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### Nursery school supervisors' knowledge and practice regarding prevention of upper respiratory tract infections among children under 5 years old

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#### Abstract

Upper respiratory tract infections are the major causes of mortality and morbidity for children under 5 years. The Aim of this study was to assess nursery school supervisor's knowledge and practice regarding prevention of upper respiratory tract infections among children under 5 years old.

**Design:** A descriptive research design was used in this study.

**Method:** the study was carried out at (12) nursery schools from east and west of Assiut city. A convenience sample of (57) participants (35) teachers and (22) supervisors. A structured self-administered questionnaire to assess nursery school supervisors' knowledge and observational checklist to evaluate their practice concerning the prevention of upper respiratory tract infections were used.

**Results:** Knowledge regarding prevention of upper respiratory tract infections in children under five years among nursery schools was insufficient as well as practices. Conclusion: the participants had insufficient knowledge and practices regarding the prevention of upper respiratory tract infections in children under five years there were statistically significant relation between participant socio-demographic characteristics and their knowledge (age, years of experience), while no statically significant relation between participant socio-demographic characteristics and their practice. The study recommended that providing periodic regular training educational program for all nursery schools teachers and supervisors about infection control precautions.

**Keywords:** Upper respiratory tract infection, nursery school supervisors, knowledge & practice

#### 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) [13]. 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) [16].

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) [3].

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) [17].

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) [9]. 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) [4].

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) [12].

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) [11].

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 (Griehaber & Ryan, 2018) [5].

### 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 assessment of nursery school

supervisor s' knowledge and practices about prevention of upper respiratory tract infections is necessary.

### Aim of the study

This study was carried out to assess nursery school supervisors' knowledge and practice regarding prevention of upper respiratory tract infections among children under 5years old.

### Research design

A descriptive 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.

### Subjects

The study subjects included a convenience sample of (57) supervisors from chosen nursery schools which was affiliated Directorate of Social Affairs in Assiute city with no exclusion criteria. Systematic random sample technique was used for selecting the study nursery schools.

### Method

#### A structured self-administered questionnaire was used which includes the following

- Socio-demographic data as (age, sex, marital status, number 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).
- Knowledge regarding upper respiratory tract infections.

This part covers knowledge about upper respiratory tract infections, causes, clinical manifestation, prevention management, complications,... ect. Questions related to knowledge level contains (52) questions. Total knowledge score was (72) with zero for incorrect answer and one for correct answer.

#### Practices regarding upper respiratory tract infections

An observational checklist was developed by researcher after revised extensive literatures to assess the practices of studied participants through direct observation. They included the following procedures: hand washing, wearing and removing mask items, taking an axillary temperature, counting respiratory rate and finally general infection control precautions. Total practices score was (128). The score of (2) was given for the item if done correctly, (1) for done incompletely and (zero) for not doing. If the subject got score below 60% has unsatisfactory, if more than 60% has satisfactory level of practices.

#### Ethical consideration

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 after an explanation of the aim of the study. There was no risk for studied participants during

application of the research. Written consents were obtained from the studied participants that were willing to participate in the study, after explaining the nature and purpose of the study. The studied participants were assured that the data of this research was used only for the research purpose Confidentiality and anonymity assured.

#### Pilot study

A pilot study was carried out on 6 (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. A content validity of the tools was measured by content validity index were (0.96).

#### 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 three months from the beginning of September (2017) to the end of November (2017). At the study setting (Nursery schools). Interviewing of studied participants was done according to their study schedule to collect data. the time needed for each interview ranged from (30-45) 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.

#### 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. Chi-square test and Fisher Exact test were used to compare between qualitative variables. 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. P-value considered statistically significant when  $P < 0.05$ .

#### Results

**Table 1:** Socio-demographic characteristics of the studied participants

Items	No. (n= 57)	%
<b>Age: (years)</b>		
< 30	20	35.1
30 – 40	22	38.6
> 40	15	26.3
Mean $\pm$ SD (Range)	34.35 $\pm$ 8.59 (22.0 – 57.0)	
<b>Marital status</b>		
Single	20	35.1
Married	36	63.2
Divorced	1	1.8
<b>Having children</b>		
Yes	32	86.5
No	5	13.5
<b>No. of children</b>		
1 – 2	18	56.3
3 or more	14	43.8
Mean $\pm$ SD (Range)	2.56 $\pm$ 0.98 (1 – 5)	
<b>Qualification</b>		
University	25	43.9
Technical institute	8	14.0
Secondary	24	42.1
<b>Occupation</b>		
Supervisor	22	38.6
Teacher	35	61.4
<b>Years of experience</b>		
< 5	21	36.8
5 – 10	16	28.1
> 10	20	35.1
Mean $\pm$ SD (Range)	9.54 $\pm$ 8.02 (1.0 – 30.0)	
<b>Attending training courses</b>		
Yes	0	0.0
No	57	100.0

