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AN EVALUATIVE STUDY ON WELL-BEING AND CORRECT USE OF ASTHMA INHALER AMONG ASTHMATIC ADOLESCENCE

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Abstract

Healthy infancy is the foundation for healthy adult life. The study aimed to assess whether individualized re-education on the asthma inhaler technique improves the use of asthma inhaler by school children and increases the children's well-being. An evaluative research approach with the purposive sampling technique, 30 asthmatic children, were selected from the outpatient department in a selected hospital at Coimbatore. The study results have revealed that the asthmatic children's overall well-being has been improved by about 66.6% compared to before intervention 32.4% ('t' =30.0, P<0.05). The mean score of different well-being dimensions was physical 65.5%, psychological 67.29%, social 40.64% and cognitive well-being 67.56% were improved after the intervention. The mean score of the overall performance of the inhaler technique was improved after intervention at 74.6%, and it was showed a significant difference between before and after the intervention (t value = 12.5, P<0.05, df =29). After intervention the use of inhaler technique was improved in the aspects of preparation phase 27.7% (t=8.65), performance phase 23.0%, (t=4.13%), and aftercare phase 24.2% (t=6.88%). The study concludes that the asthmatic children level of well-being in different aspects (physical, psychological, social, and cognitive) improved when followed correct technique of use of the inhaler.

Keywords: well-being, correct use of asthma inhaler technique, asthmatic children.

I.Introduction:

Bronchial asthma is one of the most prevalent childhood disorders, which has a lasting impact on children's growth and development (Prashanth 2011). Some of the virus, bacteria, fungus, influenza and parasites, and

exposure to indoor allergens such as pets, dust mites, moulds, and outdoor air pollution affect children's health status. These irritating substances on inhalation result in decrease the lung function. A recurrent infection causes the lungs and its structures narrowing of the airway and thus can result in asthma (Suraj Guptae 2009), (Gaffin and Phipatanakul 2009).

Asthma is an illness caused in the lungs by inflammation in the airways. It causes airways to tighten and narrow, which blocks air from flowing freely into the lungs. Other than organisms and allergens, weather factors such as humidity and temperature can also trigger asthma. When the asthma children are exposed to triggers, their sensitive airways become inflamed, swell up, and fill with mucus. The muscles which surround the swollen airways tighten and constrict, shrinking and narrowing them even more. (Nursing Times 2009).

Statistically, the global prevalence of incidence and death, particularly among children, has risen significantly. About 300 million people worldwide have asthma, and its prevalence increases every decade by fifty per cent. In India, it is estimated that 57,000 deaths were reported due to asthma, and it was one of the leading cause of morbidity and mortality in India (Braman 2006). The mean prevalence of asthma in urban and rural children was 18% in Tamil Nadu, and the prevalence of diagnosed asthma was 5%. Overall, 22% of urban children and 9% of rural children aged 6-twelve years reported shortness of breath. (Shibi et al. 2002)

Airflow obstruction either resolves naturally or responds to a wide variety of therapies, enhances lung function as near as possible to normal, and enables a child to carry out their daily activities. For the treatment of asthma, different drugs and therapies are available. Quick-relief medications include short-acting, inhaled beta-agonists like albuterol, levalbuterol, pirbuterol and anticholinergic such as ipratropium. Long-acting antibiotics include leukotriene modifiers, stabilizers with mast cells (cromolyn sodium and nedocromil), inhaled and oral corticosteroids (budesonide, beclomethasone), long-acting beta-agonists, and theophylline are used as treatment regimens. (Pamela and Vanessa 2009)

A standard meter dose inhaler is used to deliver various types of drugs. It contains an inert pressurized gas in each puff that propels a dose of a drug. By pressing the top of the inhaler, each dose is released. This type of inhaler is simple to use, tiny and convenient to carry and less costly. Pushing the canister and breathing in fully at the same time takes good coordination. The spacer device is a plastic cylinder designed to make the metered-dose inhaler easier for use. A face mask can be used besides the spacer device for young children and older children. (Abrolat et al. 2001). So inhalation of medication is the cornerstone of therapy for the child with asthma. Inhalers deposit the medicine directly into the air passages, and only tiny (micro) quantities of the medicine go into the body. (De Benedictis and Selvaggio 2003), (Deerojanawong et al. 2009). To achieve asthma control, children must receive appropriate instruction regarding the correct technique of using the inhaler. They need to be used accurately in order to gain proper value from these

inhalers. So, re-education of proper use of inhaler technique among children helps strengthen their practice and improve life quality. (Brand 2005)

II. Methodology:

The study setting was the outpatient department in a private hospital at Coimbatore, Tamil Nadu, India. The evaluative research approach is used for this study. One group pretest and posttest experimental research design was adopted in this study. O_1……..X…….……O_2 O_1: Observation (Pre Test), X: Individualized Re-Education, O_2: Observation (Post Test). Self-reported well-being and correct use of asthma inhaler was study outcome of interest**.** Individualized re-education on asthma inhaler technique was the independent variable of the study.

