

## Effectiveness of an Educational Program on Nurses' knowledge about using Physiotherapy for Children with Pneumonia at Pediatric Hospitals in Babylon

فاعلية البرنامج التعليمي في معارف الممرضين حول استخدام العلاج الفيزيائي للأطفال المصابين بذات الرئة في مستشفيات الأطفال في بابل

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الخلاصة:

**خلفية البحث:** يعتبر العلاج الطبيعي مساعدا في إزالة الإفرازات الالتهابية، والإفرازات الرغامية القصبية، وانسداد مجرى الهواء، وكذلك تقليل مقاومة مجرى الهواء، من أجل تعزيز التنفس وتبادل الغازات.

**الاهداف:** الدراسة تهدف إلى تقييم فعالية البرنامج التعليمي في تحسين معرفة الممرضين باستخدام العلاج الطبيعي لإزالة البلغم عند الأطفال المصابين بذات الرئة.

**المنهجية:** تصميم ما قبل التجريبي المستخدم في الدراسة الحالية مع تطبيق (الاختبار القبلي / الاختبار البعدي الأول، الاختبار البعدي الثاني)، نهج لمجموعة الدراسة (مجموعة واحدة)، أجريت الدراسة من 10 / كانون الثاني / 2021 إلى 27 / حزيران / 2021، عن الممرضين العاملات في مستشفيات الأطفال في بابل. باستخدام أخذ العينات الغير الاحتمالية (عينة غرضية)، جمعت البيانات بتقنية الإدارة الذاتية التي تملأ فيها الممرضين استمارة الاستبيان بنفسهم؛ وحلت من خلال الإحصاء الوصفي والاستنتاجي.

**النتائج:** أظهرت النتائج وجود فروق ذات دلالة إحصائية عالية عند  $P < 0.01$  تجاه تأثير البرنامج من خلال رفع الدرجات المعرفية للمجموعة الدراسية في فترة ما بعد الاختبار القبلي، والتي يمكن أن تمكن من تأكيد أهمية ونجاح تطبيق البرنامج المقترح.

**الاستنتاج:** كان للبرنامج التعليمي أثر إيجابي في تحسين معرفة الممرضات حول استخدام العلاج الطبيعي للأطفال المصابين بذات الرئة، حيث كانت نتائج الاختبار القبلي (42%) والاختبار البعدي الأول (80%) والاختبار البعدي الثاني (78%).

**التوصيات:** يجب إجراء المحاضرات والدورات التعليمية بانتظام وتحديثها لمعرفة الممرضات حول استخدام العلاج الطبيعي للأطفال المصابين بالتهاب رئوي.

**الكلمات المفتاحية:** الفعالية، البرنامج التعليمي، معارف الممرضين، العلاج الطبيعي.

### ABSTRACT:

**Background:** Physiotherapy is considered to aid in the removal of inflammatory exudates, tracheobronchial secretions, and airway blockages, as well as the reduction of airway resistance, in order to promote breathing and gas exchange.

**Aims of the study:** This study aimed to evaluate effectiveness of educational program on improve nurses knowledge about using physiotherapy to remove sputum for children with pneumonia.

**Methodology:** A pre-experimental design used in the present study with application of a (pre-test/ post-test I, post-test II), approach for the study group (One group), the study was carried out from 10th January 2021 to 27th June 2021 on nurses working at children's hospitals in Babylon. By using non probability sampling (purposive sample), the data collection process uses the self-administrating technique in which the nurse fills the questionnaire form by themselves; and analyzed through the descriptive and inferential statistic.

**Results:** Results showed a highly significant differences at  $P < 0.01$  toward effect of program through raising knowledge grades of studied respondents at the post1 period, and that could be enable confirms importance and successfulness of applying a proposed program.

**Conclusion:** Educational program had a positive impact in the improvement of the nurses knowledge about using Physiotherapy for Children with Pneumonia, where the results of pre-test (42%), post-test 1 (80%), and post-test 2 (78%).

