer (9).

Good and effective nebulization therapy according to The Saudi Initiative for Asthma (SINA) guideline includes dose and duration of nebulization therapy for asthma exacerbation in children based on weight (10).

## Methodology

Design of the study: Quasi-experimental study design for two groups, study and control group (pretest-posttest) carried out at medical ward of pediatric teaching hospitals in Baghdad city to evaluate the effect of the interventional program on mothers practice about using Nebulizer therapy at pediatric teaching hospitals from 30 of November/ 2022 until 30 of July / 2023.

Sample of the study: the selection of the sample was using the non- probability (Purposive) sample that chosen for the present study. The total study sample consisted of

(50) mothers, (25) child mothers was admitted to the medical ward in welfare Pediatric Teaching Hospital and Al-Elwya Pediatric Teaching Hospital and (25) child mothers was admitted to the medical ward in Ibn-Albaladi children and maternal hospital and Central Pediatric Teaching Hospital.

Study tool: The program lectures and questionnaire were constructed and provided for mothers to evaluate the effect of the interventional program on mothers practice regarding using of nebulizer therapy . The program lectures was contain 2 lecture, two lecture each day (during one week) , and The questionnaire was contain two sections, first section concerns the demographic information, while another section was contained the mothers practice regarding using nebulizer therapy. The items were rated according to the Likers' scale of the three observations then rated to (3) Apply always , (2) apply sometimes, and (1) for never (not apply). The higher grade of scoring, the greater practice and according to good (2.34 -3), moderate (1.67–2.33), and low (1. –1.66).

Validity of the study: The validity of the questionnaire tool and program was established through a panel of experts which have experience in their pediatric field to determine the validity of instrument tool ( questionnaire) and program were clarity, relevancy and adequacy of information about subject

Reliability of the Study Instrument: Internal consistency reliability is employed for the determination of the study instrument's adequacy. Cronbach alpha correlation coefficient is computed on responses of (10) mothers were admitted with asthmatic children in Al-Kadhimiya Children's Hospital. Finding of this computation indicates that the correlation coefficient is approving that the instrument is adequately reliable measure for the underlying the current study.

## Result

The present study's findings were analyzed by using statistical methods through SPSS program and the data were organized and interpreted.

Table (1): Distribution of demographic data to the study and control groups according to the study sample

Variables	Groups	Study (n=25)		Control (n=25)		C.S. P-value
		Freq.	%	Freq.	%	
Age (years)	<b>20-25</b>	<b>8</b>	<b>32.0</b>	<b>11</b>	<b>44.0</b>	t-test p=0.578 NS
	26-30	6	24.0	5	20.0	
	31-35	3	12.0	2	8.0	
	36-40	3	12.0	1	4.0	
	41-45	2	8.0	4	16.0	
	46- 50	3	12.0	2	8.0	
Educational Level of Mothers	Illiterate	1	4.0	4	16.0	t-test P=0.121 NS
	Read and Write	5	20.0	2	8.0	
	<b>Primary graduate</b>	<b>7</b>	<b>28.0</b>	<b>11</b>	<b>44.0</b>	
	Secondary graduate	5	20.0	5	20.0	
	Medical institute graduate	3	12.0	3	12.0	
	College graduate and more	4	16.0	0	0.0	

