

## **Effect of Implementing Educational Intervention on Mothers' knowledge and Practices regarding Respiratory Problems for Children with Cerebral Palsy**

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### **Abstract**

#### **Background**

Respiratory problems have a significant impact on morbidity and mortality in children with cerebral palsy. **Aim:** Evaluate the effect of implementing educational intervention on mothers' knowledge and practices regarding respiratory problems for children with cerebral palsy. **Method:** A quasi-experimental research design was used for a convenience sampling of 60 mothers and their cerebral palsy children at outpatient clinic and Pediatric Inpatient Neurology Unit of Tanta Main University Hospital. **Tools:** Two tools were used to collect the required data: structured interview schedule and observational checklists to assess mothers' practices regarding the management of respiratory problems. **Results:** Most of mothers had low level of knowledge and three quarter of them had unsatisfactory practice pre educational intervention, whereas immediately and month later, improved mothers' scores on knowledge and practice. **Conclusion:** There was a significant improvement in mothers' performance about care of respiratory problems for cerebral palsy children. **Recommendation:** Provides frequent regular education intervention programs should be provided in all health facilities to mothers.

**Key words:** (Cerebral Palsy Children, Educational Intervention, Respiratory Problem)

## Introduction

Cerebral palsy (CP) is the most prevalent physical disability in childhood. Chronic or recurrent respiratory problems, which are the main cause of early death and greatly reduce a child's quality of life, are common in children with neurocognitive impairment. Cerebral palsy children with respiratory problems are more likely to spend extended periods of time in the hospital. Children with cerebral palsy often have delayed motor, postural, and cognitive development.<sup>(1,2)</sup>

The prevalence of cerebral palsy is around 1.5-3 per 1,000 live births in both developed and developing countries. The incidence of respiratory symptoms is high in children with CP.<sup>(3)</sup> Recurrent aspiration, impaired airway clearance, and deformity of the spine and/or chest wall are major contributors to the development of the progression from acute respiratory tract infection to chronic inflammation of the lower airways, and eventually resulting in bronchiectasis. Various respiratory problems can occur as persistent cough (asthma, aspiration), recurring chest infections (pneumonia, aspiration and bronchitis), noisy breathing during airway blockage, stridor and obstructive apnea during sleep.<sup>(4,5)</sup>

Life expectancy in children with CP depends critically on maintaining lung health. While cerebral palsy isn't a respiratory illness in and of itself, improving a child's or family's respiratory health via intervention is a major step in enhancing their quality of life. In addition to minimize the

health care costs associated with CP.<sup>(2)</sup>

Children with CP should have a complete history and clinical examination of their respiratory health to determine their risk of respiratory illness. Concerns, risks, care and comfort requirements, and any changes to gross motor function or eating and swallowing abilities will all be noted. Detailed history including any risk factors or comorbidities that may increase the likelihood of respiratory disease: children under the age of three, those with epilepsy, GERD, drooling, aspiration episodes, wheezing, or loud breathing, and those who score high on the GMFCS, Eating and Drinking Ability Classification (EDACS), or Dysphagia Outcome and Severity Scale (DOSS) administered by a speech pathologist.<sup>(6)</sup>

There are many strategies that can prevent, treat, and improve respiratory problems as well as decrease the chance of complications. Physiotherapy treatment is important to prevent atelectasis, improve lung compliance, maintain cardiopulmonary fitness, chest wall mobility, airway clearance routines to help with secretion removal and improves cough force. Chest physiotherapy consists of external mechanical maneuvers, such as chest percussion, postural drainage, and vibration, to augment mobilization and clearance of airway secretions.<sup>(7)</sup>

Nebulization is a treatment method for breathing problems. It is a method of administering medication to patients who are unable to utilize inhalers, such as small children with asthma,

COPD, or other respiratory conditions.<sup>(8)</sup> Children frequently use inhaled medications to treat a variety of respiratory diseases, including asthma, chronic lung disease, and bronchopulmonary dysplasia. These medications, which are administered using inhalers and nebulizers, are essential for managing diseases effectively and provide a number of clinical benefits.<sup>(9)</sup>

