

Pattern of varicella and associated complications in children in United Arab Emirates: 5-year descriptive study

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أنماط الحُمّاق والمضاعفات التي تصاحبه أطفال الإمارات العربية المتحدة: دراسة وصفية استغرقت 5 سنوات ساينا أودومان، محمد شيخ حسين، محمود بكير، عمر طراد، موسى الحوسني، ج. أودمان، فاروق شيخ

الخلاصة: كان الغرض من هذه الدراسة توصيف السمات الوبائية للحماق وللمضاعفات التي تصاحبه في إمارة العين في الإمارات العربية المتحدة خلال الفترة 2000 – 2004. وتراوح عدد الحالات المبلغ عنها بين 373 و 790 حالة لكل مئة ألف من السكان وكان معظم الحالات (89%) من الأطفال دون سن 15 عاماً، ومن بين 187 طفلاً احتاجوا للإدخال إلى المستشفيات كان لدى 50.3% منهم مرض حموي ناجم عن عدوى جرثومية ثانوية، ولدى 17.6% منهم مضاعفات عصبية. وقد بلغ معدّل الوفيات الإجمالي بين الأطفال الذين أدخلوا المستشفيات 1.1%، ونجحت الوفاة لديهم جميعاً عن المجموعة A من العقديات الغزوية. لقد أصبح الحماق والمضاعفات المصاحبة له لدى أطفال كانوا أصحاء قبل الإصابة به من المشكلات الهامة في الصحة العمومية وفي السيريات في الإمارات العربية المتحدة.

ABSTRACT The objective of this study was to characterize the epidemiology of varicella and varicella-associated complications in Al-Ain, United Arab Emirates (UAE) during 2000–04. The annual number of reported cases varied from 373 to 790 per 100 000 population. Most (89%) occurred in children < 15 years old. Of 187 children requiring hospital admission, 50.3% had febrile illness due to secondary bacterial infection and 17.6% had neurological complications. The overall mortality rate among hospitalized children was 1.1%, all due to invasive group A *Streptococcus*. Varicella and associated complications in previously healthy children is becoming an important clinical and public health problem in the UAE.

Évolution de la varicelle et des complications associées chez l'enfant aux Émirats arabes unis : étude descriptive sur 5 ans

RÉSUMÉ L'objectif de cette étude était de caractériser l'épidémiologie de la varicelle et des complications associées à cette maladie à Al-Ain, aux Émirats arabes unis (ÉAU), entre 2000 et 2004. Le nombre annuel de cas déclarés variait de 373 à 790 pour 100 000 habitants. La plupart des cas (89 %) se comptaient parmi les enfants âgés de moins de 15 ans. Sur 187 enfants nécessitant une hospitalisation, 50,3 % présentaient un syndrome fébrile dû à des infections bactériennes secondaires et 17,6 %, souffraient de complications neurologiques. Le taux de mortalité global chez les enfants hospitalisés était de 1,1 %, dans tous les cas à cause d'infections invasives à streptocoque du groupe A. La varicelle et les complications associées chez des enfants jusque-là en bonne santé sont en passe de devenir un problème clinique et de santé publique important aux ÉAU.

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Introduction

Varicella (chickenpox) is now a vaccine-preventable disease and has been included in the infant immunization schedule in many parts of the world [1,2]. Globally, this has led to an increased awareness of the importance of varicella and its epidemiology, immunology and clinical impact on the community [3–5]. To our knowledge the health impact of childhood varicella in the population of the United Arab Emirates (UAE) has not been quantified and the reported data on varicella-associated morbidity and mortality are limited [5–7]. Varicella is a reportable disease in the UAE and generally viewed as a self-limiting illness in healthy children. This study was carried out before the availability of varicella vaccine for UAE children. It aimed to map the background epidemiology of varicella over 5 years and record the clinical data of hospitalized children.

Al-Ain city is a traditional oasis, inland desert region with an estimated population of 475 000 [8]. The climate ranges between a relatively cool, dry winter and a hot, dry summer with minimal yearly rainfall. Al-Ain and Tawam hospitals are tertiary care centres providing health care services both for UAE citizens and for the multinational expatriate population residing in the region.

Methods

The varicella seasonality, disease incidences and age specificity were estimated from the varicella notifications compiled by the Department of Preventive Medicine at Al-Ain General Authority for Health Services [9]. All the notified cases were clinically diagnosed and reported by primary care clinic physicians.

Varicella-associated complications were derived from an established hospital-based

surveillance system and from the medical records of patients admitted to the general paediatric wards in Al-Ain and Tawam hospitals, teaching hospitals affiliated to the United Arab Emirates University. Data gathered from medical records included information about age, sex, nationality, reason for admission, type of complication, duration of hospitalization and disease outcome. A complication associated with varicella illness was defined as a condition or event occurring within 3 weeks of onset of skin rash.

Statistical analysis was carried out using Student *t*-test for comparison of continuous variables, confirmed by nonparametric Mann–Whitney *U*-test. Chi-squared analysis was performed to test for differences in proportions of categorical variables between ≥ 2 groups. In 2×2 tables, the Fisher exact test (2-tailed) was used when sample size was small. Chi-squared goodness-of-fit test was used for trend. $P < 0.05$ was considered as the cut-off value for significance.