Marital status	<b>Married</b>	<b>17</b>	<b>68.0</b>	<b>22</b>	<b>88.0</b>	t-test P=0.213 NS
	Separated	2	8.0	0	0.0	
	Divorced	3	12.0	1	4.0	
	Widow	3	12.0	2	8.0	
Occupational status	<b>Housewife</b>	<b>19</b>	<b>76.0</b>	<b>19</b>	<b>76.0</b>	t-test P=0.653 NS
	Employment	5	20.0	3	12.0	
	Student	1	4.0	3	12.0	
Type of family	Small Family	12	48.0	12	48.0	FEPT P=1.000 NS
	<b>Extended Family</b>	<b>13</b>	<b>52.0</b>	<b>13</b>	<b>52.0</b>	
Number of children in family	1-2 Children	3	12.0	9	36.0	t-test P=0.321 NS
	<b>3-4 children</b>	<b>8</b>	<b>32.0</b>	<b>11</b>	<b>44.0</b>	
	<b>5-6 children</b>	<b>9</b>	<b>36.0</b>	<b>4</b>	<b>16.0</b>	
	≥ 7 children	5	20.0	1	4.0	
Income of family	Sufficient	7	28.0	8	32.0	t-test P=0.868 NS
	Not Sufficient	8	32.0	10	40.0	
	<b>May be Sufficient</b>	<b>10</b>	<b>40.0</b>	<b>7</b>	<b>28.0</b>	
Area of resident	<b>Agricultural</b>	<b>12</b>	<b>48.0</b>	<b>13</b>	<b>52.0</b>	t-test P=0.669 NS
	Industrial	2	8.0	2	8.0	
	Residential	11	44.0	10	40.0	
Habitation	<b>City Center</b>	<b>13</b>	<b>52.0</b>	<b>12</b>	<b>48.0</b>	t-test P=0.828 NS
	Spend	2	8.0	1	4.0	
	District	5	20.0	7	28.0	
	Neighborhood	4	16.0	5	20.0	
	Countryside	1	4.0	0	0.0	
Type of Residential	<b>House</b>	<b>15</b>	<b>60.0</b>	<b>11</b>	<b>44.0</b>	t-test P=0.503 NS
	Apartment	4	16.0	8	32.0	
	Residential slums	6	24.0	6	24.0	
Nature of Residential	<b>Personal House</b>	<b>19</b>	<b>76.0</b>	<b>15</b>	<b>60.0</b>	t-test P=0.420 NS
	Rent House	5	20.0	10	40.0	
	Others	1	4.0	15	60.0	
Number of bedroom	<b>1-2 bedroom</b>	<b>14</b>	<b>56.0</b>	11	44.0	FEPT P=0.404 NS
	<b>3-4 bedroom</b>	11	44.0	<b>14</b>	<b>56.0</b>	
Number of person in bed room	1- 2 persons	1	4.0	4	16.0	t-test P=0.610 NS
	<b>3- 4 persons</b>	<b>15</b>	<b>60.0</b>	<b>19</b>	<b>76.0</b>	
	≥ 5 persons	9	36.0	2	8.0	
History of asthma in family	Yes	9	36.0	8	32.0	FEPT P=0.852 NS
	<b>No</b>	<b>16</b>	<b>64.0</b>	<b>17</b>	<b>68.0</b>	
Smoker in the house	<b>Yes</b>	<b>14</b>	<b>56.0</b>	<b>16</b>	<b>64.0</b>	FEPT P=0.773 NS
	No	11	44.0	9	36.0	
Animals in house	Yes	5	20.0	0	0.0	FEPT P=0.073 NS
	<b>No</b>	<b>20</b>	<b>80.0</b>	<b>25</b>	<b>100.0</b>	

Using the nebulizer therapy in house	Yes	9	36.0	11	44.0	FEPT P=0.768 NS
	No	16	64.0	14	56.0	

Table (2): Comparison significant between the study and control groups related to mothers' practices about using of nebulizer therapy at a pretest.

