

Effect of Self learning Package on Nurses' Performance regarding Care of Children Suffering from Respiratory Syncytial Virus

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Abstract

Background: Respiratory syncytial virus (RSV) is the causative agent of both pneumonia and bronchiolitis during childhood presenting with varied signs and symptoms vary from mild upper respiratory tract infections to severe fatal lower respiratory tract infections which require hospitalization. **Aim of the study:** was to evaluate the effect of self-learning package on nurses' performance regarding care of children suffering from respiratory syncytial virus. **Study design:** A quasi- experimental approach was used in the present study. **Sample:** A convenience sampling of nurses (n=59) and children (n=59) at Pediatric medical department and Pediatric Intensive Care Units at Benha University Hospital. **Tools of data collection:** four tools were used namely; a structured interview questionnaire form, Observational Checklists, Nurses' attitude in relation to caring of children suffering from RSV and Children medical assessment form. **Result:** There was a highly statistically significant difference between the pre and the post of self-learning package regarding to nurses' knowledge, practice and attitude in relation to caring children suffering from respiratory syncytial virus (p<0.000). **Conclusion:** Implementation of self-learning package improved the studied nurses' knowledge and enhanced their practice and attitude in relation to caring of children suffering from RSV. **Recommendation:** Similar studies are encouraged to be done on larger sample of children from different age groups and regions for generalization of the results.

Keywords: Children, Nurses' performance, Respiratory Syncytial Virus & Self learning Package

Introduction

Human RSV is one of the most common viruses infecting infants and children worldwide. Initial infection occurs between the ages of 6 months and 2 years, causing lower respiratory tract infections (LRTIs); the initial infection can cause severe bronchiolitis, which is fatal. RSV poses a hospital-acquired threat for premature neonates, young children, children suffering from compromised immune systems, congenital heart, chronic lung disease, and children with neuromuscular disorders (Center for Disease Control and Prevention (CDC), 2022). RSV is characterized by being seasonal, peaking during the cold season in temperate climates; the incubation period ranging from three to five days. RSV usually contagious for three to eight days; transmission of RSV occurs through coughing or sneezing of the infected child or through direct contact by kissing or touching the infected surfaces such as doorknobs. RSV survive on hard surfaces as (tables and cot rails) for hours and inhabits soft surfaces such as (tissues and hands) for a short period of time. Infection with RSV usually symptomatic, as mild airway obstruction; rhinorrhea, nasal congestion, coughing, sneezing, tachypnea, accessory muscle tension, prolonged exhalation, sometimes fever,

muscle aches, rhonchorous breathe sounds, wheezing (Jain et al., 2022).

Palivizumab is the prophylactic agent of choice to prevent RSV infection and is recommended for high-risk children, as only drug currently available to prevent RSV infection is palivizumab, a monoclonal antibody act against the antigenic site of protein F (Martos et al., 2021). The Mild RSV infections are treated with supportive care such as using over-the-counter fever reducers and pain relievers, while more severe RSV infections such as bronchiolitis require supportive measures such as oxygen, fluids and nutrition (Azzari et al., 2021). Most practical interventions for critically ill children with RSV infection necessitate professional well-trained nurses with substantial experience in the core steps of successful care and the safety and maintenance of treatment. Nurses caring for RSV-infected children require sufficient knowledge and practice to positively impact performance levels. There is a need to understand the unique physical, physiological and psychological problems encountered by children severely infected with RSV (Sabaq et al., 2019).

Self-Learning Package (SLP) is one of the most suitable teaching methods for the nurses as an adult learners which is designed to give pediatric nurses the freedom to choose what, how, when and where they

learn. This flexibility is a key feature of the open learning process. The SLP is a format allowing pediatric nurses to self-checks of their progress (before and after tests) throughout the SLP. A SLP is a learner-initiated process, through which learning needs, setting goals, selecting resources, implementing strategies, and assessing learning outcomes for the purpose of rewarding SLPs, is identified; providing flexibility to adapt to nurses' schedules and encourages additional participation in continuing education as nurses deepen their knowledge (Bayomi & Taha, 2022 & Abd El Hamid et al., 2018).

Significance of the study

Respiratory syncytial virus is an enveloped RNA virus causing acute lower respiratory tract infection and bronchiolitis in young children, causing more than 3 million hospitalizations and more than 65,000 deaths worldwide each year. In severe cases, RSV-related complications appears including (viral pneumonia, acute otitis media, conjunctivitis hypoxia, lethargy, apnea, acute respiratory failure and death, high mortality rates have been observed in children infected with RSV after bone marrow or lung transplantation (Noble et al., 2022 ; Jain et al., 2022; WHO, 2022).

Subjects and Methods

The current study was aimed to evaluate the effect of self-learning package on nurses' performance regarding care of children with respiratory syncytial virus.

Research Hypothesis

The studied nurses' performance regarding care of children suffering from respiratory syncytial virus are expected to be enhanced after self-learning package implementation.

Research Design:

A quasi-experimental research design (one group pretest and posttest) was followed to conduct the current study through assessing the effect of independent variable (self-learning package) on the dependent variable (the studied nurses' performance regarding care of children with respiratory syncytial virus).

