

## *Clinical manifestations of upper respiratory tract infection in children at Kalideres Community Health Center, West Jakarta*

**Widagdo<sup>\*a</sup>, Harmon Mawardi\*, Ellen P. Gandaputra\*, Firda Fairuza\*, Rudy Pou\*, and Paul Bukitwetan\*\***

### ABSTRAK

\*Department of Child Health  
\*\*Department of Microbiology,  
Medical Faculty  
Trisakti University

#### Correspondence

<sup>a</sup>dr. H. Widagdo, Sp.A  
Department of Child Health  
Medical Faculty  
Trisakti University  
Jl. Kyai Tapa No 260, Grogol  
Jakarta 11440  
Tel. 021-5672731 Ext. 2705  
Fax 021-5660706  
E-mail: widiant@centrin.net.id

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#### **INTRODUCTION**

*The National Household Health Survey showed that the incidence of upper respiratory tract infection (URI) in Indonesia was high. The objectives of the study were to investigate the clinical manifestations of URI, its bacterial spectrum and sensitivity.*

#### **METHODS**

*A cross sectional study was carried out involving one hundred children with symptoms of URI i.e. fever, cough and or runny nose. The data of demography, physical sign, hematology, bacterial spectrum and sensitivity were collected.*

#### **RESULTS**

*The prevalence of URI was higher in male, younger age, smoker family, low educated, low income family, and polluted environment. The manifestations of URI were rhinopharyngitis (52%), pharyngitis (18%), rhinitis (12%), tonsilopharyngitis (10%), and tonsillitis (8%). The isolated bacteria were *S. aureus*, *S. β hemolyticus*, *K. pneumoniae*, *C. diphtheriae*, *S. albus* and *S. anhemolyticus*. *S. aureus* was higher in male than in female ( $p < 0.01$ ), while *S. aureus*, *S. â hemolyticus*, and *C. bacterium diphtheriae* were higher in preschool age children ( $p < 0.01$ ), and *K. pneumoniae* were higher in infants ( $p < 0.01$ ). *S. aureus*, and *S. â hemolyticus* were higher in children with under-nutrition, while in normal nutrition were of *K. pneumonia* and *C diphtheriae* ( $p < 0.01$ ). Most bacteria were intermediate and resistant to fourteen tested antibiotics.*

#### **CONCLUSION**

*The manifestations of URI were rhinopharyngitis (52%), pharyngitis (18%), rhinitis (12%), tonsilopharyngitis (10%), and tonsillitis (8%), each of which could be associated with the complication and accompanying disease. The pathogenic bacterial spectrum of the throat consisted of *S. aureus*, *S. â hemolyticus*, *K. pneumonia*, and *C. diphtheriae*.*

**Keywords:** URI, children, clinical manifestations, bacterial sensitivity tests

## Manifestasi klinis infeksi saluran nafas atas pada anak di Pusat Kesehatan Masyarakat Kalideres, Jakarta Barat

Widagdo<sup>\*a</sup>, Harmon Mawardi\*, Ellen P. Gandaputra\*, Firda Fairuza\*, Rudy Pou\*, dan Paul Bukitwetan\*\*

### ABSTRACT

#### LATAR BELAKANG

Survei Kesehatan Rumah Tangga (SKRT) tahun 2001 menunjukkan angka kejadian infeksi saluran nafas atas (ISNA) di Indonesia adalah tinggi. Penelitian ini dilakukan untuk mengetahui manifestasi klinis ISNA serta bakteri usap tenggorok berikut uji sensitivitasnya.

\*Bagian Ilmu Kesehatan Anak,  
\*\* Bagian Mikrobiologi  
Fakultas kedokteran  
Universitas Trisakti

#### METODE

Penelitian potong lintang dilakukan pada seratus pasien anak di Puskesmas Kalideres, Jakarta Barat, dengan keluhan ISNA berupa panas, batuk dan atau pilek. Dilakukan pengumpulan data demografi, temuan fisik, laboratorium darah, biakan dan hasil uji sensitivitas.

#### Korespondensi

<sup>a</sup>dr. H. Widagdo, SpA  
Bagian Ilmu Kesehatan Anak  
Fakultas Kedokteran  
Universitas Trisakti  
Jl. Kyai Tapa No.260 Grogol  
Jakarta Barat 11410  
Telp. 021-5672731 Eks.2705  
Email: [widiant@centrin.net.id](mailto:widiant@centrin.net.id)