**Table 2:** Nursery school supervisors' knowledge related to upper respiratory tract infections

Items	Max. score (72)	(n= 57)
		Mean $\pm$ SD
Anatomy and physiology of respiratory system	9	6.11 $\pm$ 1.41
Noso pharyngitis	7	6.33 $\pm$ 1.09
Sinusitis	6	4.60 $\pm$ 1.32
Sore throat (pharyngitis)	2	1.67 $\pm$ 0.55
Otitis media	5	3.09 $\pm$ 1.02
Croup	6	4.56 $\pm$ 1.46
Common cold	3	1.54 $\pm$ 0.78
Influenza	9	6.42 $\pm$ 1.63
Tonsillitis	5	3.56 $\pm$ 0.98
Whooping cough	4	3.24 $\pm$ 0.76
Preventive measures to prevent upper respiratory tract infection	16	12.39 $\pm$ 2.55
Total score of the knowledge		53.81 $\pm$ 7.74 Range 33.0 - 63.0

**Table 3:** Nursery school supervisors' knowledge related to upper respiratory tract infections

Items	(n= 57)	
	No.	%
<b>*Management of upper respiratory tract infection</b>		
Breastfeeding and nutrition	49	86.0
Following the hygiene procedures	52	91.2
Drug therapy	51	89.5
<b>Methods of prevention of respiratory infections</b>		
Incorrect	14	24.6
Correct	43	75.4
<b>Effect of Hand washing on transmission of infection</b>		
Incorrect	0	0.0
Correct	57	100.0
<b>Using of disinfectants</b>		
Incorrect	7	12.3
Correct	50	87.7
<b>Playing games in group as swing and transmission of diseases</b>		
Incorrect	11	19.3
Correct	46	80.7
<b>Administration vaccinations on time</b>		
Incorrect	49	86.0
Correct	8	14.0
<b>Disinfection of cleaning tools</b>		
Incorrect	39	68.4
Correct	18	31.6
<b>Allocation a special room for infants in nurseries</b>		
Incorrect	11	19.3
Correct	46	80.7
<b>Covering the floors with carpet to avoid cold and flu</b>		
Incorrect	40	70.2
Correct	17	29.8
<b>Importance of training the supervisors on taking temperature and counting respiration rate</b>		
Incorrect	9	15.8
Correct	48	84.2
<b>Use of the beds which can be cleaned and disinfected in nurseries</b>		
Incorrect	11	19.3
Correct	46	80.7
<b>Using of sterilization device, dish washer and water boiler for different equipment</b>		
Incorrect	16	28.1
Correct	41	71.9
<b>Using of Chlorine 0.5% clean the surfaces</b>		
Incorrect	13	22.8
Correct	44	77.2
<b>Effective hand washing at least 20 seconds</b>		
Incorrect	8	14.0
Correct	49	86.0

\*More than one answer

**Table 4:** Nursery school supervisors' practice related to preventive measures of upper respiratory tract infections

Items	Max. score (128)	(No.= 57)
		Mean ± SD
Hand washing	30	13.68 ± 5.18
Wearing and removing mask	20	4.81 ± 2.65
Taking an axillary temperature	28	3.60 ± 5.95
Counting a respiratory rate	20	0.00 ± 0.00
General infection control precautions	30	13.68 ± 5.18
Mean ± SD		33.16 ± 11.71
Range		10.0-62.0

**Table 5:** Relation between socio-demographic characteristics data and total mean score of knowledge related to upper respiratory tract infections

Items	Score of knowledge	P-value
	Mean ± SD	
<b>Age: (years)</b>		0.018*
< 30	57.55 ± 4.51	
30 – 40	52.91 ± 7.71	
> 40	50.13 ± 9.33	
<b>Marital status</b>		0.096
Single	56.15 ± 5.99	
Ever married	52.54 ± 8.34	
<b>Having children</b>		0.475
Yes	52.72 ± 8.62	
No	51.40 ± 6.88	
<b>No. of children</b>		0.804
1 – 2	52.39 ± 9.24	
3 or more	53.14 ± 8.08	
<b>Qualification</b>		0.069
University	56.52 ± 5.55	
Technical institute	49.38 ± 9.30	
Secondary	52.46 ± 8.40	
<b>Occupation</b>		0.055
Supervisor/ administrator	50.77 ± 9.22	
Teacher	55.71 ± 6.03	
<b>Years of experience</b>		0.012*
< 5	55.57 ± 7.22	
5 – 10	56.44 ± 5.28	
> 10	49.85 ± 8.59	