Settings:

The study was carried out at Pediatric Medical Departments and Pediatric and Pediatric Intensive Care Unit (PICU) at Benha University Hospital, which were located at the fourth floor. The Pediatric Medical Department consists of two units; first unit includes three rooms, each room has 5 beds; the second unit includes 2 rooms and each room contains 5 beds. While PICU includes two rooms, and 6 beds in each room.

Subjects:

Two subjects were included in the present study:

1. All available nurses (59) working in the previously mentioned settings, 38 nurses at Pediatric medical units & 28 nurses at PICU regardless of their characteristics, were included representing a convenient sample.
2. Children (59) with the following **Inclusion criteria:**
Age from 1 month to 2 years, from both sexes and children suffering from respiratory syncytial virus, were included representing a purposive sample.

Tools of data collection:

Data was collected through the following four tools:

Tool I: A structured interview questionnaire sheet (pre and post):

The researchers designed this tool after reviewing related literatures. It was written in Arabic language and composed of two parts, as the following:

Part 1: Characteristics of the studied nurses: as (age, gender, place of work, educational level, years of experience in pediatric department and training courses related to caring of children with RSV (six questions).

Part 2: The studied nurses' knowledge (pre and post-test): to assess their knowledge in relation to RSV. Total items were (11) included in the list. Nurses knowledge regarding; definition, high risk group, incubation period, mode of transmission, clinical manifestation, diagnosis, isolation precautions, prevention, treatment, complications and nursing care of RSV, it composed of (5) open ended question and (6) multiple choice questions.

Scoring system for nurses' knowledge was scored as following:

- Score (two) was given for correct and complete answer.
- Score (one) was given for incomplete correct answer.
- Score (zero) was given for unknown answer.

Total scoring system for nurses' knowledge was categorized as the following:-

- Poor level of knowledge (< 60%).
- Intermediate level of knowledge (60 % to < 80%).
- Good level of knowledge (≥ 80 %).

Tool II: Observational Checklists (pre & post-test):

Observational checklists were adapted from Cameron, (2015) & Lynn, (2015) then modified by the researchers to be compatible with the study nature. They were used to assess the studied nurses' practice regarding RSV. It included 243 items grouped under (14) main parts as namely hand washing, measuring (body temperature through axillary route, respiratory rate, apical pulse), monitoring oxygen saturation through pulse oximetry, giving oxygen therapy, aspirating a venous blood

sample, aspirating arterial blood gases, administering (an intramuscular injection, intravenous bolus or push, a nebulizer), chest physiotherapy, nasopharyngeal suction and oropharyngeal suction.

Scoring system for nurses' practice was scored as following:-

- Done correct and complete was scored (1).
- Not done was scored (0).

The total scoring system for nurse's practice was estimated as following:-

- Less than 85 % was considered unsatisfactory.
- From 85 % to 100% was considered satisfactory

Procedure	Total No. of items\ scores	Unsatisfactory	Satisfactory
Hand washing	13	0- 11	11- 13
Measuring axillary body temperature	13	0-11	11- 13
Measuring apical pulse	13	0-11	11- 13
Measuring respiratory rate	9	0-7	7- 9
Measuring oxygen saturation by pulse oximetry	13	0-11	11- 13
Oxygen therapy	20	0- 17	17- 20
Collecting a venous blood sample	20	0-17	17- 20
Collecting arterial blood gases	17	0-14	14 - 17
Administering an intramuscular injection	20	0-17	17- 20
Administering medication by I.V bolus or push	18	0-15	15 - 18
Administering a nebulizer aerosol route	15	0-13	13 - 15
Chest physiotherapy	42	0-35	35 - 42
Nasopharyngeal suction	16	0-13	13 - 16
Oropharyngeal suction	14	0-12	12 - 14
Total practice	243	0-206	206- 243

Tool III: Nurses' attitude in relation to caring of children suffering from respiratory syncytial virus (pre and post-test): is adapted from Revell, (2022), a 3-point Likert scale used to measure the studied nurses' attitude in relation to caring of children suffering from RSV and included (6) items as nurses acquired knowledge from the educational lesson regarding pediatric RSV patient, adherence to the recommendations of RSV management guideline is necessary in the treatment of pediatric RSV patients, receiving training about RSV in children is essential, nurses feel being comfortable for treating pediatric patients with RSV, confident in their knowledge to treat pediatric patients with RSV and confident in their skills to treat pediatric patients with RSV.

Scoring system for the studied nurses' attitude:

Two grades were given for the studied nurses' response as agree; one grade was given, if their response was neutral and zero was given, if their

response was disagree. Total score of the studied nurses' attitudes ranged from (0-12) point; if the studied nurses' total scores were $\geq 80\%$, they were considered having positive attitudes, while If their total scores were ranging from $60 < 80\%$, they were considered having neutral attitudes and they were considered as having negative attitudes if their total scores were $< 60\%$.

Tool (IV): Children medical assessment Form:

The researchers designed this tool to collect the studied children's characteristics as (age, gender, diagnosis and manifestation of RSV). The researchers collected medical data from the studied children and their medical records (four questions) in the pre-implementation phase to assess the studied children's medical condition. The researchers collected data regarding the studied children as a form of confirmation on the related literature review.

Preparatory Phase

The previous and recent national and international related literatures was reviewed using textbooks, periodicals, articles and journals to be matched with the various research problem aspects to frame the study tools for data collection. This phase took one month from the beginning to end of January 2023.