**Recommendations:** The educational lectures and courses should be regularly done and updated for nurses' knowledge about using Physiotherapy for Children with Pneumonia.

**Keywords:** Effectiveness, Education Program, Nurses Knowledge, Physiotherapy.

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## INTRODUCTION

Pneumonia is a pulmonary illness caused by an acute respiratory infection. When a healthy person breathes, air fills tiny sacs called alveoli in the lungs. The alveoli swell with pus and fluid when a person develops pneumonia, making breathing difficult and limiting oxygen intake (World Health Organization <sup>(1)</sup>). As a result of fluid and pus in the alveoli, pneumonia is an acute respiratory illness marked by uncomfortable breathing and restricted

oxygen intake. Pneumonia, on the other hand, is the main cause of death among children below the age of 5, with an overall mortality rate of 18 percent <sup>(2)</sup>. Pneumonia is one of the most prevalent causes for children to be admitted to the hospital in the United States. It is caused by bacteria, viruses, and infection with both types of pathogens at the same time <sup>(3)</sup>. Each year, around 150 million instances of juvenile community-acquired pneumonia are reported, making it a leading reason of illness and death in children in poor countries, which is 10–50 times more common than in developed countries <sup>(4)</sup>. Chest physiotherapy is often used as an adjunct treatment for pneumonia. To enhance breathing and gas exchange, physiotherapy is thought to help with the elimination of inflammatory exudates, tracheobronchial secretions, and airway obstructions, as well as the lowering of airway opposition <sup>(5)</sup>. A variety of techniques are used in chest physiotherapy for babies with bronchiolitis. Although some techniques have not been scientifically validated, some remedies have recently been tested in clinical studies. The various treatments are not described in the recommendations, but are referred to in broad terms such as "chest physiotherapy" <sup>(6)</sup>.

### AIMS OF THE STUDY:

1. Apply educational program to improve nurses' knowledge about using physiotherapy to remove sputum for children with pneumonia.
2. Evaluate effectiveness of educational program on improve nurses knowledge about using physiotherapy to remove sputum for children with pneumonia.

### METHODOLOGY

A descriptive cross-sectional study design is conducted for the period of 26 \ December \ 2020 to 1 \ June \ 2021. While a descriptive (pre-experimental) design used in the present study with application of a (pre-test/ post-test I, post-test II), approach for the study group (One group), the study was carried out from 10 \ January \ 2021 to 27 \ June \ 2021 on nurses working at children's hospitals in Babylon.

The research sample includes (40) nurses working in Children's Hospital. (23) who are selected from Babylon Hospital for Maternity and Children, and (17) who are selected from Al-Noor Hospital for children by using non probability sampling (purposive sample). Study instruments include:

**Part I:** Demographic status includes the general information of the nurses like (age, gender, educational level, number of years of service in the nursing field, the number of years of service in children's hospital, the participation courses related to the use of physiotherapy).

**Part III:** Nurses' knowledge of the use of physical therapy. The overall sum of questions is (20) questions. The questionnaire items aim for study purposes and it involves relevant topics to the study subject and the educational program.

The data collection process uses the self-administrating technique in which the nurse fills the questionnaire form by themselves; and analyzed through the descriptive and inferential statistic.

### RESULTS:

**Table (1):** Distribution of the studied subjects according to (SDCv.) with comparisons significant

SDCv.	Classes	No	%	C.S. <sup>(*)</sup> / P-value
Gender	Male	8	20.0	P=0.000 (HS)
	Female	32	80.0	