Nurses play a vital role in teaching parents, particularly mothers about care for their children, including how to handle their child safely, how to provide basic home care, how to teach their child basic manual skills and activities of daily living at their own pace and according to their functional level, and provide emotional support. Nursing management focuses on promoting growth and development, facilitating mobility, ensuring enough nourishment, supporting and educating the family and the child.<sup>(10)</sup>

### **Significance of the study**

Parents of CP children often experience higher levels of stress, grief and depression than other parents. This is due to their children with CP need long-term care and can be deprived of educational opportunities, recreational facilities, and chances to develop friendships. Mothers as caregivers may not fulfill their roles in caring for their children due to poor performance. Consequently, mothers are urged to enhance their children's health and prevent complications. So the researcher focused on how well mothers care for their cerebral palsy

children who suffered from respiratory difficulties.<sup>(11)</sup>

### **Aim of the Study**

The aim of this study was to:-

Evaluate the effect of implementing educational intervention on mothers' knowledge and practices regarding respiratory problems for children with cerebral palsy.

### **Hypothesis**

Implementing educational interventions for mothers are expected to improve their knowledge and practices regarding respiratory problems for children with cerebral palsy.

### **Subjects**

**Research design:** a quasi-experimental research design was used.

**Setting:** The research was done at:

- Outpatient Pediatric Clinic of Tanta Main University Hospital which available two days/week (Monday and Wednesday)
- Inpatient Pediatric Neurology Unit of Tanta Main University Hospital which consists of one ward which has 8 beds.

### **Subjects:**

-A convenient sample of 60 mothers and their cerebral palsy children with respiratory problems were involved in the current study. The size of the sample was measured according to power analysis depended on the level of significance (95%), study power (80%) with margin of error (5%) on Epi Info-Software Program. The participants selected according to inclusion criteria.

-Mothers provided an educational intervention regarding respiratory

problems for their children with cerebral palsy.

**Inclusion criteria for children include:**

- Child with recurrent respiratory problems
- Both sexes.
- Age from 2-12 years.
- Mild or moderate cerebral palsy

**Exclusion Criteria:**

- History of genetic and metabolic disorders
- Psychiatric or other neurological disease
- Attention deficit hyperactivity disorder and autism.

**Tools of data collection:-**

The researcher used two different data collection tools for the purpose of achieving the aim and research hypothesis

**Tool I: Structured Interview Schedule for mothers**

It was constructed by the researcher based on the related and recent literatures <sup>(5, 12, 13)</sup> to measure mothers' respiratory difficulties knowledge among children with cerebral palsy. It comprised of two parts:

**Part (1) Characteristics of the studied sample** which include:

**A- Mothers' Characteristics** as age, education, occupation, residence, number of sibling in the family.

**B- Children characteristics** as age, sex, birth order.

**C- Medical history of children** which was constructed by the researcher to assess health problems facing children with cerebral palsy such as respiratory problems as pneumonia, recurring chest infections, frequent aspiration, unintentional oral

secretion inhalation, food, and drink 'drooling of saliva, chewing difficulties, impaired speech.

**Part (2): Mothers' knowledge about cerebral Palsy:** it contained; definition, types, causes, symptoms, health problems associated with cerebral palsy, manifestations, causes of respiratory problems related to cerebral palsy, relation between respiration and swallowing, Therapeutic vibration, and postural drainage and importance of follow up and therapy compliance.

The questionnaire consisted of twelve questions. The grades ranged from (0-2) for each question. Correct complete answer was scored 2; incomplete correct answer was scored 1 and zero for incorrect answer. There were a total of 24 questions.

**Mothers' Total scores of knowledge was calculated and classified as the following:**

- Below 50% was represented low knowledge level (total scores ranged from 0-≤11)
  - From 50 - < 75% was represented moderate level of knowledge (total scores ranged from >11-17)
  - From 75-100 was represented High level of knowledge (total scores ranged from 17-24)

**Tool II: Observational checklists for mothers' practices regarding management of respiratory problems for cerebral palsy children:**

The researcher designed observational checklists based on the recent and standardized related literatures. <sup>(14, 15, 16)</sup> to assess mothers' practices regarding management of respiratory

difficulties which included the following:

- Chest percussion (8 items)
- Vibration (7 items)
- Postural drainage (30 items)
- Administering of nebulizer including (8 items)
- Inhaler with or without spacer (9 items).
- Inhaler without spacer (10 items).
- Swallowing and drooling checklist (7 items).