#### HASIL

Kejadian ISNA pada anak terdapat lebih banyak pada anak laki, usia lebih muda, keluarga perokok, pendidikan rendah, kondisi ekonomi kurang, dan lingkungan berdebu. Keluhan dan temuan fisik adalah demam, batuk, pilek, anoreksi, muntah, diare, sesak nafas, dan kejang. Manifestasi ISNA meliputi rinofaringitis (52%), faringitis (18%), rinitis (12%), tonsilofaringitis (10%) dan tonsilitis (8%). Penyakit penyulit dan penyerta antara lain otitis media, pneumonia, gizi-kurang, dan anemia. Hasil biakan menunjukkan *S. aureus* terdapat lebih banyak pada anak laki dari perempuan ( $p<0,01$ ), sedang *S. aureus*, *S. â hemolitikus*, dan *K. difteri* terdapat lebih banyak pada usia prasekolah ( $p<0,01$ ). Sebaliknya *K. pneumonia* ditemukan lebih banyak pada bayi ( $p<0,01$ ). *S. aureus* dan *S. â hemolitikus* didapatkan lebih banyak pada anak gizi kurang, sedang *K. pneumonia* dan *K difteri* lebih banyak pada anak gizi baik ( $p<0,01$ ). Kuman memperlihatkan tingkat *intermediate* dan resisten terhadap 14 jenis antibiotik yang diuji.

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#### KESIMPULAN

Manifestasi klinis ISNA terbanyak adalah rinofaringitis (52%), faringitis (18%), rinitis (12%), tonsilofaringitis (10%) dan tonsilitis (8%).

**Kata kunci:** ISNA, anak, manifestasi klinis, uji resistensi bakteri

## INTRODUCTION

The prevalence of upper respiratory tract infection (URI) in Indonesia was 38.7% in

infant, for under-five it was 42.2%, and 28.8% in children of 5 up to 14 years of age.<sup>(1)</sup> URI is an acute infections involving the nose, paranasal sinuses, pharynx, larynx, trachea, bronchi, acute

laryngotracheo-bronchitis (croup), epiglottitis, and otitis media.<sup>(2,3)</sup> These infections occur most common at about seven times per year among children and fall to two times per year in adult. Assuming that each episode last about 4 days, then a 70 year old people may have spent about 1-2 years suffering from URI.<sup>(4)</sup> URI do not contribute significantly to deaths in children, but they cause considerable burden of disability.<sup>(2)</sup> The symptoms and signs of URI can be classified by the side from which symptoms originate and their functional effects. Thus the clinical pictures vary as does the site of the initial infection, but in some cases with URI may develop serious infections such as meningitis or pneumonia.<sup>(4)</sup> As widely reported, the most cause of URI is virus,<sup>(5,6)</sup> and the others are streptococci some of which are *group A S. pyogenes*, *C. diphtheriae*, *N. gonorrhoeae*, *Fusobacteria spp.* and Spirochaetes, and *Chlamydia pneumoniae*.<sup>(6)</sup>

Since the causes of URI are vary and the microbiological confirmation of diagnosis takes time, while the clinical course of the disease takes a relatively short period thence the problem arise is the establishment of diagnosis needed to treat the URI.<sup>(4)</sup> As the impact of such situation is the occurrence of antibiotics overused with its bacterial resistant<sup>(2)</sup> and other untoward effects such as development of eczema, wheeze, and allergic sensitization<sup>(7)</sup> that are difficult be hindered. The attempt of this study about URI was to investigate the clinical picture of URI including the bacterial spectrum of throat swab and its sensitivity to antibiotics.

## METHOD

### Research design

A cross sectional design was carried out at Kalideres Community Health Center in West Jakarta from 29 July 2003 to 9 October 2003.

### Population and research subject

The population was children who visit the Child Health Clinic of Health Center at Kalideres, West Jakarta. Three days in each week we came to the Health Center for recruiting maximally 4 children per day, from the visitors who had symptoms of URI. The children chosen were the first four patients who came for examinations of their URI, until a total of 100 samples were enrolled.

### Data collections

For the purpose of study the following data will be collected: the demographic data such as gender, age, parent education and monthly income, the clinical symptoms and signs included fever, cough, rhinorrhoea, sore throat, ear ache, tonsillar hypertrophy and hyperemia, pharyngeal hyperemia and engorgement. Laboratory measurement, included routine hematology (hemoglobin, white blood cells, and its differential count), and microbiology was culture of throat swab and the sensitivity test of isolated bacteria.

