International Journal of
Health Systems and Medical Science

ISSN: 2833-7433
Volume 2 | No 11 | Nov - 2023

Incidence of Bacterial Coinfection with a Respiratory Syncytial Virus Iin Hospitalized Children Below Five Years

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Abstract:

Background: Acute respiratory infections (ARIs) are a crucial motive of mortality and morbidity in youngsters under five in the growing usa.

Objective: RSV and different breathing viruses are commonly co-detected with doubtlessly pathogenic bacteria, which include Streptococcus pneumoniae, within the top airways of young children. While these bacteria are acknowledged to be carried asymptomatically, they're additionally able to opportunistic infections.

Material and methods: The present study blanketed a total of (100) samples (entire blood, serum samples, nasopharyngeal swabs, and respiratory tract secretions) have been collected from sufferers affected by breathing tract troubles who were admitted to AL-Hashmia General Hospital and Babylon Maternity and Children Hospital during a length of three months from (November 2022 to January 2023).

Result: The end result of the present-day study is that there was a considerable affiliation between RSV and Mycoplasma pneumonia. Moreover, there have been a vast association among Co-viral contamination and Legionella peumophila serogroup 1.

Discussion: and conclusion: The immunoflorecent take a look at for RSV was observed to be touchy at 10% and 97.5% precise. While the PPV became calculated at 50%, the NPV changed into 81%. The typical accuracy of the take a look at changed into eighty persent. The current information at the mechanisms underlying bacterial and viral interactions inside the respiration tract have been summarized in this examine.

Key words: Children, Syncytial Viral Infection, Hospital, Under Five, ARIs.

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Introduction:

A frequent viral illness affecting the respiratory system, especially in young infants, is the respiratory syncytial virus [1]. This paper focuses on the prevalence of RSV infections in Babylon Province that co-infect with bacteria and cause acute respiratory infections among children younger than five.

While RSV infection itself can lead to respiratory complications, it has been observed that bacterial co-infection significantly worsens the outcomes. Common bacteria involved in these co-infections include *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Staphylococcus aureus*. The presence of bacteria can lead to more severe symptoms and hospitalization rates to rise [2].

In Babylon Province, the prevalence of RSV infections with bacterial co-infections has been a growing concern. The combination of RSV and bacterial infections can lead to severe respiratory illnesses, such as pneumonia and bronchiolitis. RSV is a highly contagious virus that spreads through respiratory droplets. It primarily affects the airways and can lead to inflammation and swelling, making it easier for bacteria to invade and cause secondary infections. Common bacterial co-infections associated with RSV include Streptococcus pneumoniae, Haemophilus influenzae, and Staphylococcus aureus.

The symptoms of RSV with bacterial co-infections in children under five years old can range from mild to severe. Common symptoms include cough, wheezing, difficulty breathing, fever, and nasal congestion. In severe cases, children may experience rapid breathing, cyanosis (bluish discoloration of the skin), and respiratory distress [3]. Nasopharyngeal swabs are commonly used to detect the presence of RSV, while blood and sputum cultures help identify the bacterial co-infections. Chest X-rays may also be performed to assess the severity of lung involvement. Treatment for RSV with bacterial co-infections in children under five years old typically involves a combination of supportive care and specific antimicrobial therapy. Supportive care includes ensuring adequate hydration, providing oxygen therapy if needed, and managing fever and respiratory symptoms [4, 5].

Antimicrobial therapy is initiated based on the specific bacteria identified in the cultures and may involve antibiotics or antiviral medications. Prevention plays a crucial role in reducing the burden of RSV with bacterial co-infections of children patients who are less than five years old. Additionally, vaccination against common bacterial pathogens, such as pneumococcus and Haemophilus influenzae, can significantly reduce the incidence of bacterial co-infections.

RSV with bacterial co-infections is a significant cause of acute respiratory infections in children under five years of age in Babylon Province. This combination of viral and bacterial pathogens can lead to severe respiratory illnesses and requires prompt diagnosis and appropriate management. By implementing preventive measures and ensuring timely treatment, the burden of RSV with bacterial co-infections can be reduced, ultimately improving the health outcomes of young children in Babylon Province.