Content Validity

It was revised by a jury consisting of three experts; two experts from Faculty of Nursing Benha University and one expert from Faculty of Nursing Monufya University) in Pediatric Nursing field. The experts revised the study tools for simplicity, relevance, clarity, comprehensiveness and achievability. The experts accepted the content but their opinion was considered concerning the paraphrasing, accuracy and format of the tools; and advised minimal language changes that make the statement and questions more clear and precise. Consequently, the required modifications were done. This phase continued one month from the beginning till the end of February 2023.

Reliability:

Tools reliability was done by the researchers through giving the same study tools to the same study subjects under the same condition. Cronbach's alpha coefficient was used to assess the internal consistency reliability of all items of the tools. It was (0.93) for nurses 'knowledge assessment sheet, (0.91) for the nurses 'practices and (0.82) for nurses 'attitude.

Ethical Considerations:

The researcher obtained an ethical approval from the Scientific Research Ethical Committee of Faculty of Medicine, Benha University (RC.15.3.2023). An informed consent was taken from the studied nurses before data collection. The studied nurses were informed regarding the study purpose and expected outcomes. Also, the studied nurses were assured

regarding the study safety, voluntary participation and withdrawal rights from the study any time freely. Anonymity and confidentiality of the collected data; as being used for the research purpose only were considered. The values, ethics, beliefs and culture of the studied nurses were respected. Children and their parent oral consent was obtained prior data collection focusing on that the study is safe and all data collected was handled for research purpose only, with complete confidentiality and privacy.

Pilot Study

A pilot study was done to test the validity, clarity, applicability and feasibility of the study tools and to calculate the required time for each tool (I & II). The total sample was (66) nurses; the researchers applied the pilot study on ten percent of the total subjects, (7) nurses were exceptional from the current study to avoid sample contamination and bias, so the actual sample size was 59 studied nurses. Modifications were followed and the last version was developed, based on analysis of pilot study. The pilot took one week; the third week of March 2023.

Field of the work

The data collection process was done over a period of about two months starting from the end of March 2023 to the end of May 2023. The researchers interviewed the nurses at the study settings, mentioned the study aim and took an approval orally from nurses to be engaged in the study and parents of children to achieve the aim of the current study by those phases: assessment, planning, implementation and evaluation phase. The researcher assessed nurses' knowledge regarding respiratory syncytial virus using the tool of a structured interviewing questionnaire (Tool I) and observed nurses' practice during care of children respiratory syncytial virus using the tool of an observational checklists (Tool II).

Self-Learning Package was performed into four phases as the following:

Assessment phase (pre-test):

Assessment phase stated by interviewing the studied nurses to obtain the baseline data; the researchers welcomed nurses, identified the study purpose, activities and duration; and their oral approval was obtained. The researchers were available by rotation for four days per week (Saturday, Sunday, Tuesday and Wednesday) at morning and afternoon shift. The researchers collected data of the studied children from their parents and the medical records which took about 15 minutes for each child. The studied nurses were given a questionnaire for filling to assess their knowledge regarding RSV which took about 20-30 minutes. Each nurse was observed individually while providing care for the studied children through using observational checklists which took about 45-60 minutes.

Planning phase:

The self-learning package was developed by the researcher in simple Arabic language considering nurses' level of understanding while designing the self-learning package, based on the baseline data obtained from the assessment phase and related literature.

Self-Learning Package (SLP):

The researchers designed the self-learning package based on the studied nurses' actual need assessment, after reviewing the related literatures in an Arabic language. It was covered the theoretical knowledge about respiratory syncytial virus such as definition, pathophysiology, incubation period, mode of transmission, manifestations, diagnostic tests, isolation precautions, treatment, high risk group, prevention methods, complications and nursing care for children, in addition, practical procedures related to nursing care for children suffering from RSV such as procedures of hand washing, measuring (body temperature through an axillary route, respiratory rate, apical pulse), monitoring oxygen saturation through pulse oximetry, giving oxygen therapy, aspirating a venous blood sample, aspirating arterial blood gases, administration of (an intramuscular injection, an intravenous bolus or push, a nebulizer, chest physiotherapy, nasopharyngeal suction and oropharyngeal suction). The self-learning package was included a table of content, introduction, prerequisites and suggested resources, instructional objectives, pre-test, and post-test as the following:

Table of content to identify each section and its page location. Introduction to the self-learning package was explained as; its purpose, contents and a reason why such knowledge is needed. Prerequisites and suggested resources, the researchers has identified the knowledge, skills and experiences that the nurse should pass before attempting to complete the self-learning package. Instructional objectives, were expressed in clear language, those objectives were quite specific so that both the studied nurses and researcher s were aware what is expected and whether it has been achieved at the end of the self-learning package. The pre-test, helped nurses to evaluate which sections of the package they skipped over and which ones they need to study in-depth. Post-test, the marks were obtained in the post-test were shown whether the nurse has mastered the content and therefore achieved the learning outcomes.