### Physical examinations

The examinations of the patients were carried out on the day of visit i.e. the history taking, and physical examinations were performed by EPG, FF, RP, under the supervision of HM. The clinical diagnosis of URI was made by the presence of general symptoms such as fever, cough, runny nose, headache, malaise and signs relating to the site of infection such as rhinitis are nasal secretion, sniffles or congestion.<sup>(8)</sup> Pharyngitis was sore throat, pharyngeal hyperemia,<sup>(9)</sup> tonsillitis was swollen and hyperemic tonsil that may covered with exudates,<sup>(10)</sup> and infection of middle ear or otitis media was the presence of ear pain and bulging membrane.<sup>(11)</sup> Sinusitis was diagnosed as persistent URI for 10-14 days associated with 3-4 consecutive of days purulent nasal discharge and cough.<sup>(12)</sup>

### Laboratory examinations

The hematology examinations were performed at the Laboratory Division of Kalideres Health Center, while microbiology examinations were carried out by the staffs of Microbiology Department supervised by PB. Throat swabs were taken by scratching the tonsils and the posterior wall of the pharynx using sterile cotton buds, and avoided touching mucous membrane of the mouth. The specimens were put into the tube containing Cary Blair transport media. The tubes containing specimens were collected in a bag containing dry ice, then directly dispatched to the Department of Microbiology for culture. Upon the receipt, the specimen was directly inoculated onto blood agar plate then was incubated in a candle-jar at 35<sup>o</sup> C for 24-48 hours. The colony grew on the blood agar plate was selected and identified according to the standard culture system.<sup>(13)</sup> The antibiotics sensitivity was determined by using of the disc diffusion method and the interpretation were made according to the criteria described by the National Committee for Clinical Laboratory Standards (NCCLS).<sup>(14)</sup>

### Statistical analysis

With the use of Microsoft Excel of Windows XP (2003) the relevant variables were totalized and converted to the percentage of the size of respective samples. The different of distribution of bacteria according each to gender, age, and nutrition were tested with the use of Chi square test with  $p < 0.05$  as the significant level.

### Ethical clearance

The participants were enrolled for the study with informed consent signed by their parents. The study will be initiated after the ethical clearance has been issued by the Ethical Committee of Trisakti Medical Faculty.

## RESULTS

During three months of the study a total sample of 100 children with URI visited the health center were enrolled. There were 19 patients refused the blood examinations. Demographic characteristic was listed in Table 1, mentioning such as gender of 58 boys and 42 girls, average age in month was  $39 \pm 31$  (4-120 months) with the distribution as 21 infants, 57 preschool age, and 22 school age children, and the parents had low in education and social economy level.

Table 2 depicted the symptoms and signs such as fever, cough, runny nose, measurements, and upper respiratory findings. The study of hematologic value in 81 cases showed that the hemoglobin (g/dl) were  $11.2 \pm 1.0$  (8.7-13.2) and prevalence of anemia was found 13.6% (11/81), mean white blood cells ( $10^3$ /dl) was  $11.3 \pm 4.9$  (4.9-31.6) and the white blood cells of  $10 \times 10^3$  or higher was found in 19% of cases, increased polymorphonuclear cells (PMNC) in 32%, and high mononuclear cells (MNC) in 54%. The erythrocyte sedimentation rate (ESR) (cm/1 hr) was  $20.1 \pm 9.4$  (1-50), and the ESR higher than 10 was seen in 77% of cases.

Table 1. Demographic characteristics of the patients (n = 100)

Characteristics	Number of finding
Gender	
Male (%)	58
Female (%)	42
Child age (mo)	$39 \pm 31$ (4-120)
Infant (%)	20
Preschool age (%)	58
School age (%)	22
Child number	$2 \pm 1$ (1-6)
Family size	$5 \pm 2$ (3-12)
Total children	$2 \pm 1$ (1-7)
Education (y)	
Father	$9 \pm 3$ (0-12)
Mother	$8 \pm 3$ (0-15)
Monthly income (IDR 000)	$544 \pm 292$ (100-1800)
Income per capita (IDR 000)	$135 \pm 91$ (11-600)

Table 2. The clinical characteristics of URI (n = 100)

Symptoms and signs	Number of findings
Fever	100
Runny nose	87
Cough	97
Anorexia	63
Vomiting	34
Diarrhea	10
Headache	10
Abdominal complaints	6
Myalgia	4
Convulsion	3
Respiratory distress	2
Respiration rate/ minute	24 ± 6 (13 - 40)
Heart rate / minute	99 ± 17 (58 - 146)
Body temperature (°C)	37.2 ± 0.8 (36 - 39)
Tonsil: enlargement & hyperemia	18
Pharyngeal hyperemia	80
Nasal secretion	64
Submandibular swelling	2
Abdominal distention/pain	8

Table 3 showed the URI's manifestation such as rhinopharyngitis 52%, the complication and accompanying diseases like pneumonia (3%), otitis media (2%), and under-nutrition was 49%.

Table 4 presented the bacterial spectrum of the throat consisted of *S. aureus*, *S. â hemolyticus*, *K. pneumonia*, and *C. diphtheriae*. Distribution of bacteria showed that *S. aureus* were higher in male than in female (p<0.01), while *S. aureus*, *S. â hemolyticus*, and *C. bacterium diphtheriae* were higher in preschool age children (p<0.01), on the other hand *K. pneumoniae* were higher in infants (p<0.01). (Data not presented).

