

# Acute respiratory infections in primary health care centres in northern Saudi Arabia

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## العدوى التنفسية الحادة في مراكز الرعاية الصحية الأولية في شمال المملكة العربية السعودية

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**خلاصة:** أجريت هذه الدراسة في المنطقة الشمالية بالمملكة العربية السعودية سنة 1419 هجرية (1999 ميلادية). فتم تحليل عينة عشوائية مكونة من 1200 وصفة طبية لتحديد حجم العوامل المصاحبة للعدوى التنفسية الحادة وكيفية معالجتها. وتبين أن العدوى التنفسية الحادة قد شُخصت في أكثر من ثلث الوصفات الطبية التي تم تحليلها، ومن بينها كانت أمراض الجهاز التنفسي العلوي تُمثل 65.8% بينما يمثل الالتهاب الرئوي أقل من 1%. وكان انتشار العدوى التنفسية الحادة أعلى بدرجة يعتد بها في المناطق الحضرية، وبين الأطفال، وبين الذكور، وخلال الفصول الباردة من السنة. ولقد تم وصف المضادات الحيوية لنسبة من المرضى بلغت 87.8%. إن هذه الدراسة تؤكد الحاجة إلى التنفيذ الفوري للبرنامج الوطني السعودي لتشخيص العدوى التنفسية الحادة ومعالجتها.

**ABSTRACT** This study was carried out in the northern region of Saudi Arabia during 1419 AH (1998 AD). A random sample of 1200 prescriptions was analysed to determine the magnitude of factors associated with acute respiratory infections (ARI) and their treatment. ARI were diagnosed in more than one-third of the prescriptions analysed, of which upper respiratory infections accounted for 65.8%, and pneumonia less than 1%. The prevalence of ARI was significantly higher in urban areas, among children, among males and during the colder seasons of the year. Antibiotics were prescribed for 87.8% of patients. This study reinforces the need to implement forthwith the Saudi national programme for diagnosis and treatment of ARI.

### Les infections respiratoires aiguës dans les centres de soins de santé primaires dans le Nord de l'Arabie saoudite

**RESUME** Cette étude a été réalisée dans la région septentrionale d'Arabie saoudite durant l'année 1419 de l'hégire. Un échantillon aléatoire de 1200 ordonnances a été analysé pour déterminer l'ampleur des facteurs associés aux infections respiratoires aiguës (IRA) et leur traitement. Des IRA ont été diagnostiquées dans plus d'un tiers des ordonnances analysées, pour lesquelles les infections respiratoires des voies supérieures représentaient 65,8% et la pneumonie moins d'un pour cent (1%). La prévalence des IRA était considérablement plus élevée dans les zones urbaines, chez les enfants, chez les garçons et pendant les saisons froides de l'année. Des antibiotiques ont été prescrits chez 87,8% des patients. Cette étude renforce la nécessité de mettre en œuvre sans délai le programme national saoudien pour le diagnostic et le traitement des IRA.

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Received: 17/01/00; accepted: 21/05/00

## Introduction

Acute respiratory infections (ARIs) are the most common infections among humans. Their tendency to recur, most often in children, makes them especially important for general practitioners working in primary health care [1].

Respiratory infections include infections in any area of the respiratory tract. Upper ARIs include infections in the ear, nose or throat. Lower ARIs include infections in the epiglottis, larynx, trachea, bronchi, bronchioles and lungs. ARIs include all of the above conditions when they are of less than 30 days duration, the exception being acute ear infection (only considered an ARI if of less than 14 days duration) [2-4].

Worldwide, ARIs are responsible for approximately 50% of morbidity among children under 5 years of age. The relatively high incidence and resulting disability in adults, with subsequent economic loss, make ARIs a major health problem.

Although 90%-95% of upper respiratory tract and 50% of lower respiratory tract infections are viral in origin [1,5], current management of ARIs relies on an overuse of drugs, especially antibiotics. In Saudi Arabia, ARIs were estimated to be responsible for 50% of morbidity in all children aged < 5 years reporting to health care centres in 1995. In addition to the high use of antibiotics and other drugs, there also appears to be an overuse, or inappropriate use, of X-rays and other laboratory tests [4,6].

A national protocol for the diagnosis and treatment of ARI in children has been developed for Saudi Arabia, with training under way. With the implementation of the national protocol, it is expected that both ARI-related mortality and morbidity will be reduced, and ARIs will be managed more

cost-effectively [7]. The present study aimed to determine the magnitude of ARIs, and to study specific factors associated with the diseases and with patterns of their treatment.