Observational checklists used to assign scores to mothers' practices; had 79 items; each item was rated on a scale from 0 to 1. A score of 1 was given when the step is done correctly, while 0 is given when the step is done improbably. The sum of all items was 79.

**Total scores for mothers' practices were calculated as follow: -**

-below 75 % was considered unsatisfactory practice (total scores less than 59)

- From 75 -100% was considered satisfactory practice (total scores ranged from 59-79)

### **Method**

The research was achieved through the following phases:

#### **1-Administrative process:**

The research got an official permission from Faculty of Nursing, Tanta University and also from the administrators of pediatric departments at Tanta Main University hospital to facilitate performance of the study.

#### **2-Ethical and legal considerations:**

The researcher interviewed the mothers and their children, informed them about purpose of the study, and any information about their children's

condition was maintained confidential. Oral consents were obtained from mothers to be involved in this study.

#### **3-Tools development:**

The researcher develops two study tools based on recent and evidence-based literatures. Structured Interview Schedule (Tool I) and Observational Checklists (Tool II).

#### **4- The validity of the contents**

A jury of five pediatric nursing professionals was provided with the tools of the study to evaluate the validity of the contents and the clarity of the questionnaire. Adjustments have been made accordingly. After determining the index of validity of the item content, the nominal validity of the questionnaire was calculated on the basis of expert opinion and was 99.1%.

#### **5-The reliability of Content:**

A Pilot study was conducted to test the reliability of tools (high reliability: Cronbach's alpha was 0.735).

#### **6-Pilot study:**

The researcher assessed the clarity, visibility, and applicability of the research tools by conducting a pilot study using 10% of the sample and necessary adjustments were made. The pilot study was left out of the research sample.

7- **The study steps:** Present study was done through four phases:

#### **I-Assessment**

It was performed to obtain baseline characteristics and evaluate knowledge of mothers regarding respiratory difficulties among children with cerebral palsy using Tool I. The researcher assessed mothers' practice regarding respiratory problems pre, immediately after educational

intervention and one month later using Tool II.

### **2-Planning**

Educational intervention was planned according to mother's educational needs assessment and based on literatures review which was focused on setting the objectives. Content preparation was included the rational for implementing the sessions. The educational intervention was translated into Arabic. A variety of teaching materials were prepared as booklets, pictures laptop, nebulizer device, video and PowerPoint presentations.

### **3- Implementation**

An educational intervention was given to the mothers by carrying out successive sessions. The educational intervention was delivered twice a week in 6 sessions scheduled in the morning. Each session is approximately 30-45 minutes, including discussion time based on mother's progress and feedback. Different educational methods were used, including interactive lectures, group discussion and demonstration. Studied mothers were divided into 10 subgroups and each subgroup was consisted of six mothers. The educational intervention was performed separately for each group by having consecutive sessions according to the subject's actual needs assessment. Each session started with a summary of what was discussed in the previous session. The sessions covered the following topics:

#### **The first session:**

It was focused on the definition, types, causes, manifestations of respiratory problems related to cerebral palsy.

#### **The second session:**

The concept of drooling, the relationship between breathing and swallowing, and the causes that affect nasal breathing.

#### **The third session:**

Instructions for relieving drooling, tongue exercises for improving swallowing and decreasing aspiration pneumonia.

#### **The fourth session:**

Administering of nebulizer, postural drainage.

#### **The fifth session:**

Vibration and percussion technique.

#### **The sixth session:**

Importance of follow up and compliance with therapy.

-Each session concluded with a summary of the content and feedback from the mothers.

-Data collected within 6 months. (From September 2021 to february2022)

### **4- Evaluation phase:**

An evaluation of the educational intervention's impact on maternal knowledge and practice was performed two times by the same assessment tool.

