Editorial

The Prevention of Acute Respiratory Infection and Vitamin D Supplementation

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Among the leading causes of under 5 mortality and morbidity in Bangladesh, Acute respiratory infections (ARI) are at the top of the list .These are a major cause of global mortality and morbidity and are responsible for 10% of ambulatory and emergency department visits in the USA[1] and an estimated 2.65 million deaths worldwide in 2013[2]. Observational studies report consistent independent associations between the low serum concentrations of 25-hydroxyvitamin D (the major circulating Vitamin D metabolite) and susceptibility of acute respiratory tract infections[3,4]. This Article highlights the indication of vitamin D supplementation in the prevention of acute respiratory Infection.

Vitamin D, or the "sun-shine vitamin", is not just as a vitamin; it is also prohormone with numerous functions in the body[5]. "Prohormone "refers to a group of fat soluble seco-steriods. The best-understood function of Vitamin D is in the absorption of calcium from the small intestine, which helps to prevent diseases such as rickets in children and osteoporosis and osteomalacia in adults[6]. In addition to causing rickets, vitamin D deficiency has been linked to respiratory infection such as tuberculosis and Bronchiolitis along with pneumonia[7]. The effects of Vitamin D are mediated by a cytosolic receptor called Vitamin D Receptor (VDR). VDR is ubiquitously expressed, and this ubiquity accounts for the numerous and varied mechanisms that are regulated by vitamin D[8]. The VDR gene, which is located on chromosome 12q13.1, has several polymorphic regions, some of which are associated with predisposition of certain diseases. This means that not only is vitamin D deficiency is associated with considerable risk of diseases, but there is wide interindividual variation in vitamin D sensitivity, which may influence risk [9].

Vitamin D has an important influence on the host's immune system, modulating both innate and adaptive immunity and regulating the inflammatory cascade. Vitamin D supports induction of antimicrobial peptides in response to both viral and bacterial stimuli, suggesting a potential mechanism by which vitamin D inducible protection against respiratory pathogens might be mediated[10-12]. Vitamin D metabolites have also been reported to induce other innate antimicrobial effector mechanisms, including synthesis of reactive nitrogen intermediates and reactive oxygen intermediates. These epidemiological and in vitro data have prompted numerous randomized controlled trials to determine whether vitamin D can decrease the risk of ARI. A total of five aggregate data meta-analyses incorporating data from up to 15 primary trials have been conducted to date, of which two reports statistically significant protective effects and three not statistically significant [13].

This heterogeneity might have arisen as a result of variation in participant characteristics and dosing regimens between trials, either of which may modify the effects of vitamin D supplementation on immunity of respiratory pathogens[14] .In this regard, it is very important to understand the definition of deficiency and insufficiency of vitamin D and how to treat this condition. Unfortunately, there is no consensus, although a level of at least 10ng/ml 25(OH)D is thought to be necessary to promote bone mineralization and calcium homeostasis and a concentration between 20ng/ml and 50 ng/ml is considered adequate to provide an immunomodulatory effect [15]. Overall , in children as well as in adults ,the term "Vitamin D deficiency" indicates values <20ng/ml, whereas insufficiency is defined as between 20ng/ml and 30ng/ml, with at least 30ng/ml required for optimal health benefits[16-18]. Although hypervitaminosis D is arbitrarily defined as 25 (OH) D concentrations >100ng/ml, symptoms of vitamin D intoxication typically do not manifest until circulating 25 (OH) D concentrations rise above 150ng/ml [19].

Now, a major role of vitamin D supplementation for the prevention of acute respiratory infections should be considered seriously specially for children, the most vulnerable group of population of the developing nations.

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