Table 5 showed the sensitivity of four pathogenic bacteria to 14 antibiotics being tested, and it showed that the bacteria were intermediate and resistant to all drugs, except *C. diphtheriae* which was sensitive to amoxicillin-clavulanic acid, cefadroxil, cefixime, and cotrimoxazol.

Table 3. Clinical manifestations, complications, and accompanying diseases (n = 100)

Findings	Number of cases (%)
Clinical manifestations	
Rhinitis	12
Tonsilitis	8
Pharyngitis	18
Rhinopharyngitis	52
Tonsilopharyngitis	10
Complications and accompanying diseases	
Pneumonia, bronchitis	3
Otitis Media	2
Enteritis, mild dehydration	1
Febrile convulsion	1
Anemia	12
Under nutrition	49
Tuberculosis	1
Allergic diseases (rhinitis, urticaria, asthma)	4
Cerebral palsy	1

Table 4. Result of the culture of the throat swab (n = 100)

Specifications	Findings (%)
<i>Staphylococcus albus</i>	32
<i>Staphylococcus aureus</i>	34
<i>Streptococcus ß-hemolyticus</i>	25
<i>Streptococcus γ-ahemolyticus</i>	17
<i>Klebsiella pneumonia</i>	20
<i>Corynebacterium diphtheriae</i>	1
Negative	7

## DISCUSSION

This study showed that URI mainly occurred in boys than girls with the male-female ratio of 3:2, and the age of the children mainly were of preschool age, followed by school age and infant in the percentage of 57%, 22%, and 21%, respectively. Some studies have documented that boys had more URI than did girls and the highest age incidence was 6-23 mo.<sup>(15)</sup> Kvaerner (2000) in Oslo reported that

Table 5. Bacterial sensitivity of four microorganisms against 14 antibiotics tested

Drugs	<i>S aur</i> (n = 34)	<i>S β hem</i> (n = 25)	<i>K pn</i> (n = 20)	<i>C dipht</i> (n = 1)
Penicillin	9.7	40.0	22.2	0.0
Methycillin	87.1	32.0	0.0	0.0
Ampicillin	6.5	24.0	16.7	0.0
Amoxycillin	6.5	56.0	33.3	0.0
Amoxycillin-clavularic acid	22.6	60.0	33.3	100.0
Cefadroxil	54.8	44.0	0.0	100.0
Cefixime	16.1	28.0	50.0	100.0
Erythromycin	90.3	40.0	11.1	0.0
Spiramycin	90.3	16.0	11.1	0.0
Chloramphenicol	25.8	68.0	22.2	0.0
Tetracycline	25.8	44.0	27.8	0.0
Co-trim oxazole	38.7	36.0	55.6	100.0
Gentamicin	93.5	72.0	50.0	0.0
Kanamycin	96.8	52.0	50.0	0.0

URI were common at 4 years old,<sup>(16)</sup> while other study also in Oslo showed that URI was common in children of 10 years of age.<sup>(17)</sup> The factors that influenced the occurrence of URI in our studies were under-nutrition (49%), anemia (14%), large family size (65%), smoker family (74%), low level of education (73%) and low social economy (64%). Studies in various country showed the predisposing factors of the evidence of URI were large family size, malnutrition, genetic such as Down syndrome), and overcrowding<sup>(4)</sup> parental smoking,<sup>(4,15)</sup> young age,<sup>(4,15,19)</sup> pollution,<sup>(4,18)</sup> low birth weight<sup>(4,19)</sup> African/Asian ethnicity and home dampness,<sup>(16)</sup> atopic disease,<sup>(16,19)</sup> and sharing bedroom with adult.<sup>(17)</sup>

Clinical presentation of URI depends on the site of the initial infection and the response of the mucosa such as simple necrosis that causes dryness, pain, and bleeding of the overlying vascular tissue, and the other possible response is over-secreting mucous afflicting sniffles, congestion, facial aching, and reduced hearing; the systemic symptoms may be related to direct pathogenic effects on skeletal muscles, or indirectly from metabolites of the immune

response.<sup>(4)</sup> In accordance with the pathogenesis as stated by del Mar (2000),<sup>(4)</sup> this study noted the clinical symptoms and signs were fever (100%), cough (97%), runny nose (87%), anorexia (63%), vomiting (34%), diarrhea (10%), dyspnea (2%), and convulsion (3%). The clinical signs were nasal secretion found in 52%, enlarged tonsil in 65% and hyperemic in 59%, and pharyngeal hyperemia in 50% of cases. Then clinical manifestations of URI were as rhinopharyngitis (52%), pharyngitis (18%), rhinitis (12%), tonsilopharyngitis (10%), tonsillitis (8%), and there were also complications and accompanying diseases found in some cases (Table 3).