Items Related to Mothers' Practices	Study – Pre			Control – Pre			C.S.		
	M.S.	S.D.	Eva.	M.S.	S.D.	Eva.	t	P-value	Sig.
1. You put the nebulizer device on a stable and balanced surface that bears its weight	2.36	0.810	G	2.80	0.408	G	2.425	0.019	S
2. You connect the wire of the device to an electrical source	2.40	0.816	G	2.80	0.408	G	2.191	0.033	S
3. Wash hands for 20 seconds with soap and running water and dry with a paper towel.	1.72	0.678	M	2.04	0.611	M	1.753	0.086	NS
4. You apply medication such as Ventolin 0.5 cc with saline 2.5 cc	2.00	0.764	M	2.12	0.666	M	0.592	0.557	NS
5. Remove the top of the cup and put medicine in it	1.92	0.909	M	1.92	0.702	M	0.000	1.000	NS
6. Make sure that the cup of the device is closed well and correctly to avoid spilling medicine from it	2.16	0.898	M	2.32	0.852	M	0.646	0.521	NS
7. Connecting the top of the device cup with the face mask	2.12	0.881	M	1.96	0.978	M	0.608	0.546	NS
8. Connecting the end of the plastic pipe to the device and connecting the other end to the cup device	2.12	0.881	M	2.60	0.764	G	2.058	0.045	S
9. After making sure that the parts of the device are connected correctly, we turn the device on by using the power key	2.16	0.850	M	2.28	0.737	M	0.533	0.596	NS
10. Apply a towel to reduce noise caused by vibration of the device	1.08	0.277	P	1.00	0.000	P	1.445	0.155	NS
11. A slight fog appears in the face mask as evidence that the device is working properly	2.00	0.816	M	2.00	0.816	M	0.000	1.000	NS
12. You try to seat your baby on your lap or on a chair when using the	2.56	0.821	G	2.72	0.614	G	0.781	0.439	NS

device									
13. Put the face mask on the baby's face and make sure that the mask covers the child's nose and mouth with the child's mouth closed as much as possible	1.36	0.757	P	1.40	0.707	P	0.193	0.848	NS
14. You distract the child by using children's magazines or watching videos and games with sounds and colors	1.76	0.779	M	1.88	0.666	M	0.586	0.561	NS
15. If your child is of toddler age or preschool age, you ask him to take a deep breath and slowly	1.32	0.627	P	1.32	0.557	P	0.000	1.000	NS
16. Stop treatment if your child feels dizzy, vomiting and headache	2.00	0.816	M	1.84	0.688	M	0.749	0.457	NS
17. You turn off the device after making sure that the medicine is completely	2.64	0.757	G	2.60	0.577	G	0.210	0.835	NS
18. After the child completes the treatment, you try to clean the child's mouth and nose of any secretions that came out while taking the treatment.	2.04	0.790	M	2.24	0.663	M	0.970	0.337	NS
19. After using the device, you disassemble the parts of the device and soak it with soap and water for 15 minutes	1.20	0.500	P	1.00	0.000	P	2.000	0.051	NS
20. Rinse the parts of the device with running water and expose them to air to dry directly	1.16	0.473	P	1.00	0.000	P	1.693	0.097	NS
21. Keep the device in a clean and dry place away from children	2.68	0.690	G	2.60	0.500	G	0.469	0.641	NS

Table (3): Comparison significant between the study and control groups related to mothers' practices about using of nebulizer therapy at a post-test

Items Related to Mothers' Practices	Study – Post			Control – Post			C.S.		
	M.S.	S.D.	Eva.	M.S.	S.D.	Eva.	t	P-value	Sig.
1. You put the nebulizer device on a stable and balanced surface that bears its weight	2.76	0.436	G	2.68	0.476	G	0.620	0.538	NS