A total of 30 asthmatic children attending the outpatient department at a private hospital were sampled for the project. Purpose sampling technique was used. Children's well-being was collected in various aspects like physical, psychological, social, and cognitive aspects. The researcher assessed the correct technique of inhaler by the inhaler assessment checklist before and after the intervention. The individual re-education was given through demonstration. After interventions, the 15 samples were assessed inhaler technique in follow up visit. The remaining, the 15 samples were reassessed at their home. The average time taken for the interview was 30 minutes for each child. The total data collection period was 30 days. The researcher was able to do 3 to 4 samples per day. The target population of the study is 12-18 years old children who were attending the outpatient department. Children in the 12-18 age group, and those using meter dose inhaler with a spacer with mask were eligible for the study**.** On the other hand, children who were chronically ill and not willing to participate already excluded from the study.

III. **Tools:**

The tool used in this study was interview schedule. The interview schedule used to assess the demographic data and assess the various aspects of well- being like physical, psychological, social, and cognitive aspects. The Inhaler assessment checklist was used to assess the correct technique of using inhaler among asthmatic children.

3.1.Part I - Demographic information

Part I was designed to collect the demographic data of the asthmatic children namely age, sex, area of living, location of house, pet animals in house, kind of pet animals, family history of asthma, duration of asthma, taking regular treatment, kind of treatment, kind of inhaler, and use of inhaler.

3.2. Part II – Well-being scale

Part II was designed to assess the well-being of the children in various dimensions like physical, psychological, social, and cognitive well-being. It is a four point scale. The physical wellbeing comprises 11

items includes difficulties of asthmatic children in day to day activities like walking, running, climbs upstairs, bicycling, playing, and sleeping .

The psychological well-being had 12 items includes child self-confidence, independence, conflict, adjustments and angry. The social well-being had 8 items includes relationship with friends and others, social gatherings, enjoying going out with friends. Cognitive well-being had 10 items includes school performance, memory and attention, concentration in study.

3.3.Part III – Inhaler assessment check-list

Part III was designed to assess the inhaler technique includes preparation phase, performance phase and after care. Each phase contains five steps.

IV. SCORING PROCEDURE

Well being scale

It consists of four dimensions such as physical, psychological, social, cognitive aspects. The scoring items based on positive and negative items.

Positive scoring key

Always - 4, Sometimes - 3, Rarely - 2, Never - 1

Negative scoring key

Always - 1, Sometimes – 2, Rarely -3, Never - 4

SI.No	Dimensions	Grading and Scoring		
		Low well being	Average well being	High well being
1	Physical	1 - 14	15 - 29	30– 44
2	Psychological	1 - 15	16 - 32	33 – 48
3	Social	1 - 10	11 -21	22 – 32
4	Cognitive	1 - 18	19 - 37	38- 56

Overall wellbeing

SI. No	Grading	Score
1	Low well being	1-60
2	Average well being	61-120
3	High well being	121-180

Inhaler technique checklist

SI. No	Grading	Score
1	Low performance	1-5
2	Moderate performance	6-10
3	High performance	11-15

Results:

Table 1: Showing the frequency and percentage distribution (%) of demographic variables.

S. No	Demo graphic characteristics	Frequency	Percentage
	Area of living		
1	a) Urban	22	73.3
	b) Rural	8	26.7
	Location of house		
2	a) Near industries	11	36.7
	b) Near road	16	53.3
	c) Near sewage area	3	10
	Duration of asthma		
3	a) Less than one year	6	20
	b) One year	13	43
	c) Two years and more than two years	11	36.9
	Use of inhaler		
4	a) Two times per day	18	60
	b) Three times per day	12	40

Majority of the children live in Urban 73.3%. Above half of the children (53.3%), houses were located near the road, and 36.7% of houses were located near industries. Nearly half of the children (43%) had asthma over one year, 36.9% had asthma for two years. Most children (60%) used the inhaler two times a day **(Table 1).**

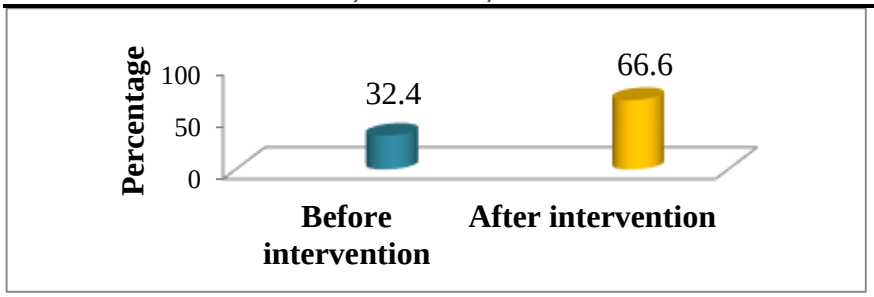

Figure – 1 Represents the mean score of the overall well-being of samples before and after intervention and level of significance.

