Risk factors of colorectal cancer in Linxian, China: A nutrition intervention trial with 30 years follow-up

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Introduction: Colorectal cancer (CRC) is one of the most common cancers in the world. Epidemiological and experimental studies have shown that some dietary factors and vitamins/minerals are associated with the risk of CRC. The Nutrition Intervention Trial (NIT) tested whether daily multivitamin/mineral supplements could reduce the incidence and mortality rate of esophageal/gastric cardia cancer. The current study evaluated the CRC risk factors at the NIT population.

Methods: After over than 30 years follow-up, 179 CRC cases were identified. Risk factors were evaluated for the development of CRC among 29,594 adults supplemented for 5.25 years according a 24 fractional factorial study design between 1986 and 1991 (factor A [5000 IU vitamin A and 22.5 mg zinc oxide], factor B [3.2mg riboflavin and 40 mg niacin]), factor C [120 mg ascorbic acid and 30 ug molybdenum], and factor D (30 ug selenium, 30 mg alpha-tocopherol, and 15 mg beta-carotene]). Using this large cohort with 30 years of follow-up that was initially established as a randomized controlled trial of upper gastrointestinal cancer and multivitamin/mineral intake conducted in rural Linxian, China, we evaluated whether demographic characteristics, food items, and intake of vitamins/minerals are associated with the risk of CRC development.

Results: When the effects of four different intervention factors were assessed in the total cohort, no associations were observed. However, subgroup analyses showed that CRC was decreased by 38% in females who received Factor D (selenium/alpha-tocopherol/beta-carotene) (RR = 0.62, 95% CI = 0.43-0.92, P = 0.015) compared to females who did not get Factor D.

Conclusion: This study showed that increased risk of CRC was associated with age, height, and weight. Furthermore, piped water, increased consumption of food cooked in oil, eggs, fresh vegetables, and fruits were associated with increased risk of CRC. However, higher intake of selenium, alpha-tocopherol, and beta-carotene were protective factors for CRC risk. Some of these associations were dependent on the age and gender subgroups. To account for the racial/ethnic differences of the intervention effect we were not able to find similar multivitamin intervention studies’ information from the Chinese population, therefore we had to review other studies of immigrants or other countries. This is one of the largest and most comprehensive evaluations of CRC risk factors in rural Chinese people to date by the prospective design randomize clinical intervention cohort study.