Implementation phase:

The self-learning package distributed by the researchers to each nurse. The researchers has clarified the purpose of the study and discussed the utility technique of the package as; each chapter should be read carefully any page in the package shouldn't be canceled; the questions following each

chapter should be answered; it isn't permitted to move to another chapter unless the required score is obtained; if the required score can't be reached, the nurses should return again to the same chapter and they can return to the researchers for vague points' clarification. The objective of this phase was to raise knowledge, enhance both practices and attitudes of the studied nurses. It was done over a period of about two months starting from the end of March 2023 to the mid of May 2023.

Evaluation phase of self-Learning package (post-test):

During the evaluation phase (post-test), the effect of the self-learning package on nurses' knowledge and practices in relation to caring of children with respiratory syncytial virus was evaluated by using the same versions of the study tools which were used pre-implementation; were used again immediately post-implementation of the self-learning package. It was done over a period of the third week of May 2023.

Administrative Design:

Officially, an approval was taken from the Dean of the Faculty of Nursing Benha University to the

hospital director and head of pediatric medical departments at Benha University Hospital in Benha city. The researchers gave a specific explanation regarding the study importance and nature.

Statistical Design:

The researchers used the Statistical Package for Social Science (SPSS) version 21 for statistically analyzing the collected organized data. Tabulation done for descriptive statistics, test of significance, significance of qualitative variables was measured through Chi-square test, significance of quantitative variables was measured through paired t test and correlation coefficient was used for quantitative variables that were normally distributed or when one of the variables is qualitative. These tests were applied to test the study hypothesis. Cronbach's Alpha was used to assess the study tools' reliability. The significance level was categorized into a highly significant level when $p < 0.001$, a significant level when $p < 0.05$ and no statistical significance difference when $p > 0.05$.

Results

Table (1): Distribution of the studied nurses regarding their characteristics (n= 59).

Items	No.	%
Age/ years:		
25- <30	4	6.8
30- <35	5	8.5
35- <40	20	33.9
≥ 40	30	50.8
Mean ± SD	34.1 ± 5.58	
Gender:		
Male	6	10.2
Female	53	89.8
Place of work:		
Pediatric medical units	34	57.6
Pediatric intensive care units	25	42.4
Educational level:		
Secondary school of nursing	10	16.9
Technical institute of nursing	30	50.8
Bachelor in nursing science	16	27.1
Post graduate studies	3	5.1
Years of experience in pediatric department:		
< 3 year	4	6.8
3- <6	19	32.2
6- <10	6	10.2
≥ 10	30	50.8
Mean ± SD	8.50 ± 3.79	

Table (2): Frequency distribution of the studied children regarding their characteristics

Items	No.	%
Age in months:		
< 6 month	17	28.8
6- < 12 months	19	32.2
12- < 18 months	16	27.1
18- 24 months	7	11.9
Mean ± SD	9.91±5.44 months	
Gender:		
Boy	40	67.8
Girl	19	32.2
Diagnosis:		
Bronchiolitis	46	77.9
Pneumonia	13	22.1
Clinical Manifestations:		
Fever	50	84.7
Cough	57	96.6
Coryza	45	76.2
Shortness of breath	49	83.0
Sore throat	18	30.5

Table (3): Distribution of the studied nurses according to their knowledge regarding care of children suffering from respiratory syncytial virus thorough self-learning phases (n =59).

Knowledge regarding RSV	Pre self-learning						Post self-learning				X ² FET	P value
	Complete correct Answer		Incomplete correct answer		Unknown or wrong answer		Complete correct Answer		Incomplete correct answer			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Definition of RSV	2	3.4	5	8.5	52	88.1	56	94.9	3	5.1	102.7	0.000**
Incubation period	1	1.7	5	8.5	53	89.8	55	93.2	4	6.8	105.1	0.000**
Mode of transmission	2	3.4	6	10.2	51	86.4	58	98.3	1	1.7	106.8	0.000**
Manifestation of diseases caused by RSV	2	3.4	7	11.9	50	84.7	57	96.6	2	3.4	104.0	0.000**
Diagnosis of RSV	1	1.7	3	5.1	55	93.2	56	94.9	3	5.1	108.0	0.000**
Isolation precautions	2	3.4	6	10.2	51	86.4	57	96.6	2	3.4	104.2	0.000**
Treatment of diseases caused by	1	1.7	7	11.9	51	86.4	54	91.5	5	8.5	102.4	0.000**
High risk group RSV	2	3.4	20	33.9	37	62.7	57	96.6	2	3.4	102.9	0.000**
Prevention methods	1	1.7	24	40.7	34	57.6	54	91.5	5	8.5	97.5	0.000**
Complications	1	1.7	19	32.2	39	66.1	56	94.9	3	5.1	103.7	0.000**
Nursing care for child suffering from RSV	3	5.1	19	32.2	37	62.7	57	96.6	2	3.4	99.3	0.000**

** A highly statistically significant difference (P <0.001)

- Fisher exact test "FET"