The mean score percentage of well-being before the intervention was 32.4% compared to after intervention, and the performance was 66.6% (t=30.0). It concludes that the calculated value (t=30.0) more than table value (1.699) there was a significant difference in overall well-being before and after the intervention. **(Figure – 1)**

Table 2: Represents mean score dimensions of samples' well-being before and after intervention and level of significance

S. No	Dimensions of Well-being	Max Score	Before Intervention			After Intervention			Mean Difference	Paired 't' value
			Mean score	Mean score %	SD	Mean Score	Mean score %	SD		
1	Physical	44	13.4	30.4	3.548	28.86	65.59	4.55	35.19	17.98 *
2	Psychological	48	15.9	33.1	3.71	32.3	67.29	6.198	34.19	16.16*
3	Social	32	11.1	19.8	2.56	22.76	40.64	3.339	20.84	22.46*
4	Cognitive	56	18	32.1	2.13	36.83	65.76	5.46	33.66	19.3*

***significance**-P<0.05, degree of freedom = 29

The mean score of well-being in different dimensions was physical well-being 30.4%, psychological well-being 33.1%, social well-being 19.8%, and cognitive well-being 32.1% before the intervention. After the intervention, the mean score of well-being was physical 65.5%, psychological 67.2%, social 40.6% and cognitive well-being 65.7%. This table concludes that in all the four dimensions, the well-being had improved after the intervention. Statistically, there was a significant difference in all the dimensions of well-being after the intervention. **(Table-2)**

Table 3: Mean overall Performance score of Inhaler Technique in a study group before and after the intervention and significance level.

S. No	Intervention	Max Score	Mean Score	Mean score Percentage	S.D.	Mean Difference	Paired 't' value
1	Before Intervention	15	6.76	45	1.83	0.29	12.5*

2	After Intervention	15	11.2	74.6	1.51

***significance**-P<0.05, degree of freedom = 29

The mean score of the overall performance of the inhaler technique relatively low at about 45.0%. After intervention score was (74.6%). This table concludes that the inhaler assessment technique's overall performance improved after interventions that indicate intervention effectiveness. Statistically, there is a significant difference in the overall performance of the inhaler technique before and after the intervention. (t value = 12.5, P<0.05, df =29). **(Table 3)**

Table 4: Shows the mean score of different aspects of Inhaler Technique before and after intervention and significance level.

S. No	Inhaler Aspects	Max Score	Before Intervention			After Intervention			Mean Difference	Paired 't' value
			Mean score	Mean score %	SD	Mean Score	Mean score %	SD		
1	Preparation Phase	15	2.53	16.8	0.62	4.16	27.7	0.83	1.63	8.657*
2	Performance Phase	15	2.4	16	0.93	3.46	23	1.19	1.06	4.136*
3	After Care	15	1.86	12.4	0.81	3.63	24.2	1.12	1.77	6.880*

***significance**-P<0.05, degree of freedom = 29

The mean score percentage of inhaler use in the preparation phase was relatively low at 16.8%, performance 16.0% and aftercare 12.4% before the intervention. After intervention the use of inhaler technique were improved in the aspects of preparation phase 27.7% (t=8.65), performance phase 23.0%, (t=4.13%), aftercare 24.2% (t=6.88%). So, the calculated value more than table value in the preparation phase, performance phase, aftercare. (t=1.699, P<0.05). This table concludes there is a significant difference in the procedure steps of inhaler assessment technique before and after Intervention **(Table 4).**

Table 5: Shows the Correlation between overall well-being and overall Inhaler Technique before Intervention.

S. No	Variables	Mean score	'r' value	't value
1	Well-being	58.4	-0.25	0.17
2	Inhaler technique	6.76		

***significance**-P<0.05, degree of freedom = 29, **Table value**: 1.699

The obtained r value is –0.25. When statistically computed significance, the mild negative correlation found between the well-being and inhaler technique. The calculated value (t=0.17, df=29, P<0.05) is less than table

value. So there was a significant mild negative correlation between the well-being and inhaler technique. **(Table-5)**

Table 6: Association between selected demographic variables and level of performance of the inhaler technique.