## Materials and methods

From the northern region's 40 primary health care centres (covering the three cities Arar, Rafha and Turaf and their surroundings), 10 urban and 10 rural centres were randomly chosen. The study was performed retrospectively to eliminate the possibility of bias if physicians knew their prescribing habits were being assessed. From each health centre in the study, a random sample of 60 prescriptions issued during 1419 AH (1998 AD) was selected for analysis, a total of 1200 prescriptions. Prescriptions with dressings or procedures were excluded.

Data extracted from the prescriptions included:

- patient's age and sex
- date of consultation
- diagnosis
- medications prescribed for ARI.

The data were analysed using *Epi-Info*, version 6.02. Differences between groups were tested using the chi-squared test of significance.

## Results

ARIs were diagnosed in 433 prescriptions (36.1% of the total), of which pharyngitis/tonsillitis, acute bronchitis and common cold/influenza accounted for 41.3%, 31.9% and 21.9% respectively. Pneumonia accounted for 0.9% (Table 1).

ARIs were significantly higher in urban areas compared to rural areas, in children

**Table 1 Classification of acute respiratory infections (ARIs) diagnosed at primary health care centres**

ARI type	No.	%
<i>Upper ARI</i>	285	65.8
Common cold/influenza	95	21.9
Pharyngitis/tonsillitis	179	41.3
Otitis media/sinusitis	11	2.5
<i>Lower ARI</i>	148	34.2
Croup <sup>a</sup>	6	1.4
Acute bronchitis	138	31.9
Pneumonia	4	0.9
<i>Total</i>	433	100.0

<sup>a</sup>Croup included cases of laryngitis (3), acute epiglottitis (2) and laryngotracheitis (1).

less than 15 years of age compared to adults, in males compared to females, and in winter and spring compared to the other seasons (Table 2).

Of all prescriptions for ARIs, 87.1% contained antibiotics (one antibiotic in 85.5% of cases and two in 1.8% of cases). A total of 1064 drugs were prescribed (mean: 2.5 drugs per prescription), with antibiotics accounting for 35.5% of these. Amoxicillin was the most frequently prescribed antibiotic (48%), followed by other penicillins (23%) and erythromycin (18%).

The prescription of different drug categories differed significantly according to diagnosis of ARI (Table 3), with 87.8%, 83.8% and 78.3% of ARI prescriptions containing antibiotics, antipyretics and expectorants/antitussives respectively. Nearly all cases of pharyngitis/tonsillitis, acute bronchitis and pneumonia received antibiotics, compared to 46.3% of cases with common cold/influenza. Expectorants/antitussives were prescribed more frequently for acute bronchitis than for other diagnoses.

**Table 2 Factors associated with acute respiratory infections (ARIs) in primary health care centres**

Factor	Total prescriptions	ARI diagnosis		$\chi^2$
		No.	%	
<i>Residence</i>				
Urban	600	233	38.8	3.9*
Rural	600	200	33.3	<i>df</i> = 1
<i>Age (years)</i>				
< 1	41	19	46.3	57.2*** <i>df</i> = 3
1-4	228	123	53.9	
5-15	198	96	48.5	
> 15	733	195	26.6	
<i>Sex</i>				
Male	586	236	40.3	8.7**
Female	614	197	32.1	<i>df</i> = 1
<i>Season</i>				
Winter	356	161	45.2	113.0***
Spring	312	166	53.2	<i>df</i> = 3
Summer	239	45	18.8	
Autumn	293	61	20.8	
<i>Total</i>	1200	433	36.1	

\* $P \leq 0.05$ ; \*\* $P \leq 0.01$ ; \*\*\* $P \leq 0.001$ .

*df* = degrees of freedom.

## Discussion

ARIs, as recognized in day to day health practice, involve a wide variety of conditions and are caused by many different viruses and bacteria. They range from trivial rhinitis to fatal pneumonia. It is estimated that ARIs are responsible for 20%–60% of all health centre visits [5].

Of the prescriptions analysed, ARI accounted for more than one-third of diagnoses (36.1%), with approximately two-thirds of these affecting the upper, and one-third affecting the lower respiratory tract. Pharyngitis/tonsillitis and acute bronchitis were the most frequently diagnosed ARIs (41.3% and 31.9% respectively).