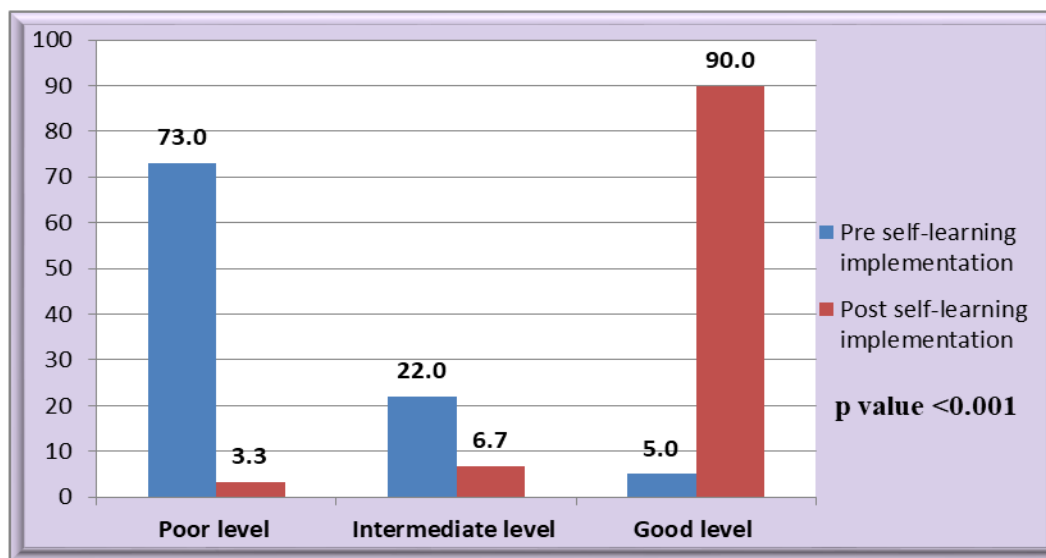


Figure (1): Distribution of total level of the studied nurses' knowledge regarding care of children suffering from RSV pre and post self-learning implementation (n =59).

Table (4): Distribution of total level of the studied nurses' practice regarding g care of children suffering from respiratory syncytial virus thorough self-learning phases (n =59).

Procedure	Pre self-learning				Post self-learning				X ² FET	P value
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactor			
	No.	%	No.	%	No.	%	No.	%		
Hand washing	15	25.4	44	74.6	57	96.6	2	3.4	62.8	0.000**
Measuring axillary body temperature	8	13.6	51	86.4	57	96.6	2	3.4	82.2	0.000**
Measuring apical pulse	6	10.2	53	89.8	54	91.5	5	8.5	78.1	0.000**
Measuring respiratory rate	7	11.9	52	88.1	57	96.6	2	3.4	85.3	0.000**
Measuring oxygen saturation by pulse oximetry	15	25.4	44	74.6	58	98.3	1	1.7	66.4	0.000**
Oxygen therapy	14	23.7	45	76.3	56	94.9	3	5.1	61.9	0.000**
Collecting a venous blood sample	7	11.9	52	88.1	53	89.8	6	10.2	71.7	0.000**
Collecting arterial blood gases	14	23.7	45	76.3	55	93.2	4	6.8	58.6	0.000**
Administering an intramuscular injection	7	11.9	52	88.1	57	96.6	2	3.4	85.3	0.000**
Administering medication by intravenous bolus or push	18	30.5	41	69.5	56	94.9	3	5.1	52.3	0.000**
Administering a nebulizer aerosol route	13	22.0	46	78.0	57	96.6	2	3.4	67.9	0.000**
Chest physiotherapy	11	18.6	48	81.4	54	91.5	5	8.5	63.33	0.000**
Nasopharyngeal suction	15	25.4	44	74.6	59	100	0	0	70.16	0.000**
Oropharyngeal suction	17	28.8	42	71.2	56	94.9	3	5.1	54.63	0.000**

** A highly statistically significant difference (P <0.001) - Fisher exact test "FET"

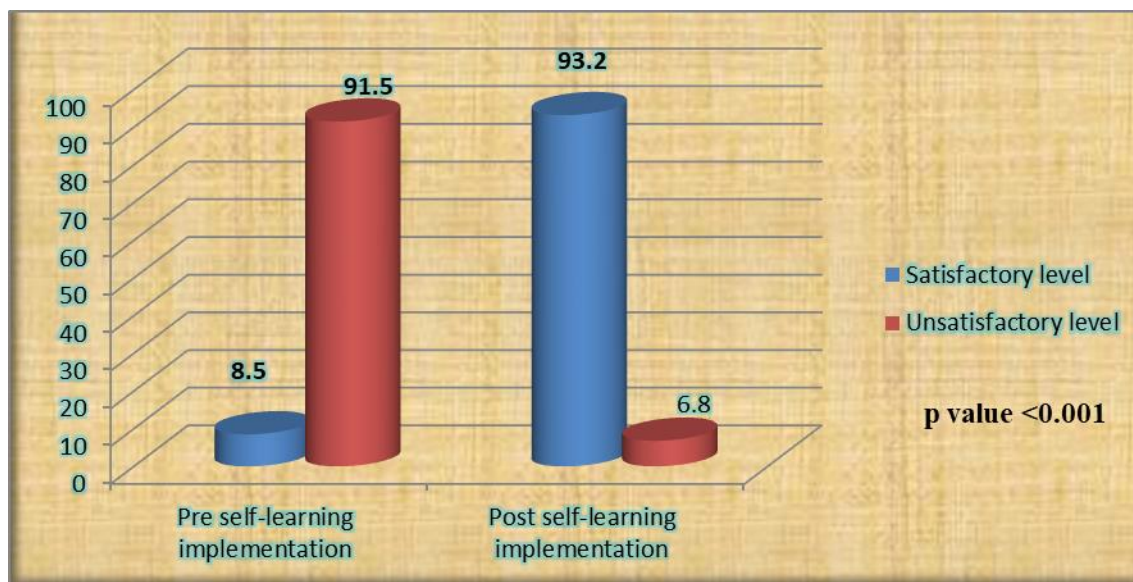


Figure (2): Distribution of total level of the studied nurses' practice regarding care of children suffering from RSV pre and post self-learning implementation.

