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Future Trends in Trace Element Research in Health and Disease

Agriculture was probably introduced by Homo sapiens around Nile valley, Mesopotamia, Indus basin and other areas of early civilizations around 10-12000 years ago. The eating habits of our hunter-gatherer ancestors changed drastically after the invention of fire and knowing the secrets of seeds. With the advances in technology and instrumentation, the early practice of agriculture improved tremendously and our ancestors quickly learned to domesticate crops ultimately crossbreeding different plants to create such staple grains such as wheat, rye and barley. Our dietary habits changed further after the advent of industrialization a couple of centuries ago. The introduction of fertilizers and other chemicals to boost the production of crops resulted in the contamination of soil and water. The percentage of heavy metals in the environment increased significantly and this in turn affected the plants and aquatic life. During the last century, much new information has accumulated on the function and requirements of trace elements which are micronutrients that cannot be synthesized by living cells. Although starvation and malnutrition are restricted to certain poverty-stricken areas of our planet, it has become increasingly evident that subclinical symptoms due to micronutrient deficiencies are fairly common even in affluent countries. According to recent estimates by the World Health Organization (WHO) and the Food and Agricultural Organization (FAO), nearly a third of the world's population suffers from symptoms of iron and iodine deficiency. Marginal deficiency of other trace elements such as zinc and selenium is probably of the same magnitude, but unrecognized. Recent supplementation studies in Africa, Bangladesh and South America indicate the relevance zinc in human health and disease. A lack of characteristic symptoms and diagnostic tools is the main reason that trace element deficiencies are not detected at an early stage. Even when the dietary intake is restricted, the body functions are maintained for a certain interval by homeostatic mechanisms by making use of the body reserves. An ideal approach to study the long-term effect of a certain trace element deficiency such as zinc is to follow vulnerable groups in the general population. The ideal groups are children, pregnant women, elderly and alcoholics. Another possibility rests in therapeutic trials. The response to iron and iodine supplementation in populations suffering from iron-deficiency anemia and goiter due to iodine deficiency are classical examples illustrating the impact of supplementation. Zinc supplementation in children and the positive response to growth is another example. Until very sensitive, affordable and specific tests are readily available for routine use to detect early signs of deficiency, prevention must be attempted in general populations. It is a lot cheaper to do such studies in poor countries than in industrialized ones. A great deal of thought and effort have been made in the past to identify priority action at the individual, household, community, national, regional and global levels. Unfortunately nothing much has happened when it comes to trace element nutrition in developing countries. Apart from population explosion and poverty, the fast growing countries in Asia, Africa, and South America are forced to cope with serious environmental pollution. With rapid industrial growth, many harmful substances are dumped in our environment. Acid rainfalls from the polluted atmosphere will affect the soil which in turn will affect the availability of trace elements to plants, animals and humans. These trends ultimately are bound to affect the very survival of our species. This paper will give an outline of the current trace element status in the world.

Biography

Mohamed Abdulla has completed his Md-PhD from the University of Lund, Sweden and currently working as professor of medicine for the Swedish medical board. He has published over 300 original publications and several chapters in textbooks. He is currently active in the field of diet and aging.

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