#### **Statistical analysis:**

The collected data were sorted, tabulated and statistically analyzed using spss software (Statistical Package for the Social Sciences, Version 23, spss Inc. Chicago, IL, USA). For quantitative data, range, mean, and standard deviation were calculated. For qualitative data, which describes a categorical set of data based on frequency, percentage, or proportion of each category, a comparison of two and more groups was performed using the Chi-square

(x2) test. Student's t-test was used to compare means of two sets of parametric data from independent samples. For the comparison of more than two means of parametric data, the value of the ANOVA test was calculated. The correlation between variables was evaluated using the Pearson correlation coefficient (r). The significance was assumed to be  $p < 0.05$  for the interpretation of the results of the tests of significance. <sup>(17)</sup>

### Results

**Table (1):** Demonstrates socio-demographic characteristics of studied mothers. It was observed that, maternal age was observed to range from 20<30 years with a mean of  $(25.33 \pm 5.022)$ . In relation to the level of education, it was evident that, 50% of mothers were illiterate, read and write while, 25% had secondary education, 16.17% completed their university education, 8.3% of them had primary education. Regarding the residence, it was evident that, three quarter of mothers (75%) came from rural areas, while 25% were from urban areas.

According to their occupation, it was found that, more than two thirds of mothers (68.3%) not working while 31.7% working. Regarding to number of children in the family, it was found that, 40% have two children, while 33.4% have three children.

**Table (2):** Represents socio-demographic characteristics of studied children. It was showed that, the mean age of the children was  $(6.6 \pm 2.56)$ , ranging from 2 to 12 years, 53.3% were the second child in the family, and more than two-thirds (73, 3%) were male.

**Table (3):** Represents percentage distribution of children regarding medical history. It was presented that, the majority of children (95%) were diagnosed after birth. In relation to hospitalization, all of the studied children (100%) were admitted to the hospital. Most of them (86.7%) were admitted because of pneumonia, while 11.7% were admitted because of convulsions. As regards associated health problems, more than half of children (54.5%) had speech difficult, while 23.37% had sleep problems.

The study clarified that, all of the children (100%) were admitted to hospital because of respiratory problems and 38.3% were admitted two or three times in the last six months. More than three quarters (76.7%) had pneumonia, while 20% had a cough or choking with food. The findings revealed that, 91.7% had feeding problems affecting breathing, 56.3% weak swallowing muscles, as well as 32.7% had drooling. As regards treatment of cerebral palsy, more than half (52.64%) received medical therapy, while 21.06% received speech therapy.

**Table (4):** Represents total scores of mothers' knowledge regarding cerebral palsy. It was showed that, slightly more than two thirds of mothers (68.3%) had poor knowledge pre educational intervention, while 41.7% and 68.4% had good and moderate knowledge immediate and one month after educational intervention respectively. Three periods pre, immediately after, and month later the educational intervention showed statistically

significant differences ( $X^2=59.70$ ,  $p<0.001$ ).

**Table (5):** Shows percentage distribution of total scores of mothers' practices toward their children with cerebral palsy pre – immediately and month after educational intervention. The study cleared that, there were statistically significant differences regarding mothers' practices about (chest percussion, vibration, swallowing, drooling, administering of nebulizer, using of inhaler with spacer, inhaler without spacer and turbuhaler ( $p=0.001$ ) immediately and one month after educational intervention.

As regarding practice of postural drainage. There was statistically significant differences regarding postural drainage practice ( $p=0.006$ ) immediately and one month after educational intervention.

**Table (6):** Presents the relationship between mothers' socio-demographic characteristics and level of knowledge. It t demonstrates the statistically significant relationship between mothers' age, occupation, educational level, number of children, residence and level of knowledge ( $p=0.001$ ,  $p=0.001$ ,  $p=0.001$ ,  $p=0.001$ ,  $p=0.002$ ) respectively.

**Table (7):** Presents the correlation between knowledge and practice among studied mothers. The study showed that, there were positive correlation in all items of practices (postural drainage, chest percussion, vibration, swallowing, drooling, administering of nebulizer, ,inhaler without spacer and turbuhaler) ( $r=.0.748$ ,  $p=0.001$ ), ( $r=0.774$ ,  $p=0.001$ ), ( $r=0.522$ ,  $p=0,001$ ),

( $r=0.505$ ,  $p=0.001$ ), ( $r=0.507$ ,  $p=0.001$ ), ( $r=0.415$ ,  $p=0.001$ ) respectively.