Table (5): Mean score of the studied nurses' attitude regarding care of children suffering from respiratory syncytial virus pre and post self-learning implementation (n =59).

Items	Pre self-learning	Post self-learning	Paired t test	P value
	Mean ± SD	Mean ± SD		
I gained knowledge from the education lesson regarding pediatric RSV patient	.15±48	1.89±.30	22.1	0.000**
Adherence to RSV management guideline recommendations is important in the treatment of pediatric RSV patients.	.20±.51	1.89±.30	21.8	0.000**
Receiving training about RSV in children is essential	.18±50	1.91±.28	17.9	0.000**
I feel comfortable treating pediatric patients with RSV	.13±43	1.88±.31	26.9	0.000**
I feel confident in my knowledge to treat pediatric patients with RSV.	.16±53	1.94±.22	24.4	0.000**
I feel confident in my skills to treat pediatric patients with RSV.	.10±30	1.93 .25	37.1	0.000**
Total	.94±1.71	11.49±1.17	36.94	0.000**

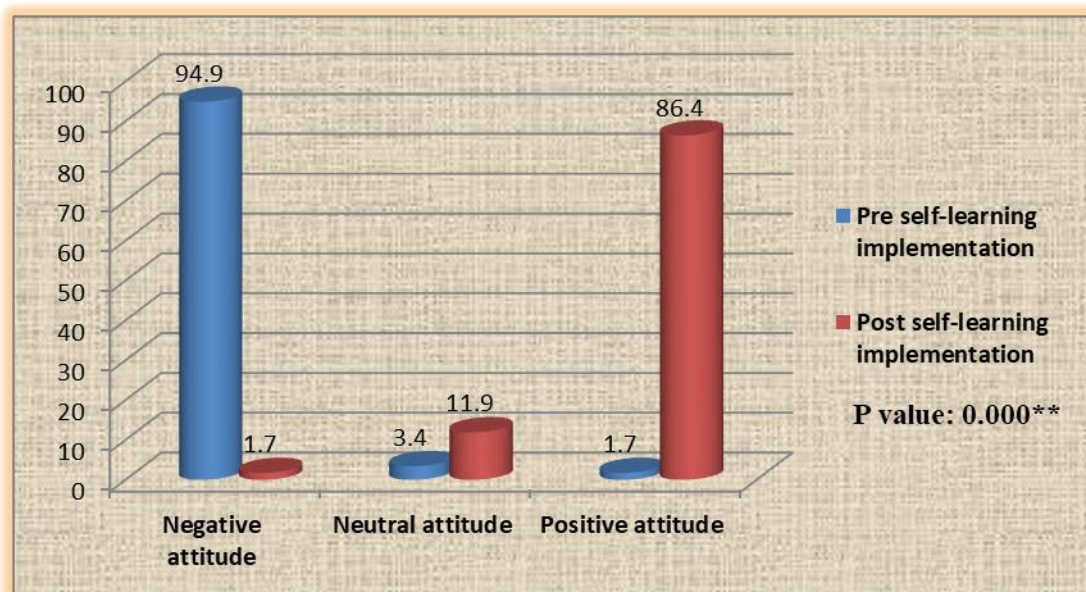


Figure (3): Distribution of total level of nurses' attitude regarding care of children suffering from RSV pre and post self-learning implementation (n= 59).

Table (6): Correlation between studied nurses' total knowledge, total practice and total attitude score pre and post self-learning package implementation.

Total scores	Pre-implementation		Post implementation	
	r	p-value	r	p-value
Knowledge - practice	0.723	.000**	0.939	.000**
Knowledge - attitude	0.784	.000**	0.964	.000**
Attitude – practice	0.710	.000**	0.970	.000**

** Correlation is significant at the 0.01 level (2- tailed).

Table (1): Shows that half (50.8%) of the studied nurses were ≥ 40 years old with mean age 34.1 ± 5.58 years, majority (89.8%) of them were females. more than half (57.6%) of them working in pediatric medical units. More than half (50.8%) of the studied

nurses had technical institute of nursing. As for years of experiences the table reveals that 50.8% of nurses had ≥ 10 years of experience in pediatric department while 6.8% of them had less than 3 years of experience with mean ±SD 8.50 ±3.79 years.

Table (2): Reveals that, 32.2% of studied children were 6-<12 months old, with mean age 9.91 ± 5.44 months. Regarding gender, 67.8% of them were male and the majority (84.7%, 96.6% and 83.0%) of children suffers from fever, cough and shortness of breath respectively. And 77.9% of the studied children diagnosed with bronchiolitis.

Table (3): Reveals that, less than two thirds and majority of the studied nurses had unknown/wrong answer regarding RSV pre self-learning, which improved to vast majority of them had complete correct answer about RSV post self-learning. Moreover, there was a highly statistical significant difference ($p < 0.000$) in favor of post self-learning.