The studies abroad reported the difference in the clinical manifestations of URI such as common cold occurred in 58.3%, rhinitis 16.4%, tonsilopharyngitis 7.5% and otitis media 7.1%;<sup>(16)</sup> tonsilopharyngitis was found in 21.6%, and otitis media in 13.8%.<sup>(17)</sup> Acute otitis media was the most common suppurative complications of URI, and the next were sinusitis, pneumonia, epiglottitis, peritonsillar abscess, periorbital cellulitis, and meningitis; while acute rheumatic fever and acute glomerulonephritis were another



important complications belongs to non-suppurative type of post-streptococcal infection.<sup>(4)</sup>

The most cause of URI was virus (40%), and the others were streptococci (25%) a third to half of which were group A *S. pyogenes*, less common (1-2%) were *C. diphtheriae*, *N. gonorrhoeae*, *Fusobacteria spp.* and *spirochaetes*, and *Chlamydia pneumoniae* occupied 30% of patients with pharyngitis whenever the other cause was not found.<sup>(6)</sup> Nokso-Koivisto (2004) showed that the three most common viral causes of URI in children less than 2 years old was *rhinoviruses*, *enteroviruses*, and *respiratory syncytial viruses*.<sup>(5)</sup> Throat swab culture in our series showed positive in 93 cases (single bacteria in 57 and more than one in 36 cases), and negative in 7 cases. The bacteria were *Staphylococcus aureus*, *Streptococcus β hemolyticus*, *Klebsiella pneumoniae*, and *Corynebacterium diphtheriae* in 34%, 27%, 20%, and 1% of cases, respectively, while *Staphylococcus albus* and *Streptococcus non-hemolytic* were found in 32% and 17% of cases.

Among the so many species of *staphylococcus*, *streptococcus*, *klebsiella*, and *corynebacterium* most are normally found in the respiratory tract, but some others are pathogenic, such as *S. aureus*, *S. epidermidis*, and *S. saprophyticus*, *S. pyogenes*, *S. dysgalactiae*, and *S. pneumoniae*, *K. pneumoniae*, *K. ozenae* and *K. rhinoscleromatis*, and *C. diphtheria*.<sup>(20)</sup> The bacterial flora isolated from the culture of pharyngeal swab and middle ear were *H. influenzae* in 37-63%.<sup>(21-23)</sup> *S. pneumoniae* in 40-58%,<sup>(21-25)</sup> Non-typeable *H. influenzae*,<sup>(24)</sup> and *M. catarrhalis* in 26-80%,<sup>(22-24)</sup> group A streptococci in 17% of cases.<sup>(26)</sup>

*S. aureus*, *S. pyogenes*, *K. pneumonia* and *C. diphtheria* were tested for the sensitivity to 14 antibiotics, while such test was not done at *S. albus* and *S. anhemolyticus*, because the bac-

teria were considered as the saprophytes. The result of the sensitivity tests showed the evidence that the bacteria were of varying degree resistant to all antibiotics, except. *C. diphtheria* which was still sensitive to amoxicillin-clavulanic acid, cefadroxy, cefixime, and cotrimoxazol.

The study in Thailand reported that 37% of *Streptococcus pneumoniae* isolated from nasopharynx of children with URI were penicillin resistant<sup>(27)</sup> while in Vietnam 39 to 87% of various pneumococcal strains were resistant to penicillin, cotrimoxazole, tetracycline, erythromycin, and cefotaxime,<sup>(28)</sup> and the report from Korea mentioned that within 7 years period, there were increasing resistance rate of group A streptococci to erythromycin and clindamycin from 29 to 51% and 10 to 34%, respectively.<sup>(26)</sup> A collaborative study between eight Latin American countries showed that *S. pneumonia* were penicillin-resistance in 30%, while to cefuroxime, cefachlor, and azithromycin, the bacteria were resistant in 9.2%, 20.8%, and 15.1% cases, respectively.<sup>(29)</sup>

Based on several studies it was concluded that the bacterial resistant related to the overused of antibiotics in the treatment of upper respiratory infections.<sup>(2,30-32)</sup> As much as sixteen to eighty nine percent of children with URI of whatever the causes who have visited family physician or pediatrician in various countries have received antibiotics for their treatment.<sup>(23,30,35-39)</sup> The reasons why did physicians over-prescribed antibiotics for respiratory tract infection (RTI), was of uncertainty diagnosis, socio-culture and economic pressures, prevention of secondary infection, shorten the duration of illness, lessen the illness severity, concerning over malpractice litigation, and parent expectations about antibiotics.<sup>(40)</sup> The quantitative systematic review of the treatment of URI concluded that the available evidence did not support antibiotic

treatment of children with URI because of lack of efficacy and the risk of complications or illness progression.<sup>(32,34,41)</sup>

The way to reduce bacterial resistance is through reducing the number of inappropriate antibiotic prescriptions given to children with URI.<sup>(30,42,43)</sup> Thence the effort has been taken through the intervention consisting of community dissemination of consumer information on antibiotic use for URIs and education of health professionals, resulted in statistically significant reductions in the range of 31-70% of the dispensing of 6 antibiotics.<sup>(44)</sup> In general, the recommended management for URI is symptomatic treatment that should be directed to maximize the relief of most prominent symptom(s), reduce the incidence of sequel such as deafness after otitis media, and minimize the inappropriate use of antibiotics in order to inhibit the development of antibiotic resistance and to conserve the resources.<sup>(2)</sup> Bed rest, and voice rest is necessary, and increased fluid intake are recommended for all URI.