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2. You connect the wire of the device to an electrical source	2.76	0.436	G	2.60	0.500	G	1.206	0.234	NS
3. Wash hands for 20 seconds with soap and running water and dry with a paper towel.	2.72	0.458	G	2.08	0.640	M	4.064	0.000	HS
4. You apply medication such as Ventolin 0.5 cc with saline 2.5 cc	2.76	0.436	G	2.08	0.640	M	4.389	0.000	HS
5. Remove the top of the cup and put medicine in it	2.80	0.408	G	1.88	0.666	M	5.890	0.000	HS
6. Make sure that the cup of the device is closed well and correctly to avoid spilling medicine from it	2.84	0.374	G	2.20	0.816	M	3.563	0.001	HS
7. Connecting the top of the device cup with the face mask	2.88	0.332	G	1.92	0.954	M	4.753	0.000	HS
8. Connecting the end of the plastic pipe to the device and connecting the other end to the cup device	2.76	0.436	G	2.44	0.768	G	1.812	0.076	NS
9. After making sure that the parts of the device are connected correctly, we turn the device on by using the power key	2.88	0.332	G	2.20	0.707	M	4.353	0.000	HS
10. Apply a towel to reduce noise caused by vibration of the device	2.92	0.277	G	1.00	0.000	P	34.671	0.000	HS
11. A slight fog appears in the face mask as evidence that the device is working properly	2.84	0.374	G	1.92	0.702	M	5.780	0.000	HS
12. You try to seat your baby on your lap or on a chair when using the device	2.76	0.523	G	2.52	0.653	G	1.434	0.158	NS
13. Put the face mask on the baby's face and make sure that the mask covers the child's nose and mouth with the child's mouth closed as much as possible	2.68	0.476	G	1.40	0.645	P	7.979	0.000	HS
14. You distract the child by using children's magazines	2.76	0.436	G	1.92	0.640	M	5.422	0.000	HS

or watching videos and games with sounds and colors									
15. If your child is of toddler age or preschool age, you ask him to take a deep breath and slowly	2.76	0.523	G	1.36	0.638	P	8.489	0.000	HS
16. Stop treatment if your child feels dizzy, vomiting and headache	2.72	0.458	G	1.84	0.688	M	5.323	0.000	HS
17. You turn off the device after making sure that the medicine is completely	2.84	0.374	G	2.44	0.583	G	2.887	0.006	HS
18. After the child completes the treatment, you try to clean the child's mouth and nose of any secretions that came out while taking the treatment.	2.80	0.408	G	2.20	0.645	M	3.928	0.000	HS
19. After using the device, you disassemble the parts of the device and soak it with soap and water for 15 minutes	2.76	0.436	G	1.00	0.000	P	20.189	0.000	HS
20. Rinse the parts of the device with running water and expose them to air to dry directly	2.80	0.408	G	1.00	0.000	P	22.045	0.000	HS
21. Keep the device in a clean and dry place away from children	3.00	0.000	G	2.56	0.507	G	4.342	0.000	HS

Table (4): Relationships between socio-demographic data of mothers and the results of the interventional program for practices toward using of nebulizer therapy

Variables	ANCOVA			
	df	F	p- value	Sig
Age (years)	5	9.736	0.003	HS
Educational Level of Mothers	5	7.489	0.007	HS
Marital status	3	11.574	0.003	HS
Occupational status	2	7.963	0.012	S
Type of family	1	0.011	0.916	NS
Number of children in family	3	0.709	0.561	NS
Income of family	2	0.672	0.521	NS
Area of resident	2	0.598	0.562	NS
Habitation	4	0.994	0.441	NS
Type of Residential	2	1.696	0.217	NS
Nature of Residential	2	0.627	0.548	NS



Number of bedroom	1	0.104	0.750	NS
Number of person in bed room	2	0.547	0.587	NS
History of asthma in family	1	0.045	0.834	NS
Smoker in the house	1	0.500	0.488	NS
Animals in house	1	0.137	0.715	NS
Using the nebulizer therapy in house	1	6.002	0.024	S

## Discussion

The table (1) shows that more mothers participants in study sample 8(32%) and control sample 11(44%) of age group (20-25 years). A study conduct in 2023 by have similar result of participant age group was 170 (53.1%) of the same age-group (11) .

Concerning to the level of educational of most mothers in both groups were primary graduate 8(32%) of the study group and 11(44%) of control group which contrasts with the findings of a study conducted in 2022, which indicated that the majority of the participant were Intermediate school 21(21%) (12).

In relation the most mothers in both groups were marital status 17(68% ) of mothers in the study, and 22( 88%) of mothers in the control group. this finding is consistent with that of a survey released in 2023, which found that 25(83.3%) of participants were married (13).

