Educational Program for Nursery School Supervisors Related to Prevention of Upper Respiratory Tract Infections in Assiut City

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Abstract
Upper respiratory tract infections are the major causes of mortality and morbidity for children under 5 years. The **aims of this study** to develop and apply an educational program for nursery school supervisors based on their needs to improve their knowledge and practice about prevention of upper respiratory tract infections among children under 5 years old. A quasi-experimental **Research Design** was used to conduct this study which carried out at (12) nursery schools from east and west of Assiut city. **The subjects** included a convenient sample of (57) participants (35) teachers and (22) supervisors **Two tools** were used, structured questionnaire and observation checklist which were developed by the researcher. **Results** of this study revealed that, there was statistically significant difference between total mean score of studied participants knowledge and practice related to upper respiratory tract infection between pretest and posttests (1)and(2) p. value (0.001 ,0.009) (0.000, 0.000) respectively. And there were statistically significant differences between studied Participants knowledge and their Socio demographic characteristics. The study **Concluded that** the studied participant knowledge, practices regarding the prevention of upper respiratory tract infections for children under five years in nursing schools in Assiut city were improved after the implementation of the educational program. The study **Recommended** providing periodic regular training educational program for all nursery schools teachers, and supervisors about infection control precautions.

***Key words: Upper Respiratory Tract Infection, Nursery School Supervisors & Educational Program*.**

Introduction
Children represent the future to ensure their healthy growth and development ought to be a prime concern of all societies. WHO reported that in children under five years around three million of them die each year due to environment-related diseases, among them acute respiratory infection (ARI) responsible for 1.7 million deaths. They also suffer around eight to twelve episodes of ARI per year. ARI is responsible for about 30-50% visits and 20-40% admission to health care facilities and also a leading cause of disabilities such as deafness as a result of otitis media **(Ramani, et al., 2016)** In Egypt 2014 the mortality rate in children under five years was 27 deaths per 1000 live births, and in 2013 it was 21.8 deaths per 1000 live births where acute respiratory infections cause 10.6% of all deaths of children under five **(UNICEF, 2015).**

Among respiratory infections, Upper Respiratory Tract Infections (URTIs) is most common in children, which include the infections of the nose, throat, sinuses, and ears. There are over 200 viruses that can cause upper respiratory tract infections, these types of viruses are extremely contagious and are spread by direct contact, such as shaking hands, sharing food or drink, and kissing, they can also be spread, through coughing and sneezing. A virus can be spread from the hands to the upper respiratory tract, by touching the eyes, nose or mouth. The environment enhances easy exposure to many infectious agents, whether, spread from diapers, air borne, or from play surfaces. Although any illness can present and spread in a day care setting, the diseases are primarily respiratory and, gastrointestinal in nature **(Eccles & Wilkinson, et al., 2015)**.

The major symptoms of URTIs comprise fever, sneezing, cough, runny or stuffy nose, sore throat, loss of appetite, headache, body aches, painful lymph node, fatigue and unusual irritability or lethargy. The ability to distinguish serious infections from these that will resolve with minimal or no intervention is an important skill for primary care providers **(Ritchie, et al., 2017).**

Complications of upper respiratory infections are respiratory compromise from epiglottitis, secondary infection by bacteria, formation of abscesses in the tonsils, rheumatic fever from streptococcal , spread of infection from sinuses to the brain (meningitis), involvement of the ears resulting in middle ear infections (otitis media), worsening of underlying chronic lung disease (asthma, chronic obstructive pulmonary disease and spread of infection to the heart as pericarditis and myocarditis) **(Yoon, et al.,2018).**

The main emphasis of URTIs management is symptoms relieve of (fever, nasal congestion, pain and coughing), promoting comfort, maintaining of hydration and prevention of infection. Recently URTIs can be prevented by some precautions such as hand washing especially before eating and after toileting, proper hygiene, avoiding air pollution, proper ventilation, nutritious diet, good sanitation and prevention from cold. For diseases spread by droplets using a tissue to cover the face during coughing, or sneezing not sharing eating and drinking utensils avoiding finger nose and finger eye contact, masking and other precautions **(Mehta, et al., 2014**). The best approach to prevention is education and anticipatory guidance, teaching and modeling healthy behaviors help children learn to promote their own health **(Gittelman, et al., 2015).**

Preschool children attending nurseries contract more infections than children who spend the day at home and their car utilization is greater. Absence due to illness is higher among children in nurseries than children in the care of child-minders (**Pijnacker, et al., 2016).**

The classroom teacher is the key person in every school health program, he or she responsible for all health teaching along with teaching the other basic subjects, all the health instructions a child receives as well as the daily monitoring and adjusting of the classroom environment is the primary responsibility of the teacher. Even through school health services are provided by health care professional. The teacher's observation and prompt referral provide the link between each child and any health care that may be needed during the school day (**Phipatanakul , et al., 2011).**

Health care professionals play critical roles in educating parents and day care centers about ways to decrease the incidence and transmission of infectious diseases. Nurses, teachers, health educators, and others from all levels of society need to guide development of an infrastructure that supports health care for all. The nurse educator especially pediatric nurse is in an excellent position to influence the health care outcomes of the nation through work in the health promotion arena. Teaching and modeling healthy behaviors help children learn to promote their own health, because many health problems of children are carried into adulthood **(Grieshaber, et al., 2018).**

Significance of the study

Respiratory diseases are the main cause of morbidity and mortality in children under five years, for upper respiratory tract infections increased risk was present for all children attending nurseries. Parents of, those children need to feel secure about their children in safe, clean, and healthy place. Because the nursery school supervisors play important role in influencing the healthy behaviors of the children, intervening directly and indirectly in minor and major health problems. Also they act as a first point of detection and referral, of sick child. So providing nursery school supervisors by scientific knowledge and training health programs about prevention of upper respiratory tract infections will decrease the prevalence of infection.