Nasal decongestant, NSAID, anti-tussives and expectorants free of codeine, can be administered to relieve the burden of URI.<sup>(2,3)</sup> It is suggested that antibiotic treatment should be indicated for only a minority of patients with acute upper respiratory infections, included: (i) acute otitis media, (ii) mastoiditis, (iii) streptococcal pharyngitis, (iv) suppurative cervical lymphadenitis, (v) peritonsillar abscess, (vi) retropharyngeal abscess, and (vii) bacterial sinusitis.<sup>(2,45)</sup> Particularly in the treatment of URI caused by group A beta hemolytic streptococci in approximately one third of cases,<sup>(34)</sup> McIsaac (1998) recommended the application of the sore throat score in rationalizing the use of antibiotics in treating the URIs. To determine the score, the physician should assigns one score for each presence of the following 5 criteria: (i) history or measured temperature of  $\geq 38^{\circ}\text{C}$ , (ii) absence of cough, (iii) tender anterior cervical

adenopathy, (iv) tonsillar swelling or exudates, and (v) age less than 15 years. The patients with a score of  $\geq 4$  the have highest likelihood of getting infection, then initiation of antibiotics administration or throat swab should be taken. If the score is 2 or 3, throat swab is taken and antibiotic is given due to positive culture, and if the score is  $\leq 1$ , antibiotic and throat swab are not recommended. The sensitivity and specificity of the score in identifying group A streptococcus infection in children at academic center were 96.9% and 67.2%,<sup>(46)</sup> which significantly not different with the children of community based setting, i.e. 92.6% and 72.6%.<sup>(42)</sup>

Regarding the 5 S score of McIsaac, Navaz et al (2000) stated that the probability of group A beta hemolytic streptococcal pharyngitis was related to node size and tenderness, tonsillar exudates and hypertrophy, and pharyngeal erythema and together these four predictors had a sensitivity of 71%, a specificity of 77%, and a positive predictive value of 46%, thence culture is still essential for the confirmation of the streptococci.<sup>(31)</sup>

## CONCLUSION

The manifestations of URI were rhinopharyngitis (52%), pharyngitis (18%), rhinitis (12%), tonsilopharyngitis (10%), and tonsillitis (8%), each of which could be associated with the complication and accompanying disease. The pathogenic bacterial spectrum of the throat consisted of *S. aureus*, *S. â hemolyticus*, *K. pneumonia*, and *C. diphtheriae*. The bacteria were significantly different in distribution according to gender, age, and nutrition. These four pathogenic bacteria showed intermediate and resistant to 14 antibiotics tested, except *C. diphtheriae* which was still sensitive to amoxycillin-clavulanate, cefadroxil, cefixime, and cotrimoxazol.