Results

Incidence of varicella

The number of cases of varicella reported over the 5 consecutive years ranged from 1754 to 3712 cases each year, giving an annual incidence of 373–790 per 100 000 population. The monthly distribution and the seasonal wave of varicella cases are shown in Figure 1. There was a statistically significant difference ($P < 0.0001$) in the monthly rate of cases reported during the 5-year study period (with a strong peak during March–May). A higher proportion of the reported varicella cases were in males than females (58% versus 42%) and 80% were among UAE nationals.

A majority of cases (89%) occurred in children aged < 15 years. Age-specific

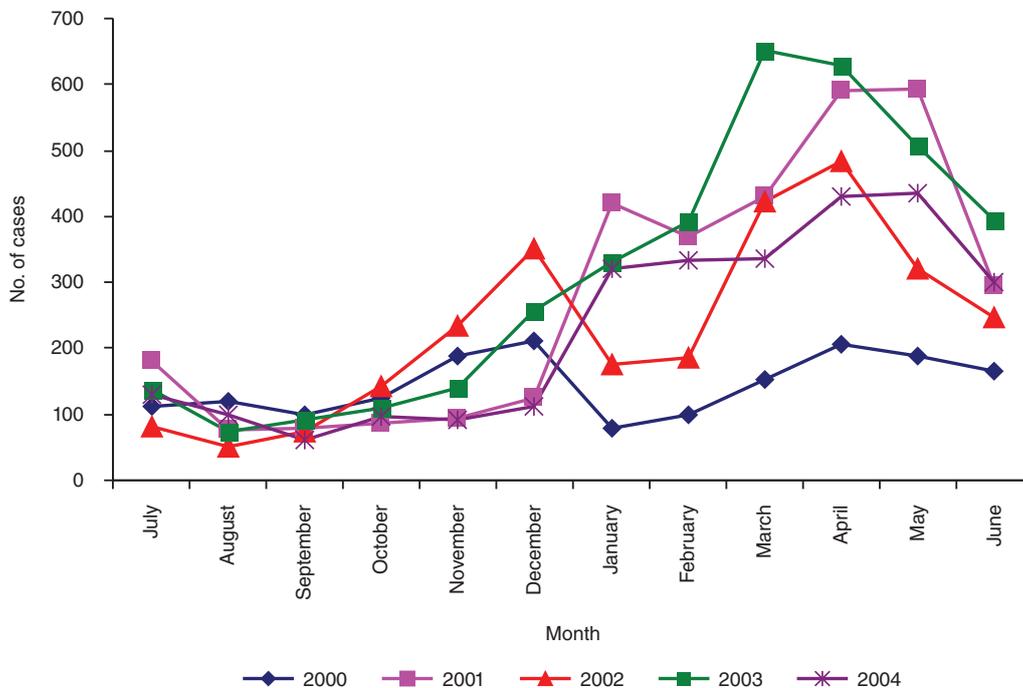


Figure 1 Monthly distribution of reported varicella cases in the United Arab Emirates, 2000–04

incidence was derived from population estimates of the Emirates Ministry of Health [8]. Over the 5 years, 2% of cases were in infants < 1 year old, 37% of cases occurred in preschool children aged 1–5 years (estimated annual incidence 129 per 1000 children) and 50% occurred in school-age children aged 6–15 years (89 per 1000 children). A history of recent household contact with siblings attending school was recorded in > 40% of varicella-infected children < 5 years of age.

Varicella-associated complications

Of the 187 children admitted to hospital 136 (72.7%) were < 5 years of age, including 10 neonates (22.5% aged 0–1 year and 50.3% aged 1–5 years), 25.0% were 6–10 years and 2.7% were 11–15 years. Mean age was 5.9

years. Length of hospital stay averaged 7.5 days. The number of admissions increased during the peak seasons of the year.

Table 1 records varicella-related illness among the hospitalized children, all of whom were reported to be healthy before contracting varicella. Bacterial infection was the reason in 94 cases (50.3%): secondary bacterial infection of the skin or soft tissue (47 cases, 25.1%) and respiratory tract infection, including clinical pneumonia, (45 cases, 24.1%) were the most common complications. Children with soft-tissue infections were younger than children with other complications. Group A *Streptococcus* and *Staphylococcus aureus* were the most common organisms identified. Two children died of group A *Streptococcus* septicaemia associated with soft tissue in-

Table 1 Varicella-associated illness among 187 hospitalized children in the United Arab Emirates, 2000–04

Associated illnesses	No. of cases	%	Remarks
<i>Fever</i>			
Prolonged primary fever	19	10.2	Bacterial cultures negative
Secondary fever associated with:			
Respiratory tract infection	38	20.3	Included otitis media & lower respiratory tract infection without radiological evidence of pneumonia
Superficial skin infection	36	19.3	Group A <i>Streptococcus</i> cultured in 8 cases & <i>Staphylococcus</i> spp. in 12 cases
Dehydration	29	15.5	
Pneumonia	7	3.7	X-ray evidence: segmental, lobular
Cellulitis of neck & groin	7	3.7	<i>Staphylococcus aureus</i> cultured in 5 cases
Invasive group A <i>Streptococcus</i> septicaemia	4	2.1	
Pyogenic arthritis	2	1.1	
<i>Neurological complications</i>			
Cerebellar ataxia	23	12.3	
Brief seizures	5	2.7	
Aseptic meningitis	3	1.6	
Encephalitis	1	0.5	
Acute transverse myelitis	1	0.5	
<i>Other</i>			
Hepatitis	7	3.7	
Thrombocytopenia	3	1.6	
Acute glomerulonephritis	2	1.1	
<i>Total</i>	187	100.0	

fection, representing an overall case fatality rate among hospitalized children of 1.1%.