**Table 6:** Relation between socio-demographic characteristics data and total mean score of practice related to upper respiratory tract infections

Items	Score of practice	P-value
	Mean ± SD	
<b>Age: (years)</b>		0.862
< 30	34.60 ± 13.69	
30 – 40	32.18 ± 11.18	
> 40	32.67 ± 10.11	
<b>Marital status</b>		0.920
Single	32.75 ± 9.96	
Ever married	33.38 ± 12.68	
<b>Having children</b>		0.306
Yes	32.75 ± 12.18	
No	37.40 ± 16.59	
<b>No. of children</b>		0.819
1 – 2	33.22 ± 13.55	
3 or more	32.14 ± 10.63	
<b>Qualification</b>		0.220
University	36.52 ± 12.50	
Technical institute	28.63 ± 11.39	
Secondary	31.17 ± 10.38	
<b>Occupation</b>		0.421
Supervisor/ administrator	34.50 ± 9.95	
Teacher	32.31 ± 12.76	
<b>Years of experience</b>		0.830
< 5	35.33 ± 11.55	
5 – 10	31.50 ± 13.44	
> 10	32.20 ± 10.63	

Table (1) shows that more than one third (38.6%) of subjects their age between 30 to 40 years with mean (34.35±8.59), about two thirds (63.2%) of them were married and the majority (86.1%) graduated from the university. While (14%) graduated from technical institution and (42.1%) of them graduated from secondary schools. About two thirds (61.4%) of them were working as teachers while one third (36.8%) of them were working as supervisors. It was noticed that more than one third (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) shows the mean score of the nursery school supervisor s' knowledge related to upper respiratory tract infections and preventive measures. It was revealed that the participants had high total mean scores 53.81±7.74 related to knowledge.

Table (3) revealed that studied participants knowledge related to preventive measures of upper respiratory tract infections. It was found that the highest percentage (86.0%) given incorrect answer was related to administration of vaccination on time.

Table (4) showed the mean score of nursing school participants' practice related to preventive measures of upper respiratory tract infections. It was observed that the participants had low scores related to their all practices by the lowest mean ±SD (0.00 ±0.00) related to counting a respiratory rate.

Table (5) represents relation between socio-demographic characteristics data and total mean score of knowledge related to upper respiratory tract infections. There were statistically significant differences between studied participants' knowledge and their age and years of experience where P value 0.018\* for the participants aged < 30 years were had highest mean score 57.55 ± 4.51, and between their years of experience where P value 0.012\* with highest mean score 56.44 ± 5.28 were regarding from 5-10 years' experience.

Table (6) indicates relation between socio-demographic characteristics data and total mean score of practice related to upper respiratory tract infections. There were no statistically significant differences between all socio demographic characteristics of participants and total mean scores of their practice.

## Discussion

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)<sup>[8]</sup>.

Nursery school 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 (Bjorklund & Causey, 2017)<sup>[1-2]</sup>.

The present study illustrated knowledge of nursery school

supervisors about prevention of upper respiratory tract infections and found that their knowledge was insufficient with mean knowledge 53.81 ± 7.74. Nursery school teacher's deals 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 the result of our study. 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 were 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. So the supervisors of nursery school need urgent program about prevention and management of any respiratory disease, to be provide their knowledge to the students and their relatives 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 successful in upgrading their knowledge and practices concerning emergency situations and their care among children in the nursery school. On the same line with Joseph & George (2015)<sup>[7]</sup>, 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)<sup>[10]</sup>, found that participants' knowledge was improved after conducting structured teaching program regarding acute respiratory infection for children under five years old.

The present study showed that studied participants were insufficient knowledge and skills regarding hand washing. This is a serious indicator and the supervisors need to change their believes and attitude regarding this issue. Also the combination of positive attitudes toward handwashing among educators and the program's effectiveness in imparting knowledge helped to create a sustained social norm of handwashing among many children in disparate locations. Recently Taher, (2014)<sup>[15]</sup>, 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. Lacks 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. Health Protection Scotland (2015)<sup>[6]</sup>, 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.

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 teachers, workers 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. Rosen *et al.*, (2009) <sup>[14]</sup>, 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.

### Conclusion and Recommendations

The studied participants' knowledge and practice regarding the prevention of upper respiratory tract infections in children under five years in nursery schools at Assiut city were insufficient. Provision of continuing educational programs associated with clinical training for all nursery schools and day care centers' teachers, supervisors and workers about infection control precaution related to upper respiratory tract infection is urgency.

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