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## References

1. Tim Survei Kesehatan Nasional. Survei Kesehatan Nasional 2001. Laporan SKRT 2001: Studi morbiditas dan disabilitas. Jakarta: Badan Penelitian dan Pengembangan Kesehatan Departemen Kesehatan Republik Indonesia; 2002.
2. Bahl R, Bhan MK. Clinical management of acute respiratory infections in children. *Annales Nestle* 2000; 58: 49-57.
3. Mossad SB. Upper Respiratory Infections. The Cleveland Clinic; 2005. Available at: [http://www.clevelandclinicmeded.com/disease/management/infectious\\_disease/urti/urti.htm](http://www.clevelandclinicmeded.com/disease/management/infectious_disease/urti/urti.htm). Accessed Januari 14, 2007.
4. Del Mar C. Understanding the global burden of acute respiratory infections. *Annales Nestle* 2000; 58: 41-8.
5. Nokso-Koivisto J. Viral upper respiratory tract infections in young Children (academic dissertation). Helsinki: University of Helsinki; 2004.
6. Spicer WJ. Clinical Bacteriology, Mycology, and Parasitology. 1<sup>st</sup> ed. Edinburgh; Churchill Livingstone; 2000.
7. Kummeling I, Stelm FF, Dagnelie PC, Snijders BEP, Penders J, Huber M, et al. Early life exposure to antibiotics and the subsequent development of eczema, wheeze, and allergic sensitization in the first 2 years of life: The KOALA Birth cohort study. *Pediatrics* 2007; 119: 225-31.
8. Turner RB, Hayden GF. The common cold. In: Behrman RE, Kliegman RM, Jenson HB, editors. *Nelson Textbook of Pediatrics*. 17th ed. Philadelphia: Saunders; 2004. p. 1389-91.
9. Hayden GF, Turner RB. Acute pharyngitis In: Behrman RE, Kliegman RM, Jenson HB, editors. *Nelson Textbook of Pediatrics*. 17th ed. Philadelphia: Saunders; 2004. p 1393-4.
10. Wetmore RF. Tonsils and adenoids In: Behrman RE, Kliegman RM, Jenson HB, editors. *Nelson Textbook of Pediatrics*. 17th ed. Philadelphia: Saunders; 2004. p. 1396-7.
11. Paradise JL. Otitis media. In: Behrman RE, Kliegman RM, Jenson HB, editors. *Nelson Textbook of Pediatrics*. 17th ed. Philadelphia: Saunders; 2004. p. 2138-49.
12. Pappas DE, Hendley JO. Sinusitis In: Behrman RE, Kliegman RM, Jenson HB, editors. *Nelson Textbook of Pediatrics*. 17th ed. Philadelphia: Saunders; 2004. p. 1391-3.
13. Murray P, Baron EJ, Jorgensen JH, Pfaller MA, Tenover FC, Tenover FC, editors. *Manual of Clinical Microbiology*. 8th ed. Washington DC ASM Press; 2003.
14. National Committee for Clinical Laboratory Standards. 2001. Performance standards for antimicrobial susceptibility testing – 10th informational supplement. M100-s11.
15. Cruz JR, Pareja G, de Fernandez A. Epidemiology of acute respiratory infections among Guatemalan ambulatory preschool children. *Rev Infect Dis* 1990; 12: S1029-34 cited by Del Mar C. Understanding the global burden of acute respiratory infections. *Annales Nestle* 2000; 58: 41-8.
16. Karevold G, Kvestad E, Nafstad P, Kvaerner KJ. Respiratory infections in schoolchildren: comorbidity and risk factors. *Arch Dis Child* 2006; 91: 391-5.
17. Koch A, Melbak K, Homoe P, Sorensen P, Hjuler T, Olesen ME et al. Risk factors for acute respiratory tract infections in young Greenlandic children. *Am J Epidemiol* 2003; 158: 374-84.
18. Brauer M, Hoek G, Van Vliet P, Meliefste K, Fischer PH, Wijga A. et al. Air pollution from traffic and the development of respiratory infections and asthmatic and allergic symptoms in children. *Am J Respir Crit Care Med* 2002; 166: 1092-8.
19. Kvaerner KJ, Nafstad P, Jaakkola JJK. Upper respiratory morbidity in preschool Children. *Arch Otolaryngol Head Neck Surg* 2000; 126:1201-6.
20. Brooks GF, Butel JS, Morse SA, Tenover FC, Tenover FC, editors. *Medical Microbiology*. 23th ed. Boston: McGraw Hill; 2004.
21. Homoe P, Prag J, Farholt S, Henrichsen J, Hornsleth A, Kilian M, et al. High rate of nasopharyngeal carriage of potential pathogens among children in Greenland: results of a clinical survey of middle-ear disease. *Clin Infect Dis* 1996; 23: 1081-90.

