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RESEARCH ARTICLE
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TO STUDY THE INCIDIENCE OF RESPIRATORY SYNTIAL VIRUS (RSV) ADENOVIRUS IN RESPIRATORY TRACT INFECTIONS BY RAPID CARD TEST IN CHILDREN LESS THAN 5YEARS AT TERTIARY CARE RAMA MEDICAL COLLEGE AND HOSPITAL KANPUR.

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ABSTRACT

Background: Acute lower respiratory tract infection (ALRTI) is a leading cause of morbidity and mortality worldwide, especially during the first year of life. Diagnostic methods includes multiplex real time polymerase chain reaction, which is quite expensive , but there is a clear trend toward point of care testing a new advent of quality Rapid diagnostic tests to detect common respiratory syncytial Virus and adenoviruses.

Aim: A Comparative study to detect Respiratory Syncytial Virus and Adeno Virus in Respiratory Infection by Rapid Card Test in Children Less than 5year Infected Patients was done.

Methods: The present study is a Prospective and cross sectional and observational study was conducted in the Department of Microbiology and Department of Pediatrics from April 2023 April 2024 at Rama Medical College Hospital and Research Center Kanpur. A total 67 Nasal swab sample were collected from the pediatric patients suspected to have the clinical features of RTI. The nasal swab samples were tested for Respiratory syncytial virus and Adenovirus by combo card test a colored Chromatographic immunoassay.

Results: A total 67 nasopharyngeal swab Samples 35 male and 32 females 10 (14.9%) were positive for RTI. Respiratory syncytial viruses were 6 RSV (8.9%) 4 (5.9%) and Adenovirus positive by Rapid card method.

Conclusion: Our study provides evidence that there is a clear trend toward point of care testing a new advent of quality Rapid diagnostic tests are reliable test to detect common respiratory syncytial virus and Adenoviruses.

Keywords: Respiratory syncytial virus, and adenovirus, acute lower respiratory infections.

INTRODUCTION

Respiratory Syncytial virus (RSV) is the most common cause of bronchiolitis and pneumonia among infants and children under 5year of age [1]. Adenovirus most commonly cause respiratory illness however depending on the infection serotype, they may also cause various other illness, such as gastroenteritis, conjunctivitis, cystitis and rash illness [2]. Adenovirus is transmitted by direct contact, fecal oral transmission and occasionally waterborne transmission [3]. Respiratory infections are caused by a variety of viruses and bacteria with respiratory viruses being the commonest etiological agent of Respiratory tract infections among infants. Adenoviruses are not often reported to cause severe illnesses in normal or healthy individuals; however, they cause a wide range of illnesses in children and immunocompromised individuals. They start from respiratory symptoms such as the common cold, sore throat, bronchitis, and pneumonia to gastrointestinal disorders such as diarrhea, vomiting, nausea, and stomach pain [4] Respiratory syncytial virus (RSV) was first described as 'acute catarrhal bronchitis' in 1901.It was isolated in 1956 and today is responsible for 45%–90% of episodes of bronchiolitis, 15%–35% of pneumonia, 6%–8% of croup, and is also a cause of apnea and otitis media. More than half of all children are infected by their first birthday. By 2 years of age, more than 80% of children have been infected at least once, and half of these children have had RSV twice[5].The clinical signs and symptoms of respiratory syncytial virus & adenovirus overlap with those off bacterial infection so it is very important to distinguish bacterial causes from viral causes[8]. This uncertainty leads to cover prescription of antibiotics and extra diagnostic testing with high cost to rule out bacterial infection[6,7,8] .Acute lower respiratory tract infections (ALRTIs) are a leading cause of morbidity and mortality worldwide, the specially during the first years of life. They are responsible for 6.8% of deaths in neonates, 20% of deaths in children aged 1-12 month and 12% of age group 0-5 year in Southeast Asia There is a data regarding etiological agents for ALRTI among infants from northern part of India .Data provided by studies carried out in different part of India may have some lacunae, because of use of tests which are less sensitive or non – specific or are unable to detect wide range of pathogens simultaneously [5-9]. Diagnosis tests can be helpful but rarely alter treatment .Nasopharyngeal washes or tracheal secretions are better specimens for confirming RSV virus than nasal swabs; however, nasal swab are most commonly performed due to ease. Enzyme immunoassay EIA is most common rapid detection test utilized due to the result time (30 minute), low cost and objective end point EIA has 90%-95% specificity, when RSV is in the community, another diagnostic test includes RSV culture but expense, time and variable laboratory technique limit its use. Washes the aspirates are more likely to grow in culture but require 4 days to 2 weeks for a result [10]. And adenovirus the gold standard of diagnostic for Adv infection has been viral culture. Although culture provides a sensitive method for diagnosis, it can take as long as 3 weeks to achieve result. Thus we developed a multiplex PCR – enzyme hybridization assay, the adenoplex, for rapid simultaneous detection and identification of adv species in a single test. [11]