S. No	Demographic variables	Level of performance				χ 2 value, p<0.05	df	Table value
		Low		Moderate				
		F	%	F	%			
1	**Age**							
	a) 12-13 years	7	23.3	16	53.3	0.124	1	3.84
	b) 14-15 years	1	3.3	6	20	ns		
2	**Sex**							
	a) Male	6	20	16	53.3	20.59	1	3.84
	b) Female	2	6.6	6	20	*		
3	**Area of living**							
	a) Urban	4	13.3	12	40	0.421	1	3.84
	b) Rural	6	20	8	26.6	ns		
4	**Location of house**							
	a) Near industries	3	10	8	26.6			
	b) Near road	4	13.3	12	40	0.407	3	7.81
	c) Near garbage area	1	3.3	2	6.6	ns		
5	**Duration of asthma**							
	a) Less than two years	6	20	7	23.3			
	b) One year	6	20	4	13.3	1.64	2	5.99
	c) Two years & more than two years	2	6.6	5	16.6	ns		
6	**Often use of the inhaler**							
	a) Two times per day	6	20	12	40	0.347		
	b) Three times per day	2	6.6	10	33.3	ns	1	3.84

***-significant, ns-non significant**

It concludes that an association between sex and the inhaler technique's performance level (20.59%). There is no significant association between the overall level of performance of inhaler technique with age (χ 2=0.12), area of living (χ 2=0.42), and location of the house (χ 2=0.40), duration of asthma (χ 2=1.64) and use of inhaler (χ 2=0.34). So the inhaler technique's level of performance was not influenced by age, area of living, location of the house, duration of asthma, and inhaler use**. (Table-6)**

Discussion:

Demographic factors can play a significant influence on asthma management. Wheezing has been reported more frequently by children living in urban areas than by rural children. The samples' demographic characteristics revealed that 73.3% lived in urban areas, and 26.7% were living in rural areas. The present study is supported by Shibi et al. (2002) regarding the prevalence of asthma in urban and rural in Tamil Nadu to identify the difference in the urban and rural area.

Frequency and percentage of various dimensions of well-being before intervention found to be sampled (80%) had low physical well-being, (20%) had average physical well-being, (54%) had low psychological well-being and (46%) with average psychological well-being. These results were similar to the study done by Safaa Wafy et al. (2012) who reported 70% and 26.5% children were activity limitation and day time symptoms and low quality of life associated with school absence, physical exercise limitation, sleep disturbance and emotional function ($P < 0.0001$).

Frequency percentage of the level of performance of inhaler technique: In performance phase (Press the canister and breath in slowly about 3 to 5 seconds, hold the breath about 5 to 10 seconds) before the intervention, samples (16.7%) were in low performance, samples (70%) were in moderate performance and (13.3%) samples in high performance. In a similar study conducted by Machira (2011) assessment of inhalation technique among asthmatic children and their careers at the Kenyatta national hospital at Kenya, It reveals that improper hand lung synchronization (27%), improper breath-holding after inhalation (26%), too rapid inspiration (19%), and inadequate shaking of the inhaler (13%).

The level of performance of asthma inhaler technique: Maximum 60% of children performed an as high level of performance of inhaler technique and (40.0%) Children were in the moderate performance of inhaler technique. In a similar study conducted by Kamps (2002), Identify factors associated with correct inhalation technique. Children who have received repeated instruction, (57.4% to 97.9%) were demonstrated a correct inhalation technique. So the demonstration of the patient's inhaler use was significantly associated with a correct inhalation technique for patients using a metered-dose inhaler plus spacer device.

The level of physical, psychological, social and cognitive well-being reported by the asthmatic children: This study attempted this lesser studied relation of various dimensions of well-being among asthmatic children. Our study reveals a significant difference in overall well-being before and after the intervention ($t = 30.0$, $df = 29$, $p = 0.05$). There was a significant difference in all the aspects of well-being like physical, psychological, social, cognitive well-being before and after the intervention ('t' value-1.699).

Association between the techniques of using an inhaler with selected demographic variables: The gender difference in asthma reviewed in many studies, boys are consistently reported to have more prevalent wheeze than girls. This study reflects a significant association between the overall performance level of inhaler technique and sex (20.59%).

Conclusion:

There was a significant difference in overall well-being before and after the intervention (t =30.0, do=29, p=0.05). There was a significant difference in overall and all the dimensions of well-being like physical, psychological, social, cognitive well-being before and after the intervention ('t' value-1.699). There is a significant difference in the overall performance of the inhaler technique before and after the intervention. ('t' value = 12.5, P<0.05, df =29). There was a significant difference in the procedure steps of inhaler technique before and after the intervention. There is a significant association between the overall level of inhaler technique and sex (20.59%).

Recommendations:

The health care providers can educate the children and their parents regarding correct technique during every follow-up visit. A nurse can develop the skill to demonstrate the correct technique of using the inhaler to improve the child's quality of life. The in-service education regarding the inhaler technique types demonstrates the correct technique of using the inhaler for nurses to develop the same skill. A special nurse can be appointed in the outpatient department to teach and demonstrate the correct inhaler technique. An administrator can organize the health programme regarding asthma and demonstrate the correct use of an inhaler in the hospital and the home.

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