Aim of the study

The aims of this study were to

- Assess nursery school supervisors' knowledge and practice concerning upper respiratory tract infections among children under 5years old.
- Develop and apply an educational program for nursery school supervisors based on their needs to improve their knowledge and practice about prevention of upper respiratory tract infections among children under 5 years old.

Research hypothesis

Nursery school supervisors' knowledge and practice concerning prevention of upper respiratory tract infections will be improved after applying the educational program.

Subjects & Method

Research design

A quasi-experimental research design was used in this study.

Setting

The study was conducted at nursery schools, the total number of nursery schools in Assuit city were (120 nurseries) covered the east and the west, which follow the ministry of social affairs. The sample included 10% from the total number of nursery schools (12), Which selected randomly from a list of table to cover the (6) in the East and (6) in the West at Assiut city. The nursery schools were (El shabatAlmoslmat, Ahbab El Rhman, Abo baker Elsdeek, Omar aben El Katabe, khalasElnfose, HakemElbesary) constitute the west of Assiut city. And (Om ayman, El helalElahmar, Abo baker El sdeek in weeledia, Elaram, Nazelt A bdallah, and Elramly El eslamia) constitute the East of Assiut city.

Subjects

Systemic random sample technique was used for selecting the study nursery schools. The first nursery school was chosen randomly from the record and then every ten onewas chosen until the end of the sample. The study subjects included a convenient sample of (57) supervisors from chosen nursery schools which followed by Directorate of social affairs in Assiute city with no exclusion criteria. The subjects were (8) El shabat-Almoslmat,

(6) Ahbab El Rahman, (5) from Abo baker Elsdeek, (6) Omar Aben El Katabe, (3) khalas Elnfose, (4) Hakem Elbesary, with total number (32) from the west of Assuit city. (4) from Omayman, (4) El hlalElahmar, (5) Abo baker El sdeek in weeledia, (3) Elaram, (3)NazeltAbdallah, and (6) Elramly El eslamia with total number (25) from the east of Assuit city.

Tools of the study

Two tools were designed to collect the necessary data as follow

Tool I: Structured interview questionnaire sheet.

This tool was developed by the researcher based on relevant literature and it consisted of two parts:

Part one: Socio-demographic characteristics of studied participant:

It included Socio-demographic characteristics of the studied participants as (age, sex, marital status, no of children, level of education, occupation, years of experiences, and attending training courses about prevention of upper respiratory tract infections in children under five years).

Part two: Knowledge of studied participants regarding upper respiratory tract infections.

This part includes a set of questions (52) to assess studied participants knowledge about upper respiratory tract infections,

(40) questions of them were MCQ the correct answer for (10) of them given (3) degree and (30) of them given (1) degree for the correct answer. And (12) questions true and false given (1) degree for correct answer and the incorrect answer was given (zero) so total grades of knowledge was (72).

Tool II: observational checklists

Observational checklists which were developed by researcher after revised extensive literature to assess the practice of studied participants through direct observation. They included the following procedures: hand washing (15) items, wearing and removing mask (10) items, taking an axillary temperature (14) items, counting respiratory rate (10) items and finally general infection control precautions (15) items. Two grades were given for the item which done correctly, one for done incorrectly and zero for not doing, so total grades of practices were (128) for (64) observational items .

Method

An official letter was obtained from the dean of the faculty of nursing, Assiut University to Directorate of social affairs and to the directors of chosen nursery schools for approval to collect data and apply for a particular educational program, after an explanation of the aim and purpose of the study.

Ethical consideration

1. The research was approved from the Dean of the Faculty of Nursing.
2. There was no risk for studied participants during application of the research.
3. Witten consents were obtained from the studied participants that were willing to participate in the study, after explaining the nature and purpose of the study.
4. The studied participants were assured that the data of this research was used only for the research purpose.
5. Confidentiality and anonymity assured.

Pilot study

A pilot study was carried out on (10%) of studied participants (excluded from the study sample) to assess tools clarity, applicability and to estimate the time needed to fulfill each sheet. Then the necessary modification was done and the final form was developed.

Validity of the tools

It was checked and revised by panel of three experts of pediatric nursing at Assuit University who reviewed the tools for clarity, relevance, comprehensiveness, understanding and applicability**.**

Reliability of the tools

Reliability analysis was done for each tool; Tool I (0.710) and tool II (0.864) by using Cronbach s' Alpha test.