MATERIAL AND METHODS

An observational cross sectional study was carried out between April 2023 to April 2024 at Department of Microbiology and Pediatrics Rama Medical College Hospital and Research Centre in Kanpur, Uttar Pradesh India. A total of 67 Nasopharyngeal Samples from respiratory infection patients aged below 5 years showing sign of fever, running of nose, sore and throat, short of breathing, cough, were included in study Children diagnosed bacterial respiratory tract infection and other cause of respiratory tract infection was excluded from the study.

Sample collection and processing-

Sample should be process as soon as possible after collection. If this is not possible the samples can be stored in the refrigerator (2-8^{o}C) for 8 hours prior to testing.

1-Remove the swab from its packing

2- Collect specimen with a sterile swab from one nostril.

3-Insert the swab into the nostril to the nasopharynx, rotating against the nasal wall

(to ensure swab contains cells as well as mucus).
4- Repeat procedure using another nostril.
5- Process the swab as soon as possible after collecting the specimen.

Nasopharyngeal aspirate method (suction apparatus, sterile suction catheter).
For children
1. Use an aspiration bulb or bulb syringe to instill the saline water into one nostril leaning the children head.
2. Aspirate the mix of mucus-saline water into the bulb and transfer it into a clean container.
3. Repeat for the other nostril and transfer the fluid into the same specimen container.

Test procedure: -
Allow tests, samples and controls to reach room temperature (15-30ºC) prior to testing. Do not open pouches until the performance of the assay.

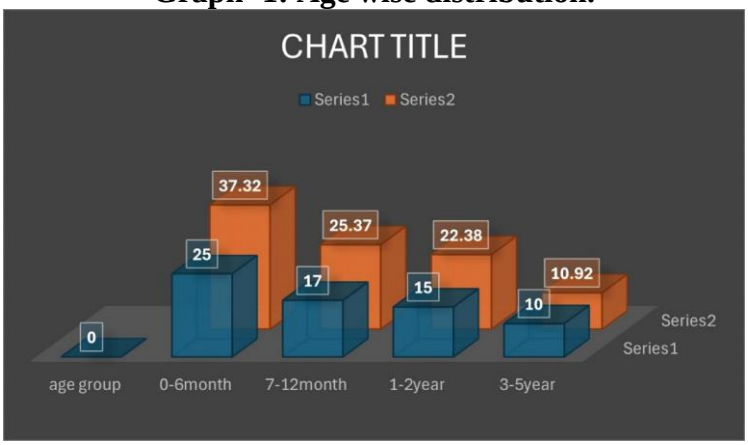
Procedure A using nasal swab samples:
1. Add 15 drops (1) Reagent B and immediately put the swab into the tube.
2. Mix the solution by rotating the swab forcefully against the side of the tube at least 1 minute. Best results are obtained when the specimen is vigorously extracted in the solution (2). Extract as much liquid as possible from the swab, squeezing the sides of the tube or rotating the swab against the side of the tube as the swab is withdrawn. Discard the swab.
3. Remove the CerTest RSV+ Adenovirus Resp. combo card test from its sealed bag just before using it.
4. Use a separate pipette and test for each sample or control. Dispense exactly 4 drops from the testing tube, into the circular window marked with the letter A (3) and 4 drops, using the same tube, into the circular window marked with the letter B (4).
5. Read the results at 10 minutes. Do not read the test result later than 10 minutes.
If the test does not run due to the type of sample, stir the sample added in the sample window (S) with the pipette. If it doesn´t work, dispense a drop of Reagent B until seeing the liquid running through the reaction zone.

Procedure B using nasopharyngeal wash or aspirate samples:
1. Add 6 drops (1) of the nasopharyngeal wash or aspirate samples with a pipette and 9 drops (2) of Reagent B in a testing tube. Mixer with vortex at least 1 minute to homogenize. Best results are obtained when the specimen is vigorously extracted in the solution (3).
2. Remove the CerTest RSV+ Adenovirus Resp. combo card test from its sealed bag just before using it.
3. Dispense exactly 4 drops from the testing tube, into the circular window marked with the letter A (4) and 4 drops, using the same tube, into the circular window marked with the letter B.
4. Read the results at 10 minutes. Do not read the test result later than 10 minutes. If the test does not run due to the type of sample, stir the sample added in the sample window 5. (S) With the pipette. If it doesn´t work, dispense a drop of Reagent B until seeing the liquid running through the reaction zone.

