



The Brazilian Journal of INFECTIOUS DISEASES

www.elsevier.com/locate/bjid



Letter to the Editor

Prevalence of community acquired infections in down syndrome children: a single center study

Dear Editor,

Down syndrome (DS) is the most common chromosomal abnormality among live-born infants. In Egypt with 1.6 million births/year, there is estimated risk of 2285 DS births annually.¹ Children with DS have an increased risk of infections, especially respiratory tract infections, which can be of diverse pathogenic origin (e.g. viral, bacterial, fungal or a combination of these).² This increased susceptibility to infections has been linked to abnormal parameters of the immune system, as DS is the most common recognizable genetic syndrome associated with immune defects.³⁻⁵

There are few studies on the prevalence and causative pathogens of infections in DS children. We carried out a prospective observational study (March 2011 to March 2012) to determine the prevalence, and risk factors of infections in DS children attending the outpatient genetic clinic in Mansoura University Children's Hospital (MUCH). Our study included 123 (68.7%) males and 56 (31.3%) females. Their ages ranged from 6 months to 11 years. Of these, 68 (38%) patients (44 males and 24 females) had manifestations of infection of the respiratory tract, urinary tract, eye, blood stream, or skin.

Specimens included 35 sputum, 13 throat swabs, 8 conjunctival swabs, 6 urine specimens, 5 blood samples, and one skin swab. Specimens were inoculated on blood agar with optochin disc (Oxoid, UK), incubated at 37 °C aerobically, Chocolate agar (Oxoid, UK) incubated in 5–10% CO₂ for *Haemophilus influenzae*, MacConkey agar (Oxoid, UK) for Gram-negative bacilli. Lowenstein Jensen media (Oxoid, UK) was used to exclude *Mycobacterium tuberculosis* and Sabouraud dextrose agar (Oxoid, UK) for fungi. Laboratory identification of bacterial and fungal isolates was performed by colony morphology, Gram stained films, and biochemical reactions.

Infections were detected among 68 out of 179 patients (38%). Most infections (60%) occurred during summer. The types of infection were lower respiratory tract infections (LRTIs) (51.5%); upper respiratory tract infections (URTIs) (19.1%); conjunctivitis (11.8%); urinary tract infection (UTI) (8.8%); blood stream infection (7.4%), and skin infection (1.5%). *Staphylococcus aureus* accounted for 29.4% of isolated pathogens and were most prevalent among skin infections (100%), conjunctivitis (75%) and URTIs (30.8%). *Streptococcus pneumoniae* came second (14.7%) and were isolated from URTIs (23.1%) and LRTIs (20%). *Candida* spp. and *Escherichia coli* were

Table 1 – Risk factors associated with infection among down syndrome children.

Risk factor	Total No. of infected DS children = 68	OR (95% CI)	p-Value	
Gender (No.)	Male (44)	0.84 (0.58–1.41)	0.37	
	Female (24)	1.12 (0.87–1.46)		
Gestational age (No.)	Preterm (14)	5.71 (1.96–16.65)	<0.001	
	<2 years (30)	1.57 (1.05–2.28)	0.019	
	2–4 (24)	0.66 (0.43–1.0)	0.036	
Age (No.)	>4 (14)	0.96 (0.55–1.52)	0.87	
	Season (No.)	Spring (5)	0.22 (0.08–0.5)	<0.001
		Summer (41)	2.94 (1.99–4.21)	<0.001
Autumn (9)		0.65 (0.32–1.16)	0.13	
Residence	Winter (13)	0.94 (0.53–1.51)	0.8	
	Urban (29)	0.81 (0.56–1.13)	0.19	
	Rural (39)	1.21 (0.88–1.62)		
Associated co-morbidity (No.)	CHD (36)	1.43 (0.99–2.02)	0.036	
	Chronic lung disease (19)	1.82 (0.97–3.43)	0.041	

CHD, congenital heart disease.

the most frequent pathogens isolated from cases of UTI (33.3%). Of the total bacterial isolates 16.7% were multi-drug resistant (MDR) and they included 4 MRSA, 2 *Proteus mirabilis*, one *Klebsiella pneumoniae*, one *Pseudomonas aeruginosa* and one *H. influenzae*. Preterm, age less than 2 years or between 2 and 4 years, summer months, congenital heart disease and chronic lung disease were significant risk factors of infection (Table 1).

In conclusion, respiratory tract infections represent the commonest infection form in DS children in our locality. Also, the emergence of MDR adds additional burden to the problem. Finally, the patterns of infections are seasonally changeable. In line with our findings, we recommend wise use of antibiotics to limit the emergence of MDR bacteria in this group of patients. Furthermore, pneumococcal vaccine should be added to the compulsory vaccination schedule given to DS children in Egypt.

Conflict of interest

The authors declare no conflicts of interest.

REFERENCES

1. El-Sobky E, Elsayed S. Down syndrome in Egypt. *Egypt J Med Hum Genet.* 2004;5:67-78.
 2. Selikowitz M. Health problems and health checks in school-aged children with Down syndrome. *J Paediatr Child Health.* 1992;28:383-6.
 3. Cruz NV, Mahmoud SA, Chen H, Lowery-Nordberg M, Berlin K, Bahna SL. Follow-up study of immune defects in patients with dysmorphic disorders. *Ann Allergy Asthma Immunol.* 2009;102:426-31, [http://dx.doi.org/10.1016/s1081-1206\(10\)60516-9](http://dx.doi.org/10.1016/s1081-1206(10)60516-9).
 4. Cossarizza A, Ortolani C, Forti E, et al. Age-related expansion of functionally inefficient cells with markers of natural killer activity in Down's syndrome. *Blood.* 1991;77:1263-70.
 5. de Hingh YC, van der Vossen PW, Gemen EF, et al. Intrinsic abnormalities of lymphocyte counts in children with down syndrome. *J Pediatr.* 2005;147:744-7.
- Waleed Eldars^{a,b,*}, Heba Eldeglia^{a,b}, Sohier Yahia^c, Mohamed Abou Ela^{a,b}, Samia Hawas^{a,b}
- ^a Medical Microbiology and Immunology Department, Mansoura Faculty of Medicine, Mansoura University, Mansoura, Egypt
^b Microbiology Diagnostics and Infection Control Unit, Mansoura University Hospitals, Mansoura, Egypt
^c Genetics Unit, Department of Pediatrics, Faculty of Medicine, Mansoura University Children's Hospital, Mansoura, Egypt
- *Corresponding author at: Mansoura Faculty of Medicine, Mansoura University, Mansoura, Egypt.
- E-mail addresses: wellydars@gmail.com, wellydars@mans.edu.eg (W. Eldars).

Received 11 February 2013

Accepted 2 May 2013

Available online 30 July 2013

1413-8670

© 2013 Elsevier Editora Ltda.

Este é um artigo Open Access sob a licença de [CC BY-NC-ND](https://creativecommons.org/licenses/by-nc-nd/4.0/)
<http://dx.doi.org/10.1016/j.bjid.2013.05.002>