Field of the work

This study carried out through a period of 17 months from the beginning of September (2015) to the end of January (2017). At the study setting (Nursery schools).Interviewing of studied participants was done according to their study schedule to collect data. Four studied participants were interviewed per day, each two studied participants interviewed together. the time needed for each interview ranged from (45-60) minutes, according to response of the studied participant to questions ,direct observation for each studied participant practice regarding prevention of upper respiratory tract infection was done individually where each studied participant take about(20) minutes. Data were collected two days weekly.Pre test was done before the implementation the educational program and post tests were done two times immediately and after two months.

The program development:

On the basis of the results of pilot study, the program was designed and prepared by the researcher after reviewing of related literature.

Aim of the program

To improve school supervisors knowledge and practice concerning upper respiratory tract infections among children under 5years old

Program implementation

The researcher introduced herself to the studied participants and oriented them about program purpose, importance, place, and session's time. A pretest was conducted by using tool (I) and tool (II) before the educational program implementation. The application of the program was carried out for four studied participants daily each two studied participants interviewed together this considered as one group. The time needed for each session ranged from (45-60) minutes, according to response of the studied participant, the day divided into (2) sessions, one for knowledge and the second for practice. Each group of studied participants attended around (12-16) hours (8) for knowledge (4) for practices (3) for pre and posttests and (1) for revision and the total sessions for each group were (16) sessions. To increase the interaction in program sessions, the researcher provided opportunities for studied participants to ask questions and to discuss their information. A copy of manual booklet was given for each teacher at the end of program. The booklet contains pictures to demonstrate the content of the program.

Evaluation of the program

The researcher used a questionnaire and observational check lists to evaluate the outcomes of the program which used to evaluate knowledge and practice respectively thorough pre and posttests as posttest (1) immediately after implementation the program and after two months as posttest (2) for each studied participant.

Statistical analysis

Data entry and data analysis were done using SPSS version 20 (Statistical Package for Social Science). Data were presented as number, percentage, mean, standard deviation. Mann-Whitney test was used to compare quantitative variables between two groups and Kruskal Wallis Test for more than two groups in case of non-parametric data. Wilcoxon Signed Rank Test was done to compare quantitative variables between before and after the program. P-value considered statistically significant when $P < 0.05$.

Results

Table (1): Socio-demographic characteristics of the studied participants.

Items	No. (n= 57)	%
Age: (years)		
< 30	20	35.1
30 – 40	22	38.6
> 40	15	26.3
Mean ± SD (Range)	34.35 ± 8.59 (22.0 – 57.0)	
Marital status:		
Single	20	35.1
Married	36	63.2
Divorced	1	1.8
Having children:		
Yes	32	86.5
No	5	13.5
No. of children:		
1 – 2	18	56.3
3 or more	14	43.8
Mean ± SD (Range)	2.56 ± 0.98 (1 – 5)	
Qualification:		
University	25	43.9
Technical institute	8	14.0
Secondary	24	42.1
Occupation:		
Supervisor	22	38.6

Items	No. (n= 57)	%
Teacher	35	61.4
Years of experience		
< 5	21	36.8
5 – 10	16	28.1
> 10	20	35.1
Mean ± SD (Range)	9.54 ± 8.02 (1.0 – 30.0)	
Attending training courses		
Yes	0	0.0
No	57	100.0

Table (2): Comparison between participants' knowledge related to upper respiratory tract infections and preventive measures in pre, and post – tests.

Items	Max. score (72)	Pre-test (n= 57)	Post-test(1) (n= 57)	Post-test(2) (n= 57)	P-value[1]	P-value[2]
		Mean ± SD	Mean ± SD	Mean ± SD		
Anatomy and physiology of respiratory system	**9**	6.11 ± 1.41	8.49 ± 0.80	8.67 ± 0.66	0.000*	0.002*
Noso pharyngitis	**7**	6.33 ± 1.09	6.98 ± 0.13	6.83 ± 0.26	0.000*	0.001*
Sinusitis	**6**	4.60 ± 1.32	5.79 ± 0.53	5.38 ± 0.33	0.000*	0.000*
Sore throat (pharyngitis)	**2**	1.67 ± 0.55	1.95 ± 0.23	1.88 ± 0.13	0.001*	0.001*
Otitis media	**5**	3.09 ± 1.02	4.79 ± 0.56	4.02 ± 0.43	0.000*	0.003*
Croup	**6**	4.56 ± 1.46	5.91 ± 0.29	5.39 ± 0.31	0.000*	0.000*
Common cold	**3**	1.54 ± 0.78	2.82 ± 0.54	2.21 ± 0.29	0.000*	0.008*
Influenza	**9**	6.42 ± 1.63	7.49 ± 0.83	7.27 ± 0.85	0.000*	0.000*
Tonsillitis	**5**	3.56 ± 0.98	4.77 ± 0.46	4.24 ± 0.37	0.000*	0.000*
Whooping cough	**4**	3.24 ± 0.76	3.95 ± 0.23	3.76 ± 0.26	0.000*	0.010*
Preventive measures to prevent upper respiratory tract infection	**16**	12.39 ± 2.55	15.72 ± 0.49	15.16 ± 0.40	0.000*	0.000*

P-value[1]*: Comparison between Pre-test and post-test 1*
P-value[2]*: Comparison between Pre-test and post- test 2*
Wilcoxon Signed Rank Test

Table (3): Comparison between total mean scores of the studied participants' knowledge related to upper respiratory tract infection in pre and post –tests