Material and Methods:

A total of 100 patients with acute respiratory infections (ARIs), according to clinical signs and symptoms and/or chest x-ray reports of pneumonia, were referred to AL-Hashimiya General Hospital and Babylon Maternity Children's Hospital for a period of three months from (November 2022 to January 2023). Those hospitalized for complications other than respiratory illnesses were also enrolled in the study. Informed consent was obtained from the parents of each child prior to enrollment. Patients without parental/guardian consent were excluded from the study. In addition to name, address, and temperature, the demographic information of the patients, such as age and sex,

was recorded on a standard form at the time of sampling [6]. Vital signs, including heart rate and respiratory rate, were also recorded at the same time. Nasal swabs were taken from each participant.

Sampling examples: Nasal and nasopharyngeal swabs were collected for identification of bacteria and viruses. The physician's nasopharyngeal swab method held the infant or young child's head securely, and the forehead was at an angle of about 70 degrees slightly behind the back, then swabbed straight back and rotated the swab at 180 C° for a full mouth swab.

Using aseptic techniques and sterile syringes, blood samples (2–5 ml each) were taken from the patients. Every blood sample was drawn into an EDTA tube and a sterile gel tube. Then, the EDTA samples were frozen at - 80 C° for real-time reverse transcription assay (rRT-PCR) and the gel tube samples were left at room temperature for 30 minutes to ferment and coagulate thereafter.

Results and Discussion:

This study was aimed to find out the effect of these viruses in the respiratory tract related with children under five years old and there relation to other bacterial infections.

The sociodemographic characteristics of the study sample were measured, included (age, gender, residence, and smoking habit). The age of the patients' sample were categorized into groups: 30% (30) of the patients aged <1 year old while only 12% (12) were 2-3 years old, table [7]. 57% of the samples were males, while the remaining 43% were females. Also, in most of the samples, 52% lived in rural areas, and 74% had non-smoker family members.

Table [7]: Distribution of patients according to sociodemographic characteristics

Sociodemographic characteristics	N	%
Age (years)		
Less than one years	**30**	**30.0%**
(1-2) years	**32**	**32.0%**
(2-3) years	**12**	**16.0%**
(3-4) years	**16**	**18.0%**
≥ 4 years	**10**	**19.0%**
Total	**100**	**100.0%**
Gender		
F	**43**	**43.0%**
M	**57**	**57.0%**
T	**100**	**100.0%**
Residence		
Rural	**52**	**52.0%**
Urban	**48**	**48.0%**
Total	**100**	**100.0%**
Family Smoking habit		
Smoker	**26**	**26.0%**
Non-smoker	**74**	**74.0%**
T	**100**	**100.0%**

Studies discovered that the incidence price of RSV-related lower respiratory contamination is higher within the first six months of lifestyles in comparison with older age organizations, and the illness is normally greater excessive in young babies [8]. Another study by using observed that age-specific prevalence prices (IR) have been appreciably better in children more youthful than two years old than in the older age group, and the identical sample turned into observed for overall intense

lower breathing tract contamination. Among the ones, the IRs of general RSV LRTI and general intense RSV LRTI were mainly high in kids aged 3-five months.

Most of the sample patients, 57% were male, and 52% of them were of rural residence. Only 26% of the patient's families had smokers. Other studies find that residences in rural areas are of influence on the infection with respiratory viruses [1, 9].

The distribution of patients according to the type of micro-organism, including (RSV, *L .pneumophila* serogroup 1, *Mycoplasma pneumoniae*, *Coxiella burnetii*, *Chlamydophila pneumoniae*, and *Streptococcus pneumoniae*) were studied in Table [7]

Table [7]: Distribution of patients according to type of microorganisms.

Type of micro-organism	N	%
RSV		
Yes	**22**	**22.0%**
No	**78**	**78.0%**
Total	**100**	**100.0%**
***L. pneumophila* serogroup 1**	**5**	**5.0%**
Yes	**95**	**95.0%**
No	**100**	**100.0%**
Total		
Mycoplasma pneumoniae		
Yes	**23**	**23.0%**
No	**77**	**77.0%**
Total	**100**	**100.0%**
Coxiella burnetii		
Yes	**5**	**5.0%**
No	**95**	**95.0%**
Total	**100**	**100.0%**
Chlamydophila pneumoniae		
Yes	**2**	**2.0%**
No	**98**	**98.0%**
Total	**100**	**100.0%**
Streptococcus pneumoniae		
Yes	**8**	**8.0%**
No	**92**	**92.0%**
Total	**100**	**100.0%**

An investigation of the association between RSV infection and type of bacterial infection, including (*L. pneumophila* serogroup 1, *Mycoplasma pneumoniae*, *Coxiella burnetii*, *Chlamydophila pneumoniae*, and *Streptococcus pneumoniae*) is shown in Table (3). There was a significant association between RSV and *Mycoplasma pneumoniae*.