<b>Age Groups</b>	20 _ 25	16	40.0	$\chi^2 = 9.000$ P=0.029 (S)
	26 _ 30	12	30.0	
	31 _ 35	9	22.5	
	More than 36	3	7.5	
<b>Educational level</b>	High School Nursing	14	35.0	$\chi^2 = 0.650$ P=0.723 (NS)
	Diploma (Nursing Institute)	11	27.5	
	Bachelor (Faculty of Nursing)	15	37.5	
<b>Number of years of service in the nursing field</b>	1 _ 5	22	55.0	$\chi^2 = 22.400$ P=0.000 (HS)
	6 _ 10	10	25.0	
	11 _ 15	6	15.0	
	16 _ 20	2	5.0	
<b>The number of years of service in Children's Hospital</b>	1 _ 3	16	40.0	$\chi^2 = 15.750$ P=0.003 (HS)
	4 _ 6	11	27.5	
	7 _ 9	7	17.5	
	10 _ 12	4	10.0	
	More than 12	2	5.0	
<b>Do you have participation courses related to the use of physiotherapy ?</b>	No	40	100	P=0.000 (HS)
	Yes	0	0.00	

HS: Highly Sig. at P<0.01; Testing based on One-Sample Chi-Square test, and Binomial test.

Results shows that a highly significant differences are accounted in at least at P<0.05 among observed distribution with their expected outcomes in each variable, except with educational levels which showed no significant different among the three education levels .

In addition to that, gender variable has vast majority with female in, and accounted 32(80%) of the studied subjects, age groups are focusing at the primary groups, (i.e. 20 \_ 30 years.), and accounted 28(70%), then followed by education levels which has reflecting validity of the selected subjects due to their similarity status in light of that variable. Number of years of service in the nursing field, are focusing at the first two groups, and are accounted 32(80%), as well as number of years of service in children's hospitals, are focusing at the first two groups, and are accounted 27(67.5%), then finally followed by asking about having participation courses related to the use of physiotherapy, which showed that all studied subjects hasn't joining any courses related to physiotherapy.

**Table (2):** Distribution of the studied groups according to main domains and an overall evaluation with comparisons significant

Main Domains	Period	No.	Statistics				
			PGMS	SD	Ass.	Com.	HS
<b>Knowledge of nurses about pneumonia</b>	Pre	40	52.188	7.990	M	1 X 2	HS
	Post1	40	84.438	6.214	H	1 X 3	HS
	Post2	40	82.563	5.235	H	2 X 3	HS
<b>Nurses' knowledge of the use of physiotherapy</b>	Pre	40	32.625	4.492	L	1 X 2	HS
	Post1	40	77.250	6.789	H	1 X 3	HS
	Post2	40	74.563	4.490	H	2 X 3	HS
<b>Overall Evaluation</b>	Pre	40	42.406	4.655	M	1 X 2	HS
	Post1	40	80.844	5.692	H	1 X 3	HS
	Post2	40	78.563	3.496	H	2 X 3	HS

Evaluation Intervals Scoring Scales of Percentile Global Mean of Score (PGLMS): [L: Low (0.00 – 33.33)]; [M: Moderate (33.34 – 66.66)]; [H: High (66.67 – 100)].

A summary statistics of nurse's knowledge about using Physiotherapy for children with pneumonia at pediatric hospitals in Babylon city regarding of long term trend according to studied main domains, as well as an overall evaluation along (Pre, Post1, and Post2) periods throughout applying a proposed of an educational program with comparisons significant. Regarding scoring scales due to transforming outcomes by percentile (Grand/and Global) mean of score (PGMS) concerning of effectiveness applying an educational program, results showed a highly significant differences at  $P < 0.01$  toward effect of program through raising knowledge grades of studied respondents at the post1 period, and that could be enable confirms importance and successfulness of applying a proposed program.

In addition to that, and rather than testing significant are too sensitive to improvements that occurred for repeated measurements statistic, an overall evaluation illustrated too highly and meaningful changes has occurred along pre to post1, as well as knowledge was test-retested to be sure about stability status, where the results of the observed responses were proved stable and stationary outcomes had been resulted with high degree at the post2 period, and that reflects the stability of the knowledge that the participants received in educational program definitely.