**Table (1) Percentage distribution of studied mothers' regarding socio-demographic characteristics:**

Socio-demographic characteristics of Mothers	Studied Mothers (n=60)	
	No	%
<b>Age in (years)</b>		
< 20	6	10
20 to < 30	42	70
≥30 and more	12	20
<b>Mean ± SD</b>	<b>25.33 ± 5.022</b>	
<b>Range</b>	<b>18-36</b>	
<b>Educational Level</b>		
Read and write	30	50
Primary	5	8.3
Secondary	15	25
University	10	16.17
<b>Residence</b>		
Urban	15	25
Rural	45	75
<b>Occupation</b>		
Working	19	31.7
House wives	41	68.3
<b>No of Children in The Family</b>		
One	8	13.3
Two	24	40
Three	20	33.4
More than Three	8	13.3

**Table (2): Percentage distribution of children regarding socio demographic characteristics:**

<b>Socio-demographic characteristics of Children</b>	<b>The studied Children (n=60)</b>	
	<b>No</b>	<b>%</b>
<b>Age</b>		
2 >5	13	21.7
5 >8	29	48.3
8:12	18	30
<b>Mean ± SD</b>	<b>6.6±2.56</b>	
<b>Range</b>	<b>2-12</b>	
<b>Birth Order</b>		
First	18	30
Second	32	53.3
Third	10	16.7
<b>Gender</b>		
Male	44	73.3
Female	16	26.7

**Table (3): Percentage distribution of studied children regarding medical history:**

Medical History of children	The studied Children (n=60)	
	No	%
<b>Time of Diagnosis</b>		
During pregnancy	3	5
After birth	57	95
<b>Previous Hospitalization</b>		
Yes	60	100
No	0	0
<b>Cause of Hospitalization</b>		
Pneumonia	52	86.7
Surgery	1	1.7
Convulsions	7	11.7
<b>Associated health problems</b>		
Speech Difficulty	42	54.54
Sleep problems	18	23.37
Visual impairment	7	9.09
Orthopedic abnormalities	10	12.98
<b>Presence of respiratory problems</b>		
Yes	60	100
No	0	0
<b>Types of respiratory problems</b>		
Pneumonia	46	76.7
Bronchitis	2	3.3
Cough or choking with Food	12	20
<b>Frequency of respiratory problems in the last six months</b>		
Once	14	23.3
Twice	23	38.3
Three or more	23	38.3
<b>presence feeding problems that affect breathing</b>		
Yes	55	91.7
No	5	8.4
<b>Types of Feeding problems</b>		
Drooling	18	32.7
Weak swallowing muscles	31	56.3
Esophageal reflux	6	11
<b>Treatment of cerebral palsy</b>		
Medical therapy	40	52.64
Speech therapy	16	21.06
Rehabilitation and behavioral therapy	15	19.73
Hyperbaric oxygen therapy	5	6.57

\*More than one answer was allowed

**Table (4) Percentage distribution of total scores of mothers' knowledge about cerebral palsy.**

Knowledge About CP	Studied Mothers (n=60)						X <sup>2</sup>	p
	Before		Immediately		After one month			
	No	%	No	%	No	%		
<b>High</b>	0	0	25	41.7	8	13.3	59.70	0.000
<b>Moderate</b>	19	31.7	24	40	41	68.4		
<b>Low</b>	41	68.3	11	18.3	11	18.3		

**Table (5): Percentage distribution of total scores of mothers' practices regarding physiotherapy techniques toward their children with cerebral palsy.**