Level of knowledge	Pre-test (n= 57)	Post-test(1) (n= 57)	Post-test(2) (n= 57)	P-value[1]	P-value[2]
Mean ± SD	53.81 ± 7.74	68.67 ± 2.58	61.39 ± 1.58	0.001*	0.009*
Range	33.0 - 63.0	58.0 - 72.0	55.0 - 72.0		

P-value[1]*: Comparison between Pre-test and post-test 1*
P-value[2]*: Comparison between Pre-test and post- test 2*
Wilcoxon Signed Rank Test

Table (4): Comparison between studied participants practice in pre, and post - tests

Items	Max. score (128)	Pre-test (No.= 57)	Post-test(1) (No.= 57)	Post-test(2) (No.= 57)	P-value[1]	P-value[2]
		Mean ± SD	Mean ± SD	Mean ± SD		
Hand washing	**30**	13.68 ± 5.18	29.00 ± 1.18	27.00 ± 1.96	0.000*	0.000*
Wearing and removing mask	**20**	4.81 ± 2.65	20.00 ± 0.00	18.89 ± 1.05	0.000*	0.000*
Taking an axillary temperature	**28**	3.60 ± 5.95	27.11 ± 1.21	24.65 ± 1.82	0.000*	0.000*
Counting a respiratory rate	**20**	0.00 ± 0.00	19.81 ± 0.40	18.82 ± 1.00	0.000*	0.000*
General infection control precautions	**30**	13.68 ± 5.18	25.14 ± 3.31	24.49 ± 2.73	0.000*	0.000*

P-value[1]*: Comparison between Pre-test and post-test 1*
P-value[2]*: Comparison between Pre-test and post- test 2*
Wilcoxon Signed Rank Test

Table (5): Comparison between total mean scores of the studied participants' practice related to upper respiratory tract infection in pre and post-tests

Score of practice	Pre-test (n= 57)	Post-test(1) (n= 57)	Post-test(2) (n= 57)	P-value[1]	P-value[2]
Mean ± SD	33.16 ± 11.71	121.05 ± 3.77	113.86 ± 5.02	0.000*	0.000*
Range	10.0-62.0	112.0-128.0	97.0-123.0		

P-value[1]*: Comparison between Pre-test and post-test 1*
P-value[2]*: Comparison between Pre-test and post- test 2*
Wilcoxon Signed Rank Test

Table (6): Relation between socio-demographic characteristics data and total mean scores of practice related to upper respiratory tract infections in pre-test and post-tests.

Items	Score of practice Pre-test Mean ± SD	P-value[1]	Score of practice Post test (2) Mean ± SD	P-value[2]
Age: (years)				
< 30	34.60 ± 13.69	0.862	115.30 ± 4.19	0.521
30 – 40	32.18 ± 11.18		113.55 ± 4.08	
> 40	32.67 ± 10.11		112.40 ± 6.83	
Marital status:				
Single	32.75 ± 9.96	0.920	114.90 ± 3.63	0.476
Ever married	33.38 ± 12.68		113.30 ± 5.60	
Having children:				
Yes	32.75 ± 12.18	0.306	113.06 ± 5.81	0.532
No	37.40 ± 16.59		114.80 ± 4.15	
No. of children:				
1 – 2	33.22 ± 13.55	0.819	113.67 ± 5.60	0.760
3 or more	32.14 ± 10.63		112.29 ± 6.19	
Qualification:				
University	36.52 ± 12.50	0.220	115.28 ± 3.96	0.320
Technical institute	28.63 ± 11.39		112.25 ± 5.65	
Secondary	31.17 ± 10.38		112.92 ± 5.59	
Occupation:				
Supervisor/ administrator	34.50 ± 9.95	0.421	113.27 ± 6.17	0.895
Teacher	32.31 ± 12.76		114.23 ± 4.20	
Years of experience:				
< 5	35.33 ± 11.55	0.830	114.81 ± 3.83	0.293
5 – 10	31.50 ± 13.44		115.19 ± 3.83	
> 10	32.20 ± 10.63		111.80 ± 6.35	

P-value[1]*: Comparison between Pre-test and post-test 1*
P-value[2]*: Comparison between Pre-test and post- test 2*
Mann-Whitney test & Kruskal Wallis Test

Table (7): Relation between socio-demographic characteristics data and total mean scores of knowledge related to upper respiratory tract infections in pre-test and post-tests.

Items	Score of knowledge Pre-test Mean ± SD	P-value[1]	Score of knowledge Post test (2) Mean ± SD	P-value[2]
Age: (years)				
< 30	57.55 ± 4.51	0.018*	69.60 ± 1.50	0.011*
30 – 40	52.91 ± 7.71		65.68 ± 1.55	
> 40	50.13 ± 9.33		58.33 ± 1.59	
Marital status:				
Single	56.15 ± 5.99	0.096	62.20 ± 1.74	0.163
Ever married	52.54 ± 8.34		59.35 ± 1.58	
Having children:				
Yes	52.72 ± 8.62	0.475	63.25 ± 1.55	0.257
No	51.40 ± 6.88		58.00 ± 1.87	
No. of children:				
1 – 2	52.39 ± 9.24	0.804	63.67 ± 1.33	0.105
3 or more	53.14 ± 8.08		58.71 ± 1.68	
Qualification:				
University	56.52 ± 5.55	0.069	65.04 ± 1.17	0.014*
Technical institute	49.38 ± 9.30		62.25 ± 2.19	
Secondary	52.46 ± 8.40		58.88 ± 1.54	
Occupation:				
Supervisor/ administrator	50.77 ± 9.22	0.055	58.64 ± 1.56	0.003*
Teacher	55.71 ± 6.03		69.71 ± 1.54	
Years of experience:				
< 5	55.57 ± 7.22	0.012*	69.62 ± 1.16	0.005*
5 – 10	56.44 ± 5.28		64.88 ± 1.41	
> 10	49.85 ± 8.59		58.50 ± 1.93	

