

## Childhood Nutrition and Prevention of Rheumatic Fever

Rheumatic heart disease (a remote sequel of rheumatic fever [RF]) remains a public health problem in many developing countries. Worldwide, RF prevention activities have been directed largely toward secondary prevention using penicillin. This approach, however, cannot prevent rheumatic heart disease in many instances because penicillin cannot stop the rheumatic process that has already been started. It can prevent further attacks only. On the other hand, the primary prevention using penicillin to treat pharyngitis is partially effective because many children with streptococcal pharyngitis do not seek treatment. The symptoms are either mild to seek treatment or treatment of pharyngitis is not considered important by the parents because of its self-limiting nature.

Even after streptococcal pharyngitis by rheumatogenic strains, most of the children escape an attack of RF. Up to 97% of the strep pharyngitis cases do not lead to RF, even in an epidemic situation. It is still an enigma why some people develop RF and some do not. Good diet and nutritional status can be an important factor that “conditions” the body for escaping an RF attack.

Studies conducted almost half a century ago found that overall malnutrition is associated with RF [1,2]. They observed low intake of some foodstuffs such as eggs, milk, and meats in rheumatic subjects. The anti-inflammatory roles of phospholipids and palmitamide are also considered important to suppress hyper-responsiveness of the susceptible subject and thus maturation of the rheumatic process [3]. Thus, nutrition is considered as a conditioning factor for children to escape a rheumatic attack after streptococcal pharyngitis depending on the degree of virulence of the streptococci. Optimum dietary intake and better nutritional status give some degree of protection to the child from becoming easy prey of this enigmatic disease.

Recently, we found in Bangladesh that RF is associated with chronic undernutrition as indicated by low height for age [4]. Intake of eggs was found to be lower in rheumatic cases than in nonrheumatic control subjects. Use of soybean oil was found to be more protective than mustard oil was [5]. These findings are in agreement with the convictions that phospholipids and palmitamides are

protective for RF because both soybean oil and eggs are rich in these chemicals. Rheumatic subjects also had low levels of serum albumin and body iron stores [6]. Therefore, nutrient-specific conditioning of the host’s body may have a conviction of rheumatogenic susceptibility.

Malnutrition in early life leads to an imbalance of the immune system, and autoimmune diseases are thought to result from such an imbalance [7]. In economically deprived populations, malnutrition in early life is common, and individuals could be hypersensitized by immune imbalance, especially if they are genetically susceptible [8]. Future exposure to rheumatogenic streptococci in such individuals should have a higher probability of getting an RF attack.

Finally, although the specific micronutrient deficiencies described may be important, it is also possible that malnutrition and energy depletion may play a role in susceptibility even beyond the specific nutrient deficiencies posited. Primary prevention of RF in developing countries should consider childhood nutrition (maybe pregnant mothers’ nutrition as well) as an essential component.

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### REFERENCES

1. Coburn AF. The continuous association of poverty with intensity of rheumatic fever. *Am J Med Sci* 1960;240:687–700.
2. Wallis AD. Dietary eggs and rheumatic fever. *Am J Med Sci* 1954;227:167–70.
3. Wallis AD, Viergiver E. Serum phospholipid and rheumatic fever. *J Med Sci* 1954;227:171–8.
4. Zaman MM, Yoshiike N, Chowdhury AH, et al. Socio-economic deprivation associated with acute rheumatic fever: a hospital-based case-control study in Bangladesh. *Pediatr Perinat Epidemiol* 1997;11:322–32.
5. Zaman MM, Yoshiike N, Chowdhury AH, et al. Nutritional factors associated with rheumatic fever. *J Trop Pediatr* 1998;44:142–7.
6. Zaman MM, Yoshiike N, Rouf MA, et al. Association of rheumatic fever with serum albumin and body iron stores in Bangladeshi children: case-control study. *BMJ* 1998;317:1287–8.
7. Krause RM. Acute rheumatic fever: an elusive enigma. *J Allergy Clin Immunol* 1986;77:282–90.
8. Zabriskie JB. Rheumatic fever: the interplay between host, genetics, and microbes. Lewis A. Conner memorial lecture. *Circulation* 1985;71:1077–86.

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