Figure (1): Demonstrates that, more than two third (73%) of studied nurses had poor level of knowledge at pre self-learning package implementation. In contrast, majority (90.0%) of them had good level of knowledge post self-learning package implementation with a highly statistical significant difference (p value < 0.001) in favor of post self-learning implementation.

Table (4): Illustrates that, majority of the studied nurses had incompetent practice level pre self-learning, which improved to majority of them have competent level of practice post self-learning. Moreover, there was a highly statistical significant difference ($p < 0.000$) in favor of post self-learning.

Figure (2): Shows that, majority (91.5%) of the studied nurses had unsatisfactory level of practice in relation to care of children suffering from RSV pre self-learning package implementation. In contrast, majority (93.2%) of them had satisfactory level of practice post self-learning package implementation with a highly statistical significant difference (p value < 0.001) in favor of post self-learning implementation.

Table (5): Presents that mean score of the studied nurses in relation to feeling confident in their knowledge to treat pediatric patients with RSV in the pre self-learning $0.16 \pm .53$ Which improved to be $1.94 \pm .22$ post self-learning. Moreover, there is highly statistical significant difference in all items of nurses' attitude regarding care of children suffering from respiratory syncytial virus post self-learning implementation in comparison of the pre self-learning implementation ($p < 0.000$).

Figure (3): Demonstrates that, majority (94.9%) of the studied nurses had negative attitude level in relation to care of children suffering from RSV pre self-learning implementation. In contrast, majority (86.4%) of them had positive attitude level post self-learning implementation with a highly statistical significant difference (p value < 0.000) in favor of post self-learning implementation.

Table (6): Reflects that, there were statistically significant positive correlations between studied nurses' total knowledge, total practice and total

attitude pre and post self-learning implementation ($p < 0.000$).

Discussion:

Respiratory syncytial virus (RSV) is a chief cause of hospitalization during infancy; in the absence of specialized care, RSV infection can be fatal in neonates; reinfection remains common in childhood. Rates of infection are at maximum episodes in the winter months during infancy, causing bronchiolitis; most children have at least one RSV infection by two years of age, common colds in older children and more serious respiratory illnesses as pneumonia in all age groups of childhood; the symptoms are ranging from mild upper respiratory tract infections to increase in the lower respiratory tract infections severity and potential fatality which require hospitalization in addition to mechanical ventilation (De la Loge et al., 2021 & Tatlock et al., 2021).

According to the studied nurses' total level of knowledge regarding RSV in children, the current study showed that, more than two third of studied nurses had poor level of knowledge at pre self-learning package implementation. In contrast, majority of them had good level of knowledge post self-learning package implementation with a highly statistical significant difference (p value < 0.001) in favor of post self-learning implementation. The finding of the current study come in the same line with Revell, (2022), who reported that. There was an increase in mean scores of nurses' knowledge on RSV/bronchiolitis between the pretest Mean \pm SD (4.57 ± 1.34) and posttest Mean \pm SD (8.92 ± 0.70) and the posttest average score was 89%, meaning that participants acquired knowledge regarding RSV/bronchiolitis. All nurses improved, none reduced posttest, which reflects the educational presentation effectiveness. In the same time, this finding agreed with Aziz & Jassm, (2020) who mentioned that, there was highly statistical significant differences in the study group between pre, post-I and post-II tests in all items related to nurses' knowledge toward children with pneumonia. According to Franklin et al., (2018) who reported that early intervention in children suffering from RSV/Bronchiolitis is a necessity to prevent escalation of care because of respiratory distress and respiratory failure.

The current study finding supported by Ibrahim et al., (2020) who mentioned that assessment study aimed to assess knowledge of nurses about pneumonia in children under age five years in Kirkuk Teaching Hospitals; reporting that, the majority of the nurses have poor total knowledge score. In the same line, this result context with Hassan et al., (2023) who applied an assessment study regarding factors

affecting nurses' performance towards caring of respiratory disorders pediatric patients, clarified that, almost two thirds (66.9%) of nurses had poor level of knowledge regarding respiratory disorders in pediatrics. This might be due to deficit of such knowledge in nurses' undergraduate curriculum, shortage of in-service training programs, lack of awareness about the importance of such theoretical knowledge and its impact on nursing practice or related to high turn-over of nurses in addition to annual leaves due to child care that results in frequent transformation between hospital department according to work needs.

The current study clarified that, majority of the studied nurses had unsatisfactory level of practice in relation to caring of children suffering from RSV pre self-learning package implementation. In contrast, majority of them had satisfactory level of practice post self-learning package implementation with a highly statistical significant difference (p value <0.001) in favor of post self-learning implementation, these results agreed with **Sharshor et al., (2019)** who reported in a study aimed to examine the educational chest physiotherapy training program effect on nurses' performance for infants suffering from lower respiratory problems in Pediatric Intensive Care Unit, they found that, most of the nurses had satisfactory level of performance in relation to measuring body temperature, measuring respiratory rate and apical pulse immediately and one month post program in comparison to preprogram with a highly statistical significant difference ($p <0.000$).