P-value[1]*: Comparison between Pre-test and post-test 1*
P-value[2]*: Comparison between Pre-test and post- test 2*
Mann-Whitney test & Kruskal Wallis Test .

Table (1): Shows socio-demographic characteristics of studied participants, it was found that 38.6% of them aged between 30 to 40 years with mean 34.35±8.59, about 63.2% of them were married and the majority 86.1% of them having children. Regarding their qualification 43.9% of them graduated from the university. While 14% graduated from technical institution and 42.1% of them graduated from secondary school. About 61.4%of them were working as teachers while 36.8% of them were working as supervisors .According to years of experience. It was noticed that 36.8%of them had experience less than five years. And, all studied participants 100% did not attend training courses about prevention of upper respiratory tract infection for children under five years.

Table (2): Reveals Comparison between participant's knowledge related to upper respiratory tract infections and preventive measures in pre, and post - tests there were highly statistically significant differences between pretest and posttest(1) and between pretest and post- test (2) regarding to all the items of knowledge .In which all means and standard deviation of all items of knowledge were improved in post-test (1) than in pretest and post-test (2) except in anatomy and physiology of respiratory system there was slightly improved in knowledge in the post-test (2) than pretest and post-test (1).

Table (3): Present the comparison between total mean scores of the studied participant's knowledge related to upper respiratory tract infection in pre and post –tests. It was noticed that there was a statistically significant differences between pre, and post-tests (1)

and (2) were (P^1=0.001*), (P^2=0.009*). Whereas the total mean scores of knowledge improved from 53.8±7.74 in the pre- test to 68.67± 2.58in the post-test (1).

Table (4): Demonstrates comparison between studied participants' practice in pre, and post - tests**.** Highly statically significant differences were found between pre and post -tests related to all items of practice (**P^1**=0.000*, **P^2**=0.000*) respectively. With high mean ± SD 29.00 ± 1.18 in hand washing

Table (5): Depicts comparison between total mean scores of the studied participants' practice related to upper respiratory tract infection in pre and post-tests .It was noticed that there was a statistically significant differences between pre, and post-tests (1) and (2) were (P^1=0.000*), (P^2=0.000*). Where as the total mean scores of practice improved from33.16 ± 11.71 in the pre- test to 121.05 ± 3.77 in the post-test (1).

Table (6): Indicates relation between socio-demographic characteristics data and total mean scores of practice related to upper respiratory tract infections in pre-test and post-tests**.** There were not found statistically significant differences between pre and post- test (2) regarding all socio demographic characteristics

Table (7): Represents relation between socio-demographic characteristics data and total mean scores of knowledge related to upper respiratory tract infections in pre-test and post-tests. There were statistically significant differences between studied participants' knowledge and their age and years of experience where **P^1** (0.018*, 0.012*) and **P^2** (0.011*, 0.005*) respectively. Also, There were statistically significant differences between them and their qualification and occupation **P^2** (0.014*, 0.003*) respectively.

Discussion

Acute respiratory tract infection (ARI) is considered one of the major public health problems and it is a leading cause of morbidity and mortality in children under five years in many developing countries **(Ramani, et al., 2016).** Upper respiratory tract infections are a common problem in a toddler as well as children and it is the major cause of lower respiratory tract infections. Although many acute respiratory infections are mild and cause few symptoms, they are responsible for the majority of the episodes of infectious disease that occur at nurseries and are the most common cause of childhood disease in the general population **(Khalek & Abdel - Salam, 2017).**

Nursery schools' teachers help to nurture and develop the knowledge, abilities, and social skills of children from birth to five years old, giving them the best possible start to their education. They must be knowledgeable about the prevention of upper respiratory tract infections and how to deal with these children to minimize the spreading of infection to other normal children in the school **(Bjornson, et al., 2013).**

The present study illustrates the potential strengths of using the educational program on improving the knowledge of nursery schools' supervisors about the prevention of upper respiratory tract infections. Supervisors' knowledge about prevention of upper respiratory tract infections has dramatically increased both immediately after the teaching program and in the follow up, and the current study demonstrated an increase in the total knowledge mean scores about prevention of upper respiratory tract infections with a mean 53.81 ± 7.74 before the program while in the immediate posttest and posttest after 2 months the mean was 68.67 ± 2.58 and 61.39 ± 1.58; respectively with highly statistical significant difference P-value1 0.001, P-value2 0.009 respectively as shown in table 2.

