Joint Effects of Serum Zinc with Red Meat Intake and Obesity on the Risk of Colorectal Cancer: A Case-Control Study

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ABSTRACT

BACKGROUND: High red meat intake, obesity and low level of zinc have been reportedly associated with colorectal cancer (CRC) risk. The aim of the present study was to explore the interaction between serum zinc with red meat intake and obesity on CRC risk. **METHODS:** Patients with CRC and the controls were recruited for the information on red meat intake, body mass index and blood sample. The serum samples of 204 patients of CRC and controls were analysed for Al, Zn and Co using Inductively Coupled Plasma Mass Spectrometer (ICPMS). Multiplicative interaction was assessed through a cross-product interaction term in a multiple logistic regression model. The presence of addictive interaction was evaluated by calculation of the relative excess risk due to interaction (RERI) and attributable proportion due to interaction (AP). **RESULTS:** The odds ratios (ORs) of the serum zinc-red meat intake product term on a multiplicative scale in the univariate and multivariate models were 5.49 (95% confidence interval, 95%CI: 3.48, 8.65) and 0.53 (95%CI: 0.04, 7.34), respectively. There was also evidence for interaction on an additive scale; the RERI and AP in the univariate model were 0.27 (95%CI: 0.03, 0.50) and 0.92 (95%CI 0.83, 1.01), respectively. After adjusting for the potential confounders, the value of RERI 0.22(95%CI: -0.13, 0.57) and AP 0.95 (5%CI: 0.89, 1.03). While for obesity factor, the serum zinc-obesity product term on multiplicative scale were 3.68 (95%CI: 1.41, 9.57) in univariate model and 4.55 (95%CI: 0.33, 62.85) in multivariate model. The value of addictive scale, RERI; 0.07(95%CI: -0.02 to 0.15), AP; 0.57(95%CI: 0.18, 0.97) in univariate model and RERI; 0.05(95%CI: -0.05, 0.15) and AP; 0.65 (95%CI: 0.04, 1.26) in multivariate model. **CONCLUSION:** Serum zinc and red meat intake interact strongly and synergistically influence the risk of CRC compare to obesity factor. Further investigations with big sample size are necessary for confirming this additive interaction.

KEYWORDS: CRC, Trace element, interaction, red meat, obese

Largest Acute Chemical Incident in Malaysia, March 2019: Opportunity to Assess the Preparedness and Response Capacity

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ABSTRACT

INTRODUCTION: Johor State reported Malaysia's largest chemical emergency from 7th to 20th March 2019, following illegal dumping of industrial toxic waste into a river. A total of 5,039 students and residents in the area were affected, with 1,228 hospitalised and 26 treated in Intensive Care Units with an incidence rate of 10.8%. No deaths were reported. Following the stand down, an After Action Review (AAR) was conducted to assess the chemical incident preparedness and response and identify strategies for improvement. **METHODS:** Facilitated focus group discussions among the key responders was undertaken by Ministry of Health to qualitatively review selected actions in response to this significant incident. The aim was to capture the response activities, determine strengths and weaknesses, and document lessons learned. The elements reviewed were coordination and communication, emergency response, laboratory functions, risk communication and case management. **RESULTS:** The existing Incident Management System functioned in-line with General Guideline on Disaster Management. Major successes were the effective multisectoral coordination, rapid emergency response and efficient patient management. Major challenges included: the chemicals were initially unknown, hence the lack of knowledge of the hazards and risks involved; inadequate use of PPE and decontamination procedures; limited laboratory capacities for testing chemicals; and delayed risk communication. **CONCLUSION:** The AAR identified strengths and areas that require improvement for better preparedness and response to a chemical emergency. An incident management protocol was developed specifically for handling chemical incidents. This addresses key areas such as information sharing, risk and crisis communication, enhanced laboratory capacities and building human skills through training and exercises.

KEYWORDS: Mass casualty, chemical incident, After Action Review (AAR), Lessons learned