Regarding to subject of occupational status show that the more than three-quarters 19 (76 %) of mothers in both groups were housewife. This finding similar result have been found in previous study in 2021 , they mentioned that 56(93.3%) mostly of participant were housewife (14).

Concerning type of family, represent that more than the half in each group 13(52%) were extended family. this result is agreement with study in 2023 they mentioned that 45 (72.6%) mostly of the extended family (15).

Concerning type of family, represent that more than the half in each group 13(52%) were extended family. In relation to the number of children in family, in study group 9 (36%) had (5-6 children), while in control 11(44%) were had (3-4 children). this result is disagreement with study in 2022 they mentioned that (31.7%) mostly of the family have one child only (16).

With regard to family income, it appears that in the study group, 10 (40%) of the mothers barely had enough, this finding similar result have been found in previous study in 2022 , they mentioned that (38%) mostly of participant perceive barely sufficient monthly income (17). While the control group 10 (40%) did not have Sufficient, this result is disagreement with study in 2022 they mentioned that (41.4. %) have of the income sufficient (18) .

Regarding to subject habitation (city center), type of residential( home) and nature of residential (Personal house) the finding similar result between study group and control group which There are no studies that have mentioned this variable . In addition the subject of number of bedroom show that the more than half in both groups 14 (56%) were had (1-2 bedroom) for the study, and (3-4 bedroom) for the control group, and number of person in bed room show that most mothers were in each group (3- 4 persons), study group 15(60%), and control group 19(76%). There are no studies that have mentioned this variable.

In both groups represent that almost two-third of mothers have not history of asthma in family, as they reached 16(64%) and 17(68%) respectively. This outcome is consistent with a survey released that was conducted in 2021, which shows that the majority of respondents (55.8%) were no have family history of asthma (19).

Concerning animals in house revealed that the majority of participants in study sample, they did not domesticate animals in their homes of the study group 20 (80%) and of the control group 25(100%) respectively. There are no studies that have mentioned this variable. And In both groups demonstrate that more than of mothers have smoker in the house, as they reached for study group 14 (56%), and control group 16(64%). This finding is consistent with a survey released that was conducted in 2016 , which confirmed that the smoking one factors to effect on the occurrence of asthma (20) .

Regarding the result of both groups more than half each group were not using the nebulizer at home , as they reached for the study group 16 (64%), and control group 14 (56%). There are no studies that have mentioned this variable.

Concluded of the table (1), there is non-significant difference of variables between study and control groups.

Table 2: shows that there are not statistical significant differences between study and control groups at pre –test in all items except (1, 2, & 8) items show that there are significant differences related to the mothers' practices about using of nebulizer therapy for their children with asthma, when analyzed by independent sample ( t-test). the most mothers in study sample have moderate level of evaluation related to practices about using of nebulizer therapy for their children with asthma in pre-test in both groups.

Table (3) : The data analysis shows that there are a high significant differences between study, and control groups at post- test in all items related to the mothers' practices regarding using of nebulizer therapy for their children with asthma except the items ( 1, 2, 8, & 12 ) show were no significant differences, when analyzed by independent sample ( t-test). In addition shows good level of evaluation at the study group in post-test , and control group remain in the moderate level of evaluation in pre-test ,

Table (4): Inspection of this table show association between post-test practices and demographic variables of the study sample based on pretest via finds the overall ANCOVA model to be significant ( $p = 0.05$ ) for the study group, it show a high significant differences in some demographic variables such as: (age, educational level of mothers, marital status, occupational status, and using the nebulizer therapy in house).

## Conclusion:

The current study concluded that the application and using of the intervention program to all ages, educational level and marital status and occupation of mothers to improve the practices about the using of nebulizer therapy for their children with asthma.

Recommendation: It is possible to expand the knowledge and practices of mothers by giving them through lectures during admission to the medical unit, or booklets or through social media about how to use the nebulizer therapy and its benefit for a child with asthma to improve mothers practices toward nebulizer therapy.

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