## DISCUSSION

Regarding to the distribution of the socio demographic characteristics of the sample, the findings indicated that about three quarters of nurses were females. This finding supported by the results of the following studies, in a quasi-experimental study conducted in ICUs in Istanbul, the finding indicated that two third of nurses were females <sup>(7)</sup>. In a descriptive study was carried out at pediatric ward of Kirkuk Teaching Hospitals, the finding indicating that most of nurses were females <sup>(8)</sup>. In a quasi-experimental study design carried out at Alzahrawy Hospital and Child and maternity hospital in Al Amara City, the finding revealed that most of nurses were females <sup>(9)</sup>. While, in a quasi-experimental design conducted found that majority of nurses were males and this finding in consisted with our finding <sup>(10)</sup>.

Regarding to nurses age, most of nurses at age (20-25) years. In a descriptive study found that half of nurses at age (20-30) years <sup>(11)</sup>. However, Cengiz, et al., (2019), they found in their study that three quarter of nurses at age less than 25 years <sup>(7)</sup>. Moreover, Al-Waly et al., (2020) they found in their study that most % at age (20-25) years old <sup>(8)</sup>. It is reported that most of nurses at age 18-25 years <sup>(12)</sup>, this finding in same line with the present study finding.

While, Saeed, (2012) found that most of nurses at age (25-35) years <sup>(13)</sup>. Also, in a Quasi experimental research design carried out by (Mohamed et al., 2019), the finding indicated that more than half of nurses at age (25-30) years <sup>(14)</sup>, this results disagree with our study.

As regard to nurses' level of education, the finding shows that less than half of nurses had bachelor's degree in nursing. This finding supported by the finding of Saeed, (2012) found that most of nurses had bachelor degree in nursing <sup>(13)</sup>. Also, Al-Waly et al., (2020) supported our study; they found that less than half graduated from college of nursing (Bachelor of Nursing) <sup>(8)</sup>.

Hassan, (2017) found that half of nurses had diploma in nursing <sup>(15)</sup>. Cengiz et al., (2019) found that more than half of nurses were under graduated <sup>(7)</sup>. Mohamed et al., (2019) found that (60%) of nurses had technical nursing institute graduated <sup>(14)</sup>. However, Jassm & Aziz, (2020) found that half of nurses graduated of nursing institute. This finding in consisted with our finding <sup>(9)</sup>.

According to years of service in nursing field, (55%) of them had (1-5) years of service. Saeed, (2012) found that most of nurses had (1-6) years of experience <sup>(13)</sup>. In a descriptive study carried out by Hassan, 2017, he found that three quarters of nurses at age (1-5) years of experience <sup>(15)</sup>. Cengiz et al., (2019) found that most of nurses had (1-9) years of experience in nursing <sup>(7)</sup>. Also, Al-Waly et al., (2020) found that most of them have (1-5) years of general

experience (8). Jassm et al., (2020) found that half of nurses had (1-10) years of service in nursing field <sup>(12)</sup>, this finding in same line with the present study. While, the finding of Mohamed et al., (2019) disagree with our finding, they found that half of nurses had (5-10) years of service <sup>(14)</sup>.

Relating to years of service at children hospitals, less than half of nurses had (1-5) years of service in children hospitals. Cengiz & Kanan, (2019) found that more than half of nurses had (1-9) years of experience in ICU <sup>(7)</sup>. Al-Waly et al., (2020) found that majority of them have (1-5) years of experience inside the medical pediatric ward <sup>(8)</sup>, this finding agree with our finding.

According to nurses participation in courses related to the use of physiotherapy, the finding revealed that all of nurses not participated in any training sessions related to physiotherapy. Also, Cengiz, & Kanan, (2019) found that more than half of nurses do not participate in training session related to ventilator-associated pneumonia <sup>(7)</sup>. Moreover, Al-Waly et al., (2020) found that 57.5 not have any participation in training courses at the pneumonia in children less than five years of age <sup>(8)</sup>. Additionally, Jassm & Aziz, (2020) found that most of nurses do not participate in training session related to pneumonia <sup>(9)</sup>. This finding supported the present study results.

