

Is Vitamin C Supplementation Associated with Low Birth Weight in Low and Middle Income Countries?

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Abstract

Globally, it is estimated that 16 per cent of the children are born with low birth weight (LBW), which means 22 million children are born with a birth weight of fewer than 2500 grams according to a definition of the World Health Organization (WHO). Around 96 per cent of LBW children are born in low- and middle-income countries with prevalence is as high as 38 per cent. Nearly, 2.7 million children die each year during the first month of life which is around 45 per cent of all under-five death. Recent estimates from Pakistan suggests that with an annual birth cohort of five million children, 16% are preterm and 32 % are LBW, which is translated into 1 million babies are risk of death due to LBW. The role which Vitamin C could play in preventing LBW or whether it is associated with LBW, is currently not only provocative, but also demanding public health researchers from countries like Pakistan to fill the gaps and should perform quality research in this area of interest.

Keywords: Vit-C • Low birth weight (LBW) • LMIC

Introduction

Globally, it is estimated that 16 percent of the children are born with 'low birth weight LBW', which means 22 million of children are born with a birth weight of less than 2500 grams according to a definition of the World Health Organization (WHO) [1]. Around 96 percent of LBW children are born in low- and middle-income countries with prevalence is as high as 38 percent. Nearly, 2.7 million children die each year during the first month of life which is around 45 percent of all under-five death. LBW attributable to 60 to 80 percent of all neonatal deaths. The low birth weight is associated with two major risks during pregnancy, the intrauterine growth restriction small for gestational age and/or premature birth i.e. 'born too small or too soon or both'. It now is considered as a multifaceted public health threat in countries like Pakistan. Recent estimates from Pakistan suggests that with an annual birth cohort of five million children, 16% are preterm and 32% are LBW, which is translated into 1 million babies are the risk of death due to LBW. It is now established fact that LBW is a foremost contributing factor of mortality, morbidity and disability among child population and also has great influence on health outcomes during adult life [2]. LBW is grossly connected with maternal factors during pregnancy, the nutritional status of the mother is key in this regard to define either born too small or too soon babies. Even though there is strong evidence that the poor nutritional status of the mother is strongly associated with LBW incidence, but there is strong need to review and determine the role of micronutrients during pregnancy in exclude the risk of Vitamin C or Ascorbic acid is one of the key micronutrient of importance, is a water soluble vitamin which is essential for human body

functions in several manner. Chemically, it is an antioxidant in nature, i.e. is considered an electron donor antioxidant or reducing agent. Vitamin C is essential for its role in hydroxylation of amino acids lysine and proline residues in the collagen protein of joints and connective tissue. Facilitation in iron absorption, carnitine and neurotransmitter biosynthesis, reductive protection of folic acid and reductive regeneration of vitamin E are the other important functions of in human body. The literature supports the fact that this vitamin could prevent premature birth and linked with this also chances of LBW babies. The Premature rupture of chorioamniotic membranes PROM could affect 10-20% of the pregnancies and lead to premature birth. Therefore, PROM alone can lead to one third of all preterm births with high neonatal mortality and morbidity associated with preterm and resultant LBW. Maternal malnutrition of micronutrients, especially Vitamin C deficiency, may be a risk factor for PPRM and LBW, because of an integral role of its in-collagen synthesis, collagen secretion, and lysis of collagen processes. However, findings from different trial conducted in developed countries showed that combination supplementation of Vitamin C and E, the risk of PROM and LBW is increased and some other findings are still unclear where around 36% reduction in placenta abruption is reported with alone use of this vitamin [3]. Linking to this many studies has unclear recommendations for the use of Vitamin C supplementation during pregnancy based on the findings whether it leads to premature births and resultant LBW, the major findings are although from the developed world. According to WHO, therefore the combination supplementations of C and E or alone is not recommended during pregnancy to improve perinatal outcomes and mentioned instead that it may lead to PROM and LBW. Whether use of this vitamin during pregnancy in already undernourished pregnant women of LMIC is associated with LBW or protective, is unclear. However, in some studies from LMIC showed promising result and a few authors gave strong endorsements that supplementation of Vitamin C is rather beneficial in preventing poor perinatal outcomes. One of the studies showed substantial benefit of supplementation in reducing LBW and IUGR birth among deficient pregnant mother of this vitamin and linked it with preventing the chances of developing PROM. The role of role of Vitamin C in preventing indirect risk factors of LBW like pre-eclampsia, is also studied in LMIC, showed positive findings [4,5]. Further at study from Egypt, there is also a positive correlation between maternal and neonatal vitamin C levels at the time of birth, with significant correlations between maternal levels and birth weight and length and placental weight. Many researchers recommend to include Vitamin C as a supplementation as many women are deprived of quality food which includes vegetable and fruits. The findings, which are mostly from the developed world are still very much controversial and missing the findings from LMIC. The role which Vitamin C could play in preventing LBW or whether it is associated with LBW, is currently not only provocative, but also demanding public health researchers from countries like Pakistan to fill the gaps and should perform quality research in this area of interest. Therefore, establishing a dialogue in the form of this communication is important to create a surge for developing strategies for potential interventions and research needs based on current available data. Because Vitamin C supplementation is essential for comprehensive study of the multifaceted disputes involved in preventing LBW.

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