22. Faden H, Duffy L, Wasielewski R, Wolf J, Krystofik D, Tung Y. Relationship between nasopharyngeal colonization and the development of otitis media in children. *J Infect Dis* 1997; 175: 1440-5.
23. Peerbooms PGH, Engelen MN, Stokman DAJ, van Benthem BHB, van Weert ML, Bruisten SM, et al. Nasopharyngeal carriage of potential bacterial pathogens related to day-care attendance, with special reference to the molecular epidemiology of *Haemophilus influenzae*. *J Clin Microbiol* 2002; 40: 2832-6.
24. Sulikowska A, Grzesiowski P, Sadowy E, Fiett JHryniewics W. Characteristics of *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis* isolated from the nasopharynxes of asymptomatic children and molecular analysis of *S. pneumoniae* and *H. Influenzae* strain replacement in the nasopharynx. *J Clin Microbiol* 2004; 42:3942-9.
25. Garbutt J, Geme JWSt, May A, Storch GH, Shackelford PG. Developing community-specific recommendations for first-line treatment of acute otitis media: Is high-dose amoxicillin necessary? *Pediatrics* 2004; 114: 342-7.
26. Kim S, Lee NY. Epidemiology and antibiotic resistance of group A streptococci isolated from healthy schoolchildren in Korea. *J Antimicrob Chemother* 2004; 54: 447-50.
27. Dejsirilet S, Overweg K, Sluijter M, Saengsuk L, Gratten M, Ezaki T, et al. Nasopharyngeal carriage of penicillin resistant *Streptococcus pneumoniae* among children with acute respiratory tract infections in Thailand: a molecular epidemiological survey. *J Clin Microbiol* 1999; 37: 1832-8.
28. Bogaert D, Ha NT, Sluijter M, Lemmens N, de Groot R, Hermans PWM. Molecular epidemiology of pneumococcal carriage among children with URI in Hanoi, Vietnam. *J Clin Microbiol* 2002; 40: 3903-8.
29. Quinones F, Algorta G, Brilla E, Mendes S, Gutierrez J, Palacios M, et al. Resistance profile of *Streptococcus pneumoniae* and beta-lactamase production in *Haemophilus influenzae* and *Moraxella catarrhalis* isolated from children with upper respiratory tract infections in Latin America 2002/2003. The 24<sup>th</sup> International Congress of Pediatrics, Cancun, Mexico, August 15-20, 2004.
30. Watson RL, Dowell SF, Jayaraman M, Keyserling H, Kolezak M, Schwartz B. Antimicrobial use for pediatric upper respiratory infections: reported practice, actual practice, and parent beliefs. *Pediatrics* 1999; 104: 1251-7.
31. Nafaz H, Smith DS, Mazhari R, Katz DL. Concordance of clinical findings and clinical judgement in the diagnosis of streptococcal pharyngitis. *Acad Emerg Med* 2000; 7:1104-9.
32. Fahey T, Stocks N, Thomas T. Systematic review of the treatment of upper respiratory tract infection. *Arch Dis Child* 1998; 79:225-30.
33. Nyquist AM, Gonzales R, Steiner JF, Sande MA. Antibiotic prescribing for children with colds, upper respiratory tract infections, and bronchitis. *JAMA* 1998; 279: 875-7.
34. Danchin MH, Curtis N, Nolan TM, Carapetis JR. Treatment of sore throat in light of the Cochrane verdict: is the jury still out? *MJA* 2002; 177: 512-5.
35. Akkerman AE, van der Wouden JC, Kuyvenhoven MM, Dieleman JP, Verheij TJM. Antibiotic prescribing for respiratory tract infections in Dutch primary care in relation to patient age and clinical entities. *L Antimicrob Chemother* 2004; 54: 1116-21.
36. Gaur H, Hare ME, Shorr RI. Provider and practice characteristics associated with antibiotic use in children with presumed viral respiratory tract infections. *Pediatrics* 2005; 115: 635-41.
37. Linder JA, Bates DW, Lee GM, Finkelstein JA. Antibiotic treatment of children with sore throat. *JAMA* 2005; 294: 2315-22.
38. Rovers MM, Balemans WAF, Sanders EAM, van der Ent CK, Zielhuis GA, Schilder AGM. Persistence of upper respiratory tract infections in a cohort followed from childhood to adulthood. *Fam Practice* 2006; 23: 286-90.
39. Huang N, Morlock L, Lee CH, Chen LS, Chou JC. Antibiotic prescribing for children with nasopharyngitis (common cold), upper respiratory infections, and bronchitis who have health-professional parents. *Pediatrics* 2005; 116: 826-32.
40. Pichichero ME. Understanding antibiotic overuse for respiratory infections in children. *Pediatrics* 1999; 104: 1384-8.
41. Garbutt JM, Goldstein M, Gellman E, Shannon W, Littenberg B. A randomized, placebo-controlled trial of antimicrobial treatment for children with clinically diagnosed acute sinusitis. *Pediatrics* 2001; 107: 619-25.
42. McIsaac WJ, Goel V, To T, Low DE. The validity of a sore throat score in family practice. *CMAJ* 2000; 163: 811-8.

43. Garbutt J, Jeffe DB, Shackelford P. Diagnosis and treatment of acute otitis media: an assessment. *Pediatrics* 2003; 112: 143-9.
44. Dollman WB, LeBlanc VT, Stevens L, O'Connor PJ, Turnidge JD. A community-based intervention to reduce antibiotic use for upper respiratory tract infections in regional South Australia. *MJA* 2005; 182: 617-20.
45. Auyard Y, Boucot I, Brahim N. Comparative efficacy and safety of four-day cefuroxime axetil and ten-day penicillin treatment of group A beta-hemolytic streptococcal pharyngitis in children. *Pediatr Inf Dis J* 1995; 14: 295-300 cited by Bahl R, Bhan MK. Clinical management of acute respiratory infections in children. *Annales Nestle* 2000; 58: 49-57.
46. McIsaac WJ, White D, Tannenbaum D, Low DE. A clinical score to reduce unnecessary antibiotic use in patients with sore throat. *CMAJ* 1998; 158: 75-83.