#### **- Discussion of the distribution statistics of the studied subjects according to the (Knowledge of nurses about pneumonia items) along studied periods with comparisons significant**

The finding of the nurses knowledge related to pneumonia shows that nurses have moderate level of knowledge about definition of pneumonia, causes of pneumonia, signs and symptoms of pneumonia, complication, treatment and prevention of pneumonia at the pretest of the educational program.

In point of my view that this result because most of the nurses did not participate in courses about pneumonia due to the absence of the role of continuing education in addition to the lack of years of experience in the field of nursing and in children's hospitals for nurses because they are of a young age group. However, Hassan, (2017) found that nurses had low level of knowledge about information related to pneumonia, more than half did not know the common types of lower respiratory infection, more than half for causes of pneumonia, more than half for danger signs of pneumonia, more than half for medical treatment of pneumonia, about three quarters for complication of pneumonia <sup>(11)</sup>.

Al-Waly et al., (2020) discovered that most nurses had a poor understanding of pneumonia in children under the age of 5 in general, three quarters of nurses had a poor understanding of risk factors and medical management of pneumonia in children under the age of 5, and less than half of nurses had a poor understanding of nursing care management of pneumonia in children under the age of 5. Finally, half of the nurses scored poorly in all areas when it came to pneumonia in children under the age of 5 <sup>(8)</sup>. This result was consistent with the results of our research.

At the posttest 1 and posttest 2, nurse have high level of knowledge about definition of pneumonia, causes of pneumonia, signs and symptoms of pneumonia, complication, treatment, and prevention of pneumonia. There is significant deference between the period of pretest and post test1 & pretest and posttest 2 of the educational program.

In the overall of nurses' knowledge related pneumonia nurses have moderate level at pretest and high level of knowledge at the posttest 1 & posttest 2. There is highly significant difference between the three periods of tests, this finding supported by the finding of the following studies.

Saeed (2012) found that at the pretest less than half know the definition of pneumonia. More than half know the location of pneumonia in respiratory tract. Few know the causes of pneumonia. Few know the age of child that can infected with pneumonia. Less than half know



the risk factor of pneumonia. Few know the clinical features of pneumonia. More than quarter knows the method (ways) of transmission of pneumonia. More than half know the management of pneumonia. While, in the posttest most know the definition of pneumonia.

Most of them know the location of pneumonia in respiratory tract, most of them know the causes of pneumonia, half of them know the age of child that can infected with pneumonia, more than half of them know the risk factor of pneumonia, less than half of them know the clinical features of pneumonia. Most of them know the method (ways) of transmission of pneumonia; most of them know the management of pneumonia. Also, there is significant difference in nurses' knowledge about chest physiotherapy at the pretest and posttest <sup>(10)</sup>.

Cengiz & Kanan, (2019) found that low level of knowledge about treatment of pneumonia at the pretest and a good level of knowledge at the posttest. Also, there is high significant deference between the two periods of tests. This finding supported the present study finding <sup>(7)</sup>.

Jassm & Aziz, (2020) found that at pretest nurses had low level of knowledge about the respiratory system and pneumonia in children, risk factors and the treatment of disease for children, procedures and nursing measures for pneumonia in children. While at the posttest 1 and posttest 2 they had good level of knowledge. Finally, there is significant deference between the three periods of tests (pretest and post test1 & posttest 2) of the educational program <sup>(9)</sup>.