This finding is in accordance with **Alexandrino et al.,(2017),** who reported that before the health education session (HES), most participants from study and control groups had some or great need for information on all of the domains of the health education session regarding prevention of acute respiratory infection (first signs and symptoms of ARI, worsening signs of ARI, medication, and nasal clearance techniques). After the HES, there were significant differences between the groups regarding the needs expressed, the majority of the participants in the intervention group expressed no or low need for information while participants in the control group maintained some or great need for information about all of the HES domains. And after two months of HES there was a higher frequency of participants with right answers in the intervention group than in the control group.

This is also in agreement with **Yang & kwon (2017),** who developed an infection prevention educational program for child care teachers and verified its effect. They concluded that the program implementation in there study was effective in improving the infection prevention self-efficacy and infection prevention behavior of child care teachers.

On the same line **Joseph & George (2015**), who conducted a structured teaching program regarding knowledge on prevention of upper respiratory tract infection for children and noticed that the majority of participants had inadequate knowledge on prevention of upper respiratory tract infection in the pretest which is sharply increased in the posttest to about three quarters of them had adequate knowledge level.

Moreover, **Pandya, et al., (2015),** found that participants s' knowledge scores were much high in posttest compered to pretest knowledge scores after conducting structure teaching program regarding acute respiratory infection for children under five years old.

On the same context **Stock well et al., (2014)** , who illustrated that the mean baseline Knowledge- attitude scores were similar for intervention and standard curriculum families. However, mean post-intervention scores increased for intervention families but remained the same for standard curriculum ones and the mean difference in baseline-to-post scores for intervention families was significantly different than for standard curriculum families.

This finding also goes line with, **Elsayed, et al., (1998),** who conducted educational training program for nursery school teachers related to emergency situations among preschool children at Assiut, Egypt. They concluded that the educational training program to the nursery school teachers was successfully in upgrading their knowledge and practices concerning emergency situations and its care among children in the nursery school**.**

Nursery schools' teachers deal with children need to update their knowledge about preventing upper respiratory tract infection. Unfortunately, no one of these teachers received any training about prevention of respiratory infection as shown in table 1. This may be attributed to less than half of studied participants were graduated from different faculties and more than half of them graduated from technical institutions and secondary technical schools, and they had not studied medical or nursing sciences. Although, teachers who graduated from educational faculties studied medical and nursing care of children course in their curriculum but students in these faculties consider these courses subsidiary courses.

The present study showed that studied participant were had a high percent score of knowledge about hand washing and there was a highly statistical significant difference between pre and posttests P-value^1 =0.000, P-value^2 =0.000 respectively, with a high mean 29.00 ±1.18 regarding their hand washing practice as shown in tables 2 and 3.

Similarly **Rosen et al., (2009)** studied the effect of a hand washing intervention on preschool educator beliefs, attitudes, knowledge and self-efficacy. Educators were believed that hand washing could affect health, had high levels of self-efficacy and had positive attitudes toward hand washing. Their Knowledge was affected by the intervention. The combination of positive attitudes toward hand washing among educators and the program's effectiveness in imparting knowledge helped to create a sustained social norm of hand washing among many children in disparate locations.

Recently **Taher, (2014)** reported that hand washing is the most effective means of reducing germs and infections in child care and school settings. Studies have shown that unwashed or improperly washed hands are the primary carriers of germs that can cause infections. Lack of hand washing and poor hand washing techniques have contributed to many outbreaks of disease among children and staff in child care and school settings.

Adherence to good hand washing techniques has consistently demonstrated a reduction in disease transmission in child care and school settings. While working with children, caregivers and teachers should not wear elaborate jewelry or long artificial fingernails because these interfere with effective hand washing. So teacher, worker and children need to understand why it is important to wash their hands and be taught how to wash, rinse and dry their hands correctly.

In the base line data results of the present study showed that the participants had low mean scores of practice concerned items of wearing and removing mask, taking an axillary temperature and counting respiratory rate where the total mean score they obtained were 4.81±2.65, 3.60±5.95, 0.00±0.00 respectively. The findings of the present study showed that there were a highly statistical significant differences were found after implementation of educational program between pre and posttests P-value^1 =0.000, P-value^2 =0.000 respectively, regarding wearing and removing the mask, taking an axillary temperature and counting respiratory rate as shown in Table3.

The current study findings are consistent with **MacIntyre et al., (2014**) who conducted research about facemasks for the prevention of infection in healthcare and community settings; they found that facemasks and facemasks plus hand hygiene may prevent infectious transmitted diseases through droplets and respirators for respiratory aerosols in community settings.

On the same context, the results of **kim & Park, (2016)** in their research about factors affecting day care center teachers' management of child hood fever. They recommended development and implementation of educational interventions program to improve day care teachers' childhood fever management.

The results of the present study showed low mean scores of the participant's practice before application of the program, this may be attributed to lack of educational pictures, posters or movies that illustrate how to identify children with upper respiratory infection and how to deal with them and lack of

supplies and equipment in the selected nursery schools. Also this can be explained by these skills had no relation with the participants' field of study and work.

The mean scores of the participants' practice were improved after application of the educational program may be due to the participants' awareness about the importance of acquiring these skills to provide care and prevention of respiratory transmitted diseases for their children at home and nursery schools.