Table (3): The association between RSV infection and type of bacterial infection

Study variables	RSV infection		Total	χ^2	P-value
	Positive	Negative			
***L. pneumophila* serogroup 1**	3 (13.0)	2 (2.6)	5 (5.0)		0.078 f

Positive	20 (87.0)	75 (97.4)	95 (95.0)		
Negative	23 (100.0)	77 (100.0)	100 (100.0)		
Total					
M. pneumoniae				10.39	0.001*
Positive	11 (47.8)	12 (15.6)	23 (23.0)		
Negative	12 (52.2)	65 (84.4)	77 (77.0)		
Total	23 (100.0)	77 (100.0)	100 (100.0)		
Coxiella burnetii					0.587 f
Positive	0 (0.0)	5 (6.5)	5 (5.0)		
Negative	23 (100.0)	72 (93.5)	95 (95.0)		
Total	23 (100.0)	77 (100.0)	100 (100.0)		
C. pneumoniae					1.000 f
Positive	0 (0.0)	2 (2.6)	2 (2.0)		
Negative	23 (100.0)	75 (97.4)	98 (98.0)		
Total	23 (100.0)	77 (100.0)	100 (100.0)		
S. pneumoniae					0.079 f
Positive	4 (17.4)	4 (5.2)	8 (8.0)		
Negative	19 (82.6)	73 (94.8)	92 (92.0)		
Total	23 (100.0)	77 (100.0)	100 (100.0)		

***p*-value ≤ 0.05 was significant, Fisher-exact test.**

Similarity between current results and different other studies had been found [10-13] regarding the co-infection of RSV with other bacteria, including *Mycoplasma pneumoniae* [14-17].

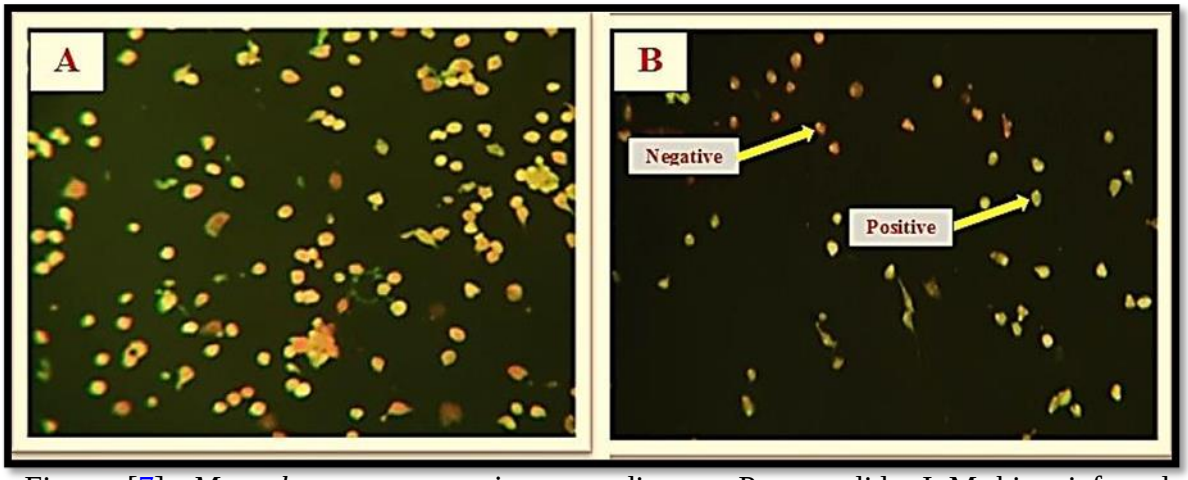

Figure [7]: *Mycoplasma pneumoniae* according to Pneumoslide IgM kit infected cells observed Apple green fluorescence A. Control positive and B. Positive sample 400X magnification.

Impact in Babylon Province:

Babylon Province, located in AL- Hashmia General Hospital and Babylon Maternity and Children Hospital, has witnessed a significant burden of RSV with bacterial co-infections in children under five. The climatic conditions, crowded living environments, and limited access to healthcare facilities contribute to the increased vulnerability of children in this region. The lack of awareness about these co-infections among healthcare providers and caregivers further exacerbates the problem.

Conclusions

This observe affords proof to the affiliation among viral and bacterial infections. In the RSV-inflamed pediatric populace, many cases had been determined to be co-infected with Mycoplasma pneumoniae, indicating an association among the viral and bacterial infections.

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