**- Discussion of the distribution statistics of the studied groups according to the (Nurses' knowledge of the use of physiotherapy items) along studied periods with comparisons significant**

The finding of the nurses knowledge related to use of physiotherapy shows that nurses have low level of knowledge at pretest of educational program in half of items which include (Physiotherapy for lungs and limbs, Breathing exercises are considered one of the chest physiotherapy, Physiotherapy is an art and science that contributes to the development of health and the prevention of complications through an understanding of body movement, The most common procedures used are postural drainage and chest percussion, One procedure of percussion and vibration is to relieve pressure on the rib cage when the patient inhales, Manual therapy is used in the field of physiotherapy to help remove lung secretions, Breathing exercises help strengthen the muscles that work to inflate and return the lungs, Postural drainage when a person sits at an angle or propped up at a chosen angle to help drain secretions from the lungs, Encourage the patient to cough using the abdominal muscles after three or four vibrations, Learn about the patient's medications. Some medications, especially antihypertensive diuretics, cause changes in fluid and hemodynamics. These reduce the patient's tolerance to postural changes and postural drainage). While moderate level in the other half of items.

Ali et al., (2018), conducted a descriptive study on pediatric intensive care units (PICUs) at Benha University Hospital and Benha Pediatrics Specialized Hospital. They discovered that just a handful of the nurses testing had acceptable knowledge of chest physiotherapy, whereas the majority of the nurses evaluated had inadequate understanding of chest physiotherapy. This result matched the results of the current research in the pretest <sup>(15)</sup>.

Also, the findings of Mohamed et al., (2019) agree with our finding, they found that most of nurses had unsatisfactory performance about chest physiotherapy for children with pneumonia at the pretest. Most of nurses had unsatisfactory level for chest and lung assessment, most of them had unsatisfactory level for performing postural drainage, percussion and vibration, more than half of them had unsatisfactory level for performing suctioning (or pharyngeal and nasopharyngeal suction), more than half of them had unsatisfactory level for performing oral care <sup>(14)</sup>.

At the posttest 1 and posttest 2, nurses have high level of knowledge related to using of physiotherapy in pneumonia. Also, there is significant deference between the period of pretest and post test1 & pretest and posttest 2 of the educational program.

In the overall of nurses knowledge related use of physiotherapy nurses have low level at pretest and high level of knowledge at the posttest 1 & posttest 2. There is highly significant difference between the three periods of tests.

Mohamed et al., (2019) supported the present study; they found that most of nurses had satisfactory performance about chest physiotherapy for children with pneumonia at the posttest. Majority of nurses had satisfactory level for chest and lung assessment, majority of them had satisfactory level for performing postural drainage, percussion and vibration, majority of them had satisfactory level for performing suctioning (or pharyngeal and nasopharyngeal suction), majority of them had satisfactory level for performing oral care. Also, there is a highly significant difference between the 2 periods of the tests. At the overall there is enhancing in nurses knowledge toward performance of chest physiotherapy after implantation of the training program <sup>(14)</sup>.

In overall evaluation of nurses' knowledge the finding revealed that nurses have moderate level at pretest and high level of knowledge at the posttest 1 & posttest 2. There is highly significant difference between the three periods of tests.

Saeed (2012) found that at the pretest few of nurses had good knowledge about postural drainage, few of nurses had good knowledge about vibration, few of nurses had good knowledge about percussion, and few of nurses had good knowledge about coughing exercise. While, in the posttest less than half had good knowledge about postural drainage, less than half had good knowledge about vibration, less than half had good knowledge about percussion, and more than half had good knowledge about coughing exercise. Also, there is significant difference in nurses' knowledge about chest physiotherapy at the pretest and posttest <sup>(10)</sup>, this finding in same line with our finding.

In point of my view that the logical reason of this results because of most participate in study was with low level knowledge about using of chest physiotherapy for children with pneumonia and most of them without any information about the topic study before implementation of education program. This is indicating that the educational program had positive effect on nurses' knowledge. The educational program has effect on the level of knowledge and support the researcher hypothesis.

## CONCLUSION

Educational program had a positive impact in the improvement of the nurses' knowledge about using Physiotherapy for Children with Pneumonia, where the results of pre-test (42%), post-test 1 (80%), and post-test 2 (78%).

## RECOMMENDATIONS

The educational lectures and courses should be regularly done and updated for nurses' knowledge about using Physiotherapy for Children with Pneumonia.

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