physiotherapeutic techniques	Mothers' practice levels (No=60)												$\chi^2$ P1	$\chi^2$ P2	$\chi^2$ P3
	Before		Immediate after				After one month								
	Unsatisfactory practice		Satisfactory practice		Unsatisfactory practice		Satisfactory practice		Unsatisfactory practice		Satisfactory practice				
	No	%	No	%	No	%	No	%	No	%	No	%			
Chest percussion	48	80	12	20	29	48.3	31	51.7	39	65	21	35	73.41	86.66	80.902
Vibration	47	78.3	13	21.7	13	21.7	47	78.3	31	51.7	29	48.3	112.34	124.84	127.559
Postural drainage	45	75	15	25	15	25	45	75	32	58.3	25	41.6	48.27	14.82	14.491
Swallowing & drooling	46	76.7	14	23.3	21	35	39	65	31	51.7	29	48.3	73.42	86.69	84.619
Administering of nebulizer	45	75	15	25	8	13.3	52	86.7	31	51.7	29	48.3	73.45	99.64	90.687
Inhaler with spacer	41	68.3	19	31.7	15	25	45	75	30	50	30	50	52.62	51.19	54.805
Inhaler without spacer	44	73.3	16	26.7	24	40	36	60	39	65	21	35	124.83	112.43	114.251
Turbuhaler	45	75	15	25	9	15	51	85	23	38.3	37	61.7	86.77	73.21	84.222
Total score of all mothers' practice	45	75	15	25	17	28.3	43	71.7	53.3	28	46.7		86.77	15.71	89.741

\* Significance at level  $p < 0.05$ 

P1: Before and immediate after educational intervention.

P2: Before and one month educational intervention.

P3: Immediately and one month educational intervention

**Table (6): Relationship between mothers' socio-demographic characteristics regarding level of knowledge:**

Mothers' Socio-demographic characteristics	Mothers' Level of knowledge						$\chi^2$	P
	Low		Moderate		High			
	No	%	No	%	No	%		
<b>Mother's Age</b>								
<20	0	0	0	0	6	100	13.82	<b>0.001*</b>
20:30	5	11.9	19	45.2	18	42.9		
>30	6	50	5	41.7	1	8.3		
<b>Occupation</b>								
Working	0	0	0	0	19	100	22.46	<b>0.001*</b>
House wives	11	26.8	24	58.5	6	14.6		
<b>No of Children</b>								
One	0	0	0	0	8	100	29.59	<b>0.001*</b>
Two	4	16.7	4	16.7	16	66.7		
Three	0	0	20	100	0	0		
More than Three	7	87.5	0	0	1	12.5		
<b>Educational Level</b>								
Illiterate	0	0	23	76.6	7	23.3	32.91	<b>0.001*</b>
Primary education	2	40	1	20	2	40		
Secondary education	0	0	0	0	15	100		
University education	9	90	0	0	1	10		
<b>Residence</b>								
Urban	11	73.3	1	6.7	3	20	18.47	<b>0.001*</b>
Rural	0	0	23	51.1	22	48.9		

\*Statistically significant difference at (P<0.05).

**Table (7): Correlation between total mothers' knowledge and practice scores**

<b>Mothers ' practices</b>	<b>Correlation coefficient</b>	<b>Mothers' Knowledge</b>
<b>Postural Drainage</b>	r p	0.748 <b>0.001**</b>
<b>Chest percussion</b>	r p	0.774 <b>0.001**</b>
<b>Vibration</b>	r p	0.522 <b>0.001**</b>
<b>Swallowing &amp; drooling</b>	r p	0.505 <b>0.001**</b>
<b>Administering of nebulizer</b>	r p	0.507 <b>0.001**</b>
<b>Inhaler with spacer</b>	r p	0.100 0.447
<b>Inhaler without spacer</b>	r p	0.415 <b>0.001**</b>
<b>Turbuhaler</b>	r p	0.529 <b>0.001**</b>

**\*\*.** Correlation is highly significant at the 0.01 level.

## Discussion

Children with CP have many medical conditions that cause breathing problems, including difficulty swallowing, frequent breathing, weak coughs, recurrent chest infections, and pneumonia, which negatively impact the child's life.<sup>(18)</sup>

Regarding mothers' sociodemographic characteristics, the present study represented that, the majority of the studied mothers were illiterate, could not read and write. This may be due to the majority of mothers were from rural areas that not concerned with learning girls in the past and low socioeconomic status.

