In recent years, a considerable number of well-designed intervention trials have been completed in many parts of the world—including both lower-income and industrialized countries—to assess the impact of zinc supplementation in populations thought to have an elevated risk of zinc deficiency. These studies have confirmed the critical importance of adequate zinc nutriture to support child growth, reduce the risk of common infections, prevent adverse outcomes of pregnancy, and improve other aspects of human health and function. Because of the likely widespread occurrence of zinc deficiency, especially in low-income groups, and the important health consequences of this condition, efforts are needed to define more precisely the risk of zinc deficiency in vulnerable populations and to develop programs to control this condition where necessary.

The present document was prepared by the Steering Committee (SC) of the newly established International Zinc Nutrition Consultative Group (IZiNCG) and several other experts in zinc nutrition invited by IZiNCG to assist in its preparation. The SC was appointed by the United Nations University’s Food and Nutrition Program for Human and Social Development (UNU/FNP) and the International Union of Nutritional Sciences (IUNS). The document was reviewed by 10 independent experts selected by the UNU/FNP and the IUNS. The IZiNCG’s response to the reviews was assessed by two additional reviewers appointed by the UNU/FNP and IUNS. Therefore, the present publication reflects the input from experts both within and outside the IZiNCG SC.

This document’s primary objective is to provide a summary of current knowledge on zinc as it pertains to public health issues, primarily in low-income countries. It presents a comprehensive background review of information on zinc metabolism, zinc requirements, risk factors for zinc deficiency, methods of assessing population zinc status, and available options for developing intervention programs to control zinc deficiency. The document is not intended to replace current reference values set by other international or national agencies with normative and/or policy roles, but to assess the scientific support of current reference values and to make recommendations for their reevaluation as appropriate. The implication of these considerations to available options for developing intervention programs to control zinc deficiency is also a key focus of this report.

Because this information has not been summarized previously in a single text, we have intentionally presented the material in some detail. An abbreviated companion document will be made available subsequently to facilitate access to the key points that need to be considered prior to designing programmatic interventions. The present document should be useful to nutrition researchers concerned with health-related aspects of zinc nutrition and to other health professionals who are planning nutrition and/or health surveys and public health intervention programs.

Introduction

During the first half of the 20th century, researchers discovered that zinc is essential for the normal growth and survival of higher plants, poultry, rodents, and swine [1]. Despite these observations, many nutritionists doubted that zinc deficiency occurred in humans because of the element’s ubiquitous distribution in the environment and the lack of obvious clinical signs of deficiency in presumably high-risk human populations. Nevertheless, evidence of human zinc deficiency began to emerge during the 1960s, when cases of zinc-responsive dwarfism and delayed sexual maturation were first reported among Egyptian adolescents [1]. Since then, clinical studies of children with acrodermatitis enteropathica—an inborn error of zinc metabolism that results in poor zinc absorption and, consequently, in severe, secondary zinc deficiency—have ascertained the critical role of zinc in physical growth of humans and normal functioning of the gastrointestinal tract and immune system [2].

Since these early observations in people with
References