



THE CEYLON MEDICAL JOURNAL

Established 1887

The Official Publication of the
Sri Lanka Medical Association
Volume 55, No.4, December 2010
Quarterly ISSN 0009-0875

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Continued overleaf

Preventive strategies for acute respiratory infections in children

Acute respiratory infections (RTIs) are a cause of significant morbidity and mortality in adults and children. In children it accounts for a considerable proportion of the under-5 year mortality, particularly in the developing world [1]. Although there are several modalities of treatment, the age old cliché “prevention is better than cure” applies to RTIs as well. Preventive strategies range from the simple to the very complex, and some are based on good evidence while others are not; some have evoked concerns regarding their long term implications.

Several physical measures have been shown to be useful in preventing RTIs. One that has been clearly shown to be of benefit in most age groups is frequent hand washing [2]. This is particularly effective in children [3] and neonates, and is of great value in preventing nosocomial respiratory infections [4]. Wearing masks (especially N95 masks), wearing gowns, and the combination of hand washing and wearing gowns, masks and gloves are effective in preventing spread of respiratory viruses [5]. There is also evidence that gargling with water, with or without povidone-iodine is useful to prevent upper RTIs [6]. There is limited information on the effectiveness of social isolation, social distancing and screening at entry ports to a country [5], although these have been used widely during epidemics and pandemics of viral infections. Of these measures frequent hand washing is the simplest strategy that can be used on a wide enough scale to obtain a substantial benefit.

Exclusive breastfeeding in the first 4 to 6 months of life reduces the frequency and duration of RTIs in infants under 6 months old [7]. There seems to be an extended advantage 6 months beyond cessation of breast feeding [8], and benefits from even partial breast feeding [9]. Adequate nutrition, and appropriate treatment and prevention of malnutrition are also well recognised preventive strategies [10]. These measures could be instituted on a nation-wide basis, although poverty, social inequity together with poor general education and illiteracy, would limit their implementation. There is considerable interest in the role of dietary and non-dietary supplements in preventing RTIs, particularly in children. Zinc supplementation in children is known to be useful, but other supplements such as iron, vitamins A, C and D are not. Anti-viral adamantane drugs such as amantadine and rimantadine are useful in the prevention of influenza A in all age groups, and neuraminidase inhibitors such as oseltamivir and zanamavir are effective in prophylaxis of influenza A and B. Probiotics in general use have no protective effect, but may lower the risk of nosocomial RTIs in hospitalised children [11].

Much work has been done on the role of immunisation in the prevention of RTIs. The recent viral epidemics and pandemics have aroused interest in

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Published by

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Fax: +94 11 2698802

Internet home page

<http://www.sljol.info/index.php/CMJ/index>

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Printed by

Ananda Press
82/5, Sir Ratnajothi Saravanamuttu
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Medical Journal

**This journal is indexed by BIOSIS,
Elsevier SCOPUS, EMBASE, CABI, and
Index Medicus/Medline**

the use of influenza vaccines. These vaccines, especially the live attenuated intra-nasally administered ones, have been found to be effective in children [12] and the elderly [13], two age groups that are particularly vulnerable to influenza. In preliminary studies the recently developed monovalent vaccines against influenza H1N1 strains have also shown promising results [14]. Two vaccines against bacterial infections, one against *Haemophilus influenzae b* and the other against *Streptococcus pneumoniae* have also been shown to be effective in preventing acute RTIs. The former has been in use for around 30 years, and has led to a 99% reduction in diseases caused by the organism, including epiglottitis and lower RTIs. The newer protein-polysaccharide pneumococcal vaccine has been in use for a considerably shorter period. Depending on the preparation, it covers only 7, 10 or 13 of the more than 90 strains of pneumococci. In the developed world, where this vaccine has been in use for the past ten years, its effectiveness in preventing pneumonia has been established. However, in countries with high rates of vaccine coverage there are concerns regarding the emergence of invasive disease caused by pneumococcal strains that are not covered by the vaccine [15]. There have also been reports of a few deaths, that occurred in the Netherlands, following administration of the vaccine, although causality was not established. As the vaccine is also quite expensive, the necessity for its use in countries, such as Sri Lanka, where pneumococcal respiratory infections do not seem to be a major problem, is debatable. An orally administered ribosomal vaccine, prepared from the ribosomes of four organisms causing recurrent RTIs, has shown significant protection against both bacterial and viral infections [16]. Though convenient to use this vaccine too is expensive.

Although there is scientific evidence on the usefulness of many of the measures mentioned in this article, it is essential that safety, cost-effectiveness, social and cultural factors, and the ability to implement these measures be taken into account when deciding on a national policy for prevention of childhood RTIs. These considerations are even more important for developing nations, which are both resource poor and have the highest disease burden due to RTIs. There must be careful assessment and selection of measures that are likely to be most beneficial.

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