Our study revealed that there was improvement in practice of the studied participants with highly statistical significant difference toward general infection control precautions in the immediate posttest and after two month compared to the pretest as shown in table 3.

The finding of the present study are congruent with findings of several Studies which had demonstrated the effectiveness of infection control programs and improving control practices and reducing the occurrence of infectious diseases at daycare centers, and some have suggested a favorable impact on costs. **Health Protection Scotland, (2015),** Infection Prevention and Control in Day Childcare Settings. And **Hodgson ,(2018)** who reported that hygiene and infection control in early years provisions need to combat the spread of infection, early years managers must ensure that the environment is kept clean. All staff has a responsibility to keep the premises clean and tidy and to identify areas that fall below acceptable or safe standards. Effective cleaning arrangements should be in place**.** These should be supported by regular quality assurance checks to ensure standards are being met. Suitably trained cleaning staff should be employed, either directly or through a contractor arrangement. Schedules of cleaning should be set up. Both kitchens and toilets require particular attention. Toilets, washrooms and showers should be kept clean and free from dirt and grime at all times. Floors and walls should be impermeable and easy to clean and cracks and broken surfaces should be repaired as soon as possible. Poor standards of cleanliness in kitchens are associated with ill health and can lead to food poisoning.

Also playing with toys or using equipment such as climbing apparatus and slides is an important part of the child's day in an early year's provision. However, these items can quickly become soiled or unhygienic and a child's habit of putting toys in their mouth can lead to a situation where disease can be spread. Early years managers and staff should always ensure that toys and equipment are inspected and cleaned regularly. This should be done at the end of each working day and can be done with ordinary soap and hot water. Many settings have occasional "deep clean" sessions to ensure a thorough cleaning of toys and combine this with an audit of the toys.

During studying the relation between the participants ' practice and their socio-demographic characteristics, the present study results revealed that there was no statistically significant relationship between the participants' pre and post-program practice and their socio-demographic characteristics such as age, marital status, having children, number of children, qualification, occupation and years of experience as shown in table 4.

As regards the relation between the teachers' knowledge and their demographic characteristics, the present study results revealed that there was a statistically significant relationship between the participants pre and post-program knowledge and age of the teachers with young teachers have better knowledge than those above 40 years as shown in table 5. This can be attributed that youth are full of activity and vitality so, they are interested in the knowledge they have learned and their memory is better than the oldest teachers so, they retained knowledge for a longer period than their older counterparts.

This study also found a significant relationship between teachers' knowledge and their qualification with teachers who had university education had better knowledge than their counterparts who had either a technical institute or secondary education in the second posttest after 2 months. This may be attributed to the higher qualification had equipped these teachers with a broader mind and hence, better knowledge.

Moreover, this study also found a significant relationship between teachers' knowledge and their occupation where teachers had better knowledge than supervisors in the second posttest after 2 months. This may be because teachers continually update their knowledge to use it during their work with the children.

Our study also found a significant relationship between teachers' knowledge and their years of experience with teachers who had from 5 -10 years' experience had better knowledge than their counterparts who have less or even years of experience either immediately post-program or after 2 months. This may be because teachers with less than 5-years' experience had little time to acquire knowledge than their colleagues with experience 5-10 years. Moreover, those teachers who have more than 10 years of experience perhaps had become bored and had less desire for learning new information.

Conclusion

Based on the results of this study, it can be concluded that:

The studied participants' knowledge and practice regarding the prevention of upper respiratory tract infections in children under five years in nursery schools in Assiut city were improved after the implementation of the educational program with slight decline after two months from implementation of program. There were statistically significant relation between participant socio-demographic characteristics (age, qualification, occupation and years of experience) and their knowledge after implementation of the program, while no statistically significant relation between participant socio-demographic characteristics and their practice.

Recommendations

Based on the present study results, the following recommendations are suggested

1. The "curriculum of education faculties and kindergarten faculties" should include information about infections transmission methods, infection control precautions in school and nursery school settings
2. Periodic regular training educational program for all nursery schools and day care centers' teachers, supervisors and workers about infection control precaution related to upper respiratory tract infection.
3. Manuals with colored pictures and posters must be placed at any area that frequently visited by the teachers, supervisors, workers and children such as sinks and toilets about proper hand washing before, after eating and toileting.
4. More researches are needed to assess and evaluate the knowledge and practice of nursery school teachers and workers about infection control.