There were 33 (17.6%) children admitted to hospital with neurological signs and symptoms (Table 1); 23 (mean age 6.2 years) presented with acute cerebellar ataxia 6–17 days (mean 8 days) after the onset of rash. Five febrile children (median age 1.9 years) presented with single brief seizures with no other associated neurological manifestations.

Discussion

Varicella is generally thought to be a benign disease and the systemic symptoms are usu-

ally mild in previously healthy children. In contrast, in adults varicella is frequently associated with complications and death, and the infection is known to be severe, progressive and often fatal among immunocompromised individuals, including neonates and children [10,11].

The UAE is a newly developed country with a divergent, multinational, working adult population in a desert climate. The epidemiology of varicella followed the pattern typical in temperate climates with infection acquired at an earlier age. It supports our own earlier study in the region that children of school-age lacked immunity against varicella [5]. The age susceptibility

to varicella zoster virus has regional and geographical variations [12,13].

There are no other varicella incidence figures or hospitalization data from the UAE for comparison. Infectious complications occurred mostly in children aged < 5 years, in agreement with earlier studies from the United States of America (USA) Canada and many European countries [12–14]. Over 60% of cases in the USA occur in children age 5–9 years, with 80% under 10 years of age [15,16]. In a recent study from Canada, the age groups 1–4 years and 5–9 years represented close to 80% of the annual cases of varicella, as in our study where 70% of cases were 1–10 years old [11].

There have been many reports in recent decades of varicella causing severe illness and occasionally fatalities in healthy children [17–19]. In industrialized countries, varicella caused more deaths and hospitalizations in previously healthy persons without underlying immunocompromising conditions [20,21]. We identified 187 children requiring hospitalization for varicella-associated complications during the 5-year observation period. Of these, 72.7% were aged < 5 years, including 10 neonates. Perinatally-acquired varicella infections were mild because of the passive immunoprophylaxis therapy administered after the mother's exposure to Varicella virus. Neonatal varicella can be serious, and without these drugs mortality rates may be as high as 31% [10,22].

Bacterial skin superinfections were the largest cause of complications in our hospitalized children, a finding that is consistent with previous epidemiological studies [18,19,21]. Recent reports warn of an increase in hospitalization for secondary bacterial infection, notably those caused by invasive group A *Streptococcus*. We cultured group A *Streptococcus* associated with soft tissue infection in 4 children,

2 of whom died. Suspicion of secondary bacterial infection should prompt early recognition when fever returns after initial defervescence. Considering the virulent nature of superinfection, especially with *Staphylococcus* and group A *Streptococcus* in varicella-infected children, it is prudent to institute empirical antimicrobial therapy in selected cases until the cultures become available.

CNS involvement was the second commonest complication, seen in 17.6% of hospitalized children, but no mortality was recorded. This rate of CNS complications was significantly higher than the 6% reported in Canada, but much lower than the 61% reported in previously healthy children in Germany [17,19]. Symptoms of postinfectious cerebellar ataxia appeared late in the course of varicella infection, as described in other reported studies. All the children recovered spontaneously and residual cerebellar syndrome persisted for 4 and 7 months in 2 cases. Five other children presented with brief febrile convulsions without other neurological abnormalities at the onset of varicella rash, presumably precipitated by the onset of fever. Long-term neurological outcomes and disability associated with varicella are often not reported, which hampers comparison.

To our knowledge this is the first reliable data published from the UAE on varicella. The study provides an insight into varicella-related clinical issues among previously healthy children in the region. While mortality from varicella is relatively rare for healthy children, the exact economic burden pertinent to childhood varicella morbidity is unknown in our health care context. Nationwide surveillance is needed to estimate the health and financial impact of varicella in our population while considering the introduction of varicella vaccine into the Expanded Programme on Immunization

in the UAE. Until then, varicella-related complications, hospitalization and death attributable to chickenpox will continue to occur among our children and nonimmune adult populations.

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National Health facility survey on the quality of outpatient primary child health care services: IMCI health facility survey Morocco October–December 2007

Integrated management of childhood illness (IMCI) was introduced in Morocco in 1997 as an integrated strategy to address the most important causes of mortality and morbidity in line with the primary health care approach.

This evaluation was conducted after 7 years of IMCI expanded implementation to collect information to assess the quality of outpatient health care services provided to sick children under 5 years old at health centres with IMCI- trained staff.

The full document can be downloaded at:

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