Ethical approval:
The study was approved by the Ethics Committee of Rama Medical College and Hospital & Research Centre, Kanpur.

RESULTS
A total of 67 nasopharyngeal samples were collected from respiratory tract patient in which ALRTI suspected cases which were studied between the age group of under 0-5 years.

Graph -1: Age wise distribution.



Graph No 2: Signs and symptoms of suspected cases for Respiratory Syncytial virus and Adeno virus.

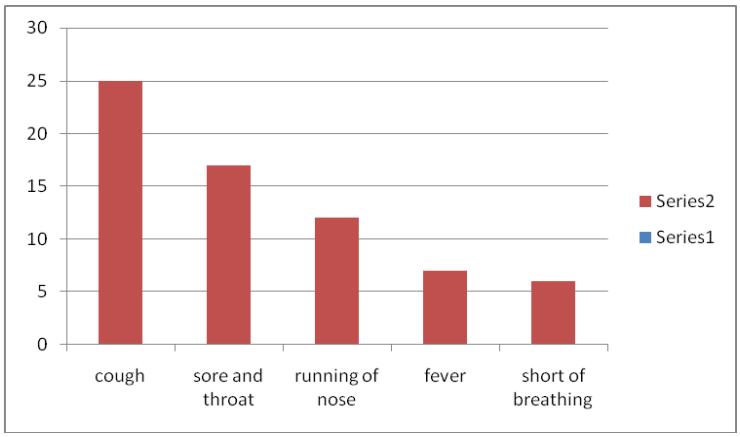


Table no-3 Area wise distribution of infected cases.

Demographical profile	No.of Respiratory synctial virus and Adenovirus	Percentage
Rural	8	80%
Urban	2	20%
Total	10	100%

Graph no -4. Distribution positive case of Respiratory syncytial virus and Aden virus.

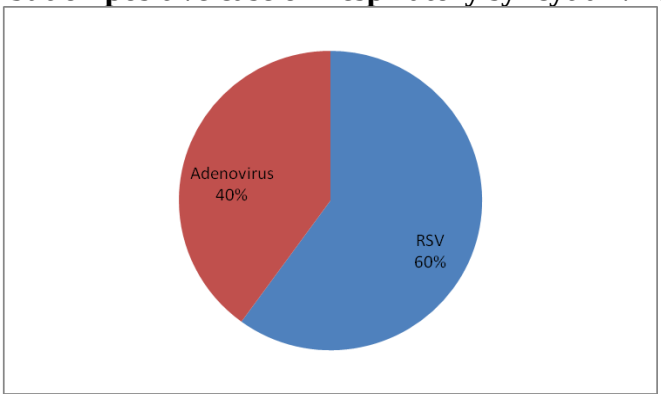


Figure no.1 RSV+ Adenovirus combo card antien test showing possitive.

DISCUSSION

In our study most of the infected cases of the month of Nov to March. In perivius study also cases come in the month of November to march. Globally, it has been observed that RSV activity occurs between March and June in temperature regions of southern hemisphere and between September and December in the northern hemisphere with low detection otside the season [12].

The incidence of respiratory syncytial virus was cases 60% in my study and higher infected infants of the 7-12 months.

These findings are similar to studies from Jaipur (60%) in western India. RSV most common are detected among SARI patients ; and adenovirus in this study, the burden of viral pathogen was higher among infants (12 months old) who made up more than half of viral detection and was similar to studies elsewhere in India [13'].

Moreover similar to other studies in India and around the SARI patients were children aged 1<5 year RSV was the most common virus detected among the children with SARI, especially among infants, which was similar to other studies. [14][15]

In our study most common symptoms is cough followed by sore throat. In previous study cough is the most common followed by fever. [16]

Conclusion -our study concludes that prevalence of Respiratory syncytial virus and adenovirus the study shows that maximum cases were seen in December to February month. The shows that maximum case was seen Respiratory syncytial virus and with Adenovirus we also concluded that the respiratory syncytial virus and adenovirus nasopharyngeal test is a rapid diagnostic test also effective with a high sensitivity and specificity this can be used for detecting respiratory syncytial virus and adenovirus infection in children less than 5 five year with acute lower respiratory infection. As the samples collected were from the unvaccinated children.

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