References

1. **Alexandrino, A., Santos, R., Melo, M., & Bastos, J., (2017):** Designing and evaluating a health education session on respiratory infections addressed to caregivers of children under three years of age attending day-care centres in Porto, Portugal, A community-based intervention, European Journal of General Practice, 23(1),pp. 43-50.
2. **Bjornson, C., Russell, K., Vandermeer, B., Klassen, T., & Johnson, D., (2013):** Nebulized epinephrine for croup in children,Cochrane Database Syst Rev, 10(1), pp1-10.
3. **Eccles, R., & Wilkinson, J., (2015):** Exposure to cold and acute upper respiratory tract infection, Rhinology, 53(2), pp.99-106.
4. **Elsayed, A., (1998):**pre. Placement educational training program for nursery school teacher related to emergency situation among preschool children at Assiut, Egypt. The new Egypt journal of medicine, 19(5):p.8
5. **Gittelman, M., Denny, S., Anzeljc, S., FitzGerald, M., & Arnold, M., (2015):** A pilot quality improvement program to increase pediatrician injury anticipatory guidance,Journal of trauma and acute care surgery, 79(3), pp. 9-14.
6. **Grieshaber. S., & Ryan, S., (2018):** The Place of Learning in the Systematization and Standardization of Early Childhood Education . The wiley habdbook of Teaching and Learning PP.257-275
7. **Health Protection Scotland (2015):** Infection Prevention and Control in Day Childcare Settings, Health Protection Scotland, Glasgow. Published by Health Protection Scotland, NHS National Services Scotland, Meridian Court, 5 Cadogan Street, Glasgow G2 6QE.
8. **Hodgson, M., (2018):** Hygiene and infection control in early years provisions Croner-i. Available at: https://app.croneri.co.uk/feature-articles/hygiene-and-infection-control-early-years-provisions
9. **Joseph, J., & George, J., (2015):** A Study to Assess the Effectiveness of Structured Teaching Programme Regarding Knowledge on Prevention of Upper Respiratory Tract Infection Among Mothers of Toddler in Selected Hospital, International Journal of Science and Research,4(12), pp.1913-1917.
10. **Kim, J., & Park, S., (2016):** Factors Affecting Daycare Center Teachers' Management of Childhood Fever, Child Health Nurs Res; 22(4): 289-298. **Available at**:https://www.echnr.org/journal/view.php?doi=10.4094/chnr.2016.22.4.289
11. **Khalek, E., & Abdel-Salam, D., (2017):** Acute respiratory tract infections in children under 5 years of age in Upper Egypt, International Journal Of Community Medicine And Public Health, 3(5), pp. 1161-1166.
12. **MacIntyre, C., Wang, Q., Rahman, B., Seale, H., Ridda, I., Gao, Z., & Moa, A., (2014):** Efficacy of face masks and respirators in preventing upper respiratory tract bacterial colonization and co-infection in hospital healthcare workers, Preventive medicine journal, 62(12), pp. 1-7.
13. **Mehta, Y., Gupta, A., Todi, S., Myatra, S., Samaddar, D., Patil, V., & Ramasubban, S.,**

(2014): Guidelines for prevention of hospital acquired infections, Indian journal of critical care medicine, 18(3), pp. 149.

14. **Pandya, A., Raval, B., & Ravindra, H., (2015):** A Study to assess the effectiveness of Structured Teaching Programme on Knowledge RegardingAcute Respiratory Tract Infection among Mothers of Under Five Children at Piparia, Vadodara,International Journal of Nursing Education, 7(3), pp.51-55.
15. **Phipatanakul, W., Bailey, A., Hoffman, E., Sheehan, W., Lane, J., Baxi, S., Rao, D., Permaul, P., Gaffin, J., Rogers, C., & Muilenberg, M., (2011):**The school inner-city asthma study: design, methods and lessons learned,Journal of Asthma, 48(10), pp.1007-1014.
16. **Pijnacker, R., Mughini-Gras, L., Heusinkveld, M., Roelfsema, J., van Pelt, W., & Kortbeek, T., (2016) :** Different risk factors for infection with Giardia lamblia assemblages A and B in children attending day-care centres, European Journal of Clinical Microbiology & Infectious Diseases, 35(12),pp. 2005-2013.
17. **Ramani, V., Pattankar, J., & Putt Ahonn A., (2016):** Acute respiratory infections among under-five age group children at urban slums of Gulbarga City: A longitudinal study,Journal of clinical and diagnostic research, 10(5), pp.1-8.
18. **Ritchie, A., Mallia, P., & Johnston, S., (2017):** Viral syndrome infections in humans of the respiratory disease syndromes tract ,Acute Exacerbations of Pulmonary Diseases, pp. 77, 76.
19. **Rosen, L., Zucker, D., Brody, D., Engelhard, D., Manor, O., (2009):** The effect of a handwashing intervention on preschool educator beliefs, attitudes, knowledge and self-efficacy Health Education Research, 24(4), PP. 686–698 available at https://doi.org/10.1093/her/cyp004
20. **Stockwell, M., Catallozzi, M., Larson, E., Rodriguez, C., Subramony, A., Martinez, R., & Meyer, D., (2014):** Effect of a URI-related educational intervention in early head start on ED visits, Pediatrics journal,22(9), pp.1-5.
21. **Taher, M., (2014):** Guidance on infection control in schools and other childcare setting. Public Health England Wellington House,PHE Publication gateway, PP.4-12.
22. **UNICEF (2015):** Childern in Egypt:a statistical digest, June 2015,UNICEF Egypt, Cairo, Egypt.website:www.unicef.org/egypt.
23. **Yang, Y., & kwon, I., (2017):** Effect of visiting and a smartphone Application Based Infection Prevention Education Program for Child Care Teacher: A Non-Randomized Controlled Trail, Korean Society of Nursing Science 47(6):PP744-755.
24. **Yoon, J., Choi, D., Lee, S., Sin, S., & Yu, S., (2018)**: Analysis of Clinical Manifestations and Laboratory Findings in Children with Influenza B-Associated Myositis: A Single Center Study. Korean journal of family medicine, 39(1), 37-41