**(Barka, 2019)** was in harmony with the present finding, reported that, majority the studied mothers were illiterate & read and write.<sup>(19)</sup> The finding was in congruent with **(Renee, 2019)**. Who reported that, the majority of caregivers were university education.<sup>(20)</sup>

According to occupation, the study illustrated that, more than two thirds of mothers were housewives. This may be attributed to many mothers prefer to care adequately for their children with chronic illness as cerebral palsy. Similarity, **Mahmoud et al., (2020)** found that, more than three quarter of them not working.<sup>(21)</sup> **(Renee, 2019)** who disagrees with these results, reported that more than two third of studied mothers were employed.<sup>(20)</sup>

In relation to residence and incidence of CP, the study found that, three quarters of mothers and their children with CP were from rural areas. The high rate of illiteracy, lack of proper health care facilities, inadequate prenatal care, and low socioeconomic

position in rural regions may all contribute to this problem. **(Mahmoud et al., 2020)** agreed with current findings that more than three-quarters of them are from rural areas.<sup>(21)</sup>

Similarly, **Tseng et al. (2018)** found that living in rural areas, low income, and inadequate follow-up care increased the incidence of CP.<sup>(22)</sup>

More than one third of the children in the present research had been hospitalized more than twice in the previous six months due to respiratory difficulties. A possible cause for this is mothers' lack of experience caring for children with CP and respiratory issues, as well as their limited understanding of the best ways to treat these conditions. **(Qureshi et al., 2020)**. Were in the line with current finding, who showed that, respiratory illnesses contribute to frequent hospital admissions and many comorbid conditions have an impact on frequency of respiratory diseases.<sup>(5)</sup> Cerebral palsy children are five to seven times more prone to respiratory problems. **(Scofano, et al., 2021)**. Were in harmony with current finding, confirmed that, respiratory impairments are an important cause hospital admissions, poor quality of life and death in CP.<sup>(23)</sup>

Regarding scores of mothers' knowledge. The current study found that, most mothers' knowledge of cerebral palsy with respiratory problems and its intervention was low before the educational intervention, but it quickly increased and the majority of mothers had excellent grades after the session. But month later educational intervention, the total scores of mothers' knowledge still improved but



were slightly reduced to about more than two quarters of them.

(**Sayed et al., 2022**). Were in the line with current finding, who found that, three quarters of caregivers had an inadequate knowledge level before the program, whereas most of them showed an improved level of knowledge after the program. <sup>(24)</sup>

Regarding mothers' scores about care of respiratory problems to their children with CP, the results revealed that, all mothers had poor care before educational intervention compared to post intervention. This can be explained by the low level of maternal education, poor knowledge about care, in addition low socioeconomic status of most families which make obstacles for providing complete and effective care and decrease health teaching programs provided to families by health facilities.

(**Afifi et al., 2018**). Were in the same line with the current finding, found that, mothers were done correctly after program implementation than pre and follow-up after program implementation results highlighted the positive effect of intervention program on mothers' practice. <sup>(25)</sup> (**Hashem, 2018**). Stated that, improved maternal knowledge was a positive predictor of maternal practice outcomes. <sup>(26)</sup>

About total scores of mothers' practices toward their cerebral palsy children. The study found a statistically significant difference regarding mothers' practices of chest physiotherapy techniques (chest percussion, vibration and postural drainage). ( **Reem, 2019**). Who reported that, chest physiotherapy plays an important role in removing

airway secretions and improves ventilation; it includes many methods as the conventional techniques of postural drainage, vibration, percussion and directed coughing in addition to other alternatives as the autogenic drainage. <sup>(27)</sup>

As regard correlation between total mothers' knowledge and practice regarding respiratory problems for cerebral palsy children pre, immediate, and one month after educational intervention the current finding represent that, there were statistically significant positive correlation in all items of practices (postural drainage, chest percussion, vibration, swallowing, drooling, administering of nebulizer, inhaler without spacer and turbuhaler) with mothers' knowledge. On the other hand, practice of Inhaler with spacer weak positive correlation associated with mothers' knowledge.

(**Afifi et al., 2018**). Were in the line with current finding, who found that, increasing mothers' knowledge would certainly lead to improvement in their practice, their awareness about needs of children with CP. <sup>(25)</sup>

### Conclusion

Based on the results of this study, it can be concluded that mothers' performance regarding caring for their children with cerebral palsy and had respiratory problems were significantly improved after educational intervention.

### Recommendations

-Mothers of children with cerebral palsy should have ongoing health education programs in all health care settings.

-Further research is needed in the Outpatient Clinics of Pediatrics

Neurology at all hospitals to evaluate mothers' performance in caring for their children cerebral palsy with respiratory difficulties.

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