As regards to nurses' practice in relation to caring of children suffering from RSV, the present study showed that, the majority of nurses had satisfactory level of practice regarding hand washing an intramuscular injection administration and medication administration either through an intravenous bolus or push post self-learning in comparison to pre self-learning implementation. Additionally, a highly statistical significant difference ($p <0.000$) in favor of post self-learning was found, these results compatible with **Zain ELdin et al., (2018)** who reflected in a study regarding nursing care protocol effect on the hospitalization duration among children suffering from pneumonia" they found that, the mean and standard deviation improved post-test than pretest in relation to hand washing, intramuscular and intravenous injection, with a highly statistical significance differences of mean scores of nurses' practices in relation to all general nursing care procedures post and follow up test than on pretest ($p <0.001$).

As regards to nurses' practice in relation to caring of children suffering from RSV, the current study verified that, the majority of the studied nurses had

competent level of practice regarding monitoring oxygen saturation through pulse oximetry and oxygen therapy post-selflearning compared to pre-self-learning. Additionally, a highly statistical significant difference ($p <0.000$) in favor of post-selflearning package implementation was found, these results compatible with **Helaly & El Sobky, (2020)**, in a study about guidelines protocol for enhancing nurses' performance for caring of children suffering from respiratory disorders, who reported that, the most of nurses had competent level of practice regarding monitoring oxygen saturation through pulse oximetry and oxygen therapy post-application of the guideline compared to pre-application, with statistically significant difference between practice levels of the nurses through guideline phases ($p = 0.000$).

As regards to nurses' practice in relation to caring of children suffering from respiratory syncytial virus, the current study clarified that, more than half of nurses were competent in chest physiotherapy and suction, post self-learning compared to pre self-learning. Moreover, a highly statistical significant difference ($p <0.000$) in favor of post self-learning implementation was found, these results agreed with **Sharshor et al., (2019)** found that more than three quarters of nurses' performance was unsatisfactory pre-program in relation to postural drainage, percussion and vibration while the performances of the majority (84% and 96%) of them was satisfactory, immediate and one-month post program, respectively. More over, less than two thirds (60%) of nurses had unsatisfactory of performance level related to suctioning procedure pre-program, while their performance was satisfactory among most (92% and 98%) of them immediately and one-month post-intervention, respectively, with a statistical significant difference between pre and immediate post, pre and post one month program application ($p = 0.000$).

Concerning to total level of nurses' practice for caring of children suffering from RSV, the present study showed that, the majority of them had competent level of practice post self-learning in comparison with pre self-learning and a highly statistical significant difference ($p <0.000$) in favor of post self-learning was evident. This finding supported by **Sharshor et al., (2019)** who reported that, most of the studied nurses had satisfactory level of performance; immediate and one-month post-intervention, respectively in comparison with pre-intervention, with a statistical significant difference between pre and immediate post, pre and post one month program application ($p = 0.000$).

As regards to nurses' attitude in relation to caring of children suffering from RSV, the current study presented that, the mean scores nurses' attitude post self-learning about the acquired knowledge from the

educational lesson regarding children's age group affected by RSV, comfort while treating pediatric patients with RSV, confident in their knowledge to treat pediatric patients with RSV. This finding supported by **Revell, (2022)**, who referred to the fact that most of nurses strongly agreed gaining knowledge from the educational lessons and following treatment guidelines for children suffering from RSV/bronchiolitis with a mean of 6.8 on both questions. Most nurses agreed having the sense of comfort while treating children suffering from RSV/bronchiolitis with the mean score 5.1 and agreed they are confident in their knowledge regarding treatment of RSV/bronchiolitis with a mean score of 5.9.

The present study clarified the presence of a statistically significant positive correlation between studied nurses' total knowledge and their total practice pre and post self-learning implementation ($p < 0.000$). This finding similar to **Zain ELdin et al., (2018)**, who pointed to that there was a positive correlation between total nurses' knowledge and their total practice scores in relation to caring of children suffering from pneumonia. Similarly, **Hassan et al., (2023)**, agreed with the current study finding, who revealed that, there was positive statistically correlation between total nurses' knowledge and their total practice; explaining that nurses who had unsatisfactory knowledge had incompetent practice, interpreting that the level of nurses' performance is influenced by the nurses' knowledge. When nurses have adequate knowledge about any procedure they practice satisfactory and vice versa when there is a lack of knowledge the practice will be incompetent. Nurses' performance refers to the real conduct of activities according to standards in order to meet responsibilities, is an indication of what is being done and how is done well and focusing attention on the global behavior of nurses and specialized knowledge and skills utility that gained through training and practice integration (**Ayed et al., 2016**).

Conclusion:

In the light of the current study findings, the researchers concluded that, self-learning package improved the studied nurses' knowledge and enhanced their practice regarding care of children with RSV. Moreover, reported the majority of the studied nurses had good level of knowledge, satisfactory practice and positive attitude regarding care of children suffering from RSV post self-learning package implementation phases. Also, it was evident that a highly statistically significant positive correlation between total nurses' knowledge and their practice for caring of children suffering from RSV

through self-learning package phases was found ($P < 0.001$).

Recommendations:

1. Self-learning package should be done regularly and updated for nurses to raise their knowledge and improve their practices regarding care of children with RSV.
2. Similar studies recommended to be applied on a more larger extended sample of children with varied age groups and regions for generalization of the results.

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