Table 3 Prescription of different drug categories according to diagnosis of acute respiratory infections (ARIs)

Category of ARI	Total pre-prescriptions	antibiotics		antipyretics		expectorants/antitussives		Prescriptions containing nose drops		vitamins		anti-histaminics		anti-asthmatics	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Common cold/influenza	95	44	46.3	77	81.1	40	42.1	21	22.1	32	33.7	16	16.8	0	0
Pharyngitis/tonsillitis	179	179	100	165	92.2	55	31.3	18	10.1	36	20.1	6	3.4	0	0
Acute bronchitis	138	135	97.8	106	76.8	103	78.3	16	11.6	14	10.1	14	10.1	25	18.1
Others <sup>a</sup>	21	20	95.2	15	71.4	9	42.9	2	9.5	2	9.5	4	19.0	1	4.8
Total ARIs <sup>b</sup>	433	378	87.8	363	83.8	108	78.3	57	13.2	84	19.4	40	9.2	26	6.0
$\chi^2$		184.8**		16.8**		62.7**		8.6*		21.3**		14.8**		47.7**	

\*  $P \leq 0.05$ ; \*\*  $P \leq 0.001$ .<sup>a</sup>Others included acute otitis media (8), croup (6), pneumonia (4) and sinusitis (3).<sup>b</sup>Eight prescriptions contained non-steroidal anti-inflammatory drugs and antiemetics. Others was added to bronchitis for  $\chi^2$  calculation.

Pneumonia, the most fatal, accounted for less than 1% of ARI diagnoses.

There were more urban than rural residents diagnosed with ARIs. This may be due to urban residents possibly having better access to primary health care centres, or being more willing to seek medical attention for ARIs. The most commonly represented age group was 1-4-year-olds, with diagnosis decreasing significantly after the age of 15 years. The significantly higher proportion of ARIs among male patients may be attributed to their exposure to cold weather chilling of the desert. ARIs were most often diagnosed during the colder seasons. All of these findings have been reported by others [1,2,6].

Antibiotics were the drugs most frequently prescribed for ARI patients, 87.8% of whom received one or more antibiotics. This high rate of antibiotics prescription for ARI has been reported in other regions of Saudi Arabia and in other developing and industrialized countries, for both children and adults [1-4,6-13]. Amoxycillin and other penicillins were the mostly frequently prescribed antibiotics. This agrees with the findings of others [2,14,15], and accords with the Saudi national protocol for diagnosis and treatment of ARI in the country [4].

Indiscriminate use of antibiotics should be discouraged. Antibiotics should be reserved for patients with group A streptococcal pharyngitis and for patients with identified bacterial complications such as otitis media, pneumonia or sinusitis [2,3].

There was a high rate of prescription of expectorants/antitussives, especially for acute bronchitis. It has been postulated that cough medicine, decongestants and antihistaminics are of

questionable effectiveness, and may even be hazardous, especially for children [1,3].

Antibiotics, expectorants/antitussives, nasal drops and antihistaminics were often prescribed irrationally for common cold/influenza. Well established palliative measures should be sufficient for the majority of cases of ARI, with emphasis on proper nursing at home. Continuation of breastfeeding, cleaning the nose, small and frequent feeds, avoiding tight and excess clothing to relieve respiratory difficulty and fever, and steam inhalation by any indigenous method are useful measures [5].

ARIs are difficult to prevent due to the multiplicity of agents, periodic antigenic changes, especially among viruses, and lack of specific treatment. Early case-finding and proper management are therefore very important [2]. Laboratory tools are not particularly useful in the diagnosis of ARI, so antibiotics should be used only

when clinically indicated. This will help to slow the emergence of resistant bacteria.

Concomitant with clinical therapies, disease prevention and other health promotion strategies (such as education of mothers, ventilation of homes and schools, and minimizing of air pollution) should be carried out.

Now is the time to implement the Saudi national protocol for diagnosis and treatment of ARIs to improve case-management, train staff and promote community awareness. Implementation of ARI control programmes elsewhere, such as in Pakistan, has resulted in a significant reduction in the prescribing of antibiotics and in ARI case fatality rates [13].

Adequate surveillance of ARIs is necessary to help reduce the morbidity and mortality attributable to ARIs, and to identify prevailing pathogens, define populations at risk and evaluate control measures.

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### **Integrated Management of Childhood Illness**

WHO and UNICEF have jointly developed a strategy called Integrated Management of Childhood Illness (IMCI) to improve child health globally. It addresses the main causes of death in children under 5 years of age, emphasizing both curative and preventive interventions, and complementing and enhancing existing programmes. The three main prongs of the strategy are improvement of health worker skills, improvement of health systems and improvement of family and community practices.

*Source:* EMRO at 50. The Work of the World Health Organization's Regional Office for the Eastern Mediterranean. *Page 15.*