

APRU Global Health Conference 2021

GLOBAL URBAN HEALTH

16-18 November 2021

The University of Hong Kong, Pokfulam, Hong Kong



Saw Swee Hock
School of Public Health



Abstract No.

Abstract Title

77

Serum micronutrients and prostate cancer risk: The Singapore Prostate Cancer Study

Theme

Non-communicable diseases

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Background



Micronutrients, such as **vitamin A**, **carotenoids** and **vitamin E**, are required by the body in **trace amounts**.ⁱ Studies on the role of these micronutrients in prostate cancer remain **inconclusive**.ⁱⁱ



Purpose

- To assess **associations** between serum concentrations of 15 **micronutrients** and **prostate cancer risk**
- To evaluate potential **effect modification** by **lifestyle factors**
- To assess **mixture effects** of multiple micronutrients

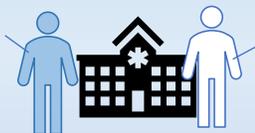
Methods

Hospital-based case control study

April 2007 to May 2009

Males aged 50-85 years diagnosed with histologically-confirmed prostate cancer

156 cases



118 controls

Male patients from other disciplines, frequency-matched by ethnicity and age



Liquid chromatography-tandem mass spectrometry

- Measuring the serum concentrations of the following micronutrients:

retinol, lutein, zeaxanthin, α -cryptoxanthin, β -cryptoxanthin, α -carotene, β -carotene, lycopene, ubiquinone, δ -tocopherol, γ -tocopherol, α -tocopherol, δ -tocotrienol, γ -tocotrienol, and α -tocotrienol

Multiple logistic regression and Weighted Quantile Sums (WQS) regression



- Adjusted odds ratio (ORs) and 95% confidence intervals (95% CIs) of prostate cancer risk with micronutrients, individually or in groups.
- Stratified analyses and a cross-product interaction term of potential modifier and micronutrient levels were used to evaluate effect modification.

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Results

Table 1. Characteristics of study population^a

Characteristic	Controls, N (%)	Case, N (%)	P-value ^b
Age	50–59 years old	57 (48.3)	<0.001
	60–69 years old	37 (31.4)	
	≥70 years old	24 (20.3)	
Years of education	Never	5 (4.2)	0.001
	1–6 years	33 (28.0)	
	7–10 years	54 (45.8)	
	> 10 years	28 (26.0)	
Family history of cancer	No	92 (78.0)	<0.001
	Yes	26 (22.0)	
Body mass index (BMI)	Quartile 1	29 (24.6)	0.010
	Quartile 2	29 (24.6)	
	Quartile 3	33 (28.0)	
	Quartile 4	27 (22.9)	

Table 2. Associations of micronutrient concentrations with prostate cancer risk

Micronutrient	Adjusted OR (95% CI) ^c	Micronutrient	Adjusted OR (95% CI) ^c
Retinol	6.08 (2.80–13.20)	α-Tocopherol	2.40 (1.08–5.35)
α-Carotene	3.27 (1.67–6.38)	δ-Tocopherol	1.08 (0.51–2.28)
β-Carotene	3.04 (1.53–6.02)	γ-Tocopherol	0.60 (0.28–1.31)
α-Cryptoxanthin	1.93 (0.91–4.08)	α-Tocotrienol	2.76 (1.30–5.87)
β-Cryptoxanthin	1.96 (0.89–4.32)	δ-Tocotrienol	3.70 (1.66–8.25)
Lutein	2.07 (1.07–4.02)	γ-Tocotrienol	3.02 (1.38–6.59)
Zeaxanthin	1.32 (0.59–2.96)	Ubiquinone	2.44 (1.13–5.28)
Lycopene	0.92 (0.43–1.97)		

^a Only demographic characteristics that were significantly different and adjusted for in our model are shown in this table.

^b P-values were obtained from chi-squared test.

^c Highest vs lowest category with cut-offs according to tertile or median values in controls; models were adjusted for age, years of education, family history of cancer, BMI, as well as sun exposure and skin/eye pigment characteristics that were previously found to be associated with prostate cancer risk in this study population.

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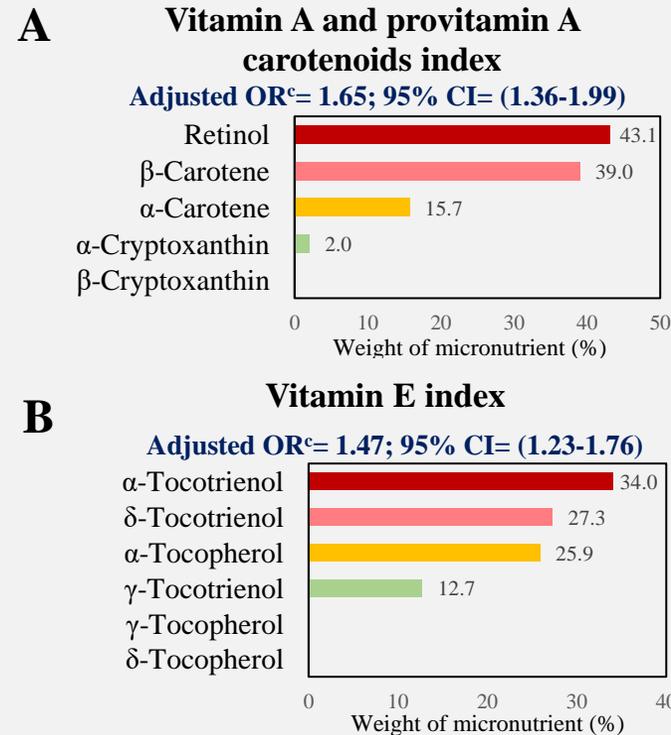
Conclusions

Table 3. Significant effect modification by (A) smoking (B) alcohol consumption status

A Micronutrient	Adjusted OR (95% CI) ^a		P-interaction ^b
	Never-smokers	Ever-smokers	
Lutein	2.75 (1.12–6.73)	6.43 (1.62–25.50)	0.011
β-Cryptoxanthin	1.08 (0.40–2.95)	7.50 (1.43–39.5)	0.005
β-Carotene	1.88 (0.80–4.41)	5.61 (1.54–20.40)	0.011

B Micronutrient	Adjusted OR (95% CI) ^a		P-interaction ^b
	Non-regular alcohol drinker	Regular alcohol drinker	
Lutein	1.81 (0.57–5.76)	2.71 (1.04–7.10)	0.036
β-Cryptoxanthin	1.28 (0.44–3.72)	2.96 (1.15–7.61)	0.044
Ubiquinone	1.99 (0.48–8.23)	3.35 (1.10–10.2)	0.030
α-Tocotrienol	1.46 (0.41–5.13)	3.06 (1.03–9.10)	0.021
γ-Tocotrienol	2.71 (0.73–9.99)	3.39 (1.08–10.6)	0.026

Figure 1. Mixture effect of micronutrient groups



- Serum micronutrients were positively associated with prostate cancer risk, particularly among ever-smokers and regular alcohol drinkers.
- Specific forms of vitamins A or E contributed greater weights to the vitamin group indices.
- Our study suggests the involvement of serum micronutrients in prostate cancer risk.
- Future research will be useful to clarify the underlying biological pathways.

^a Highest vs lowest category with cut-offs according to tertile or median values in controls; models were adjusted for age, years of education, family history of cancer, BMI, as well as sun exposure and skin/eye pigment characteristics that were previously found to be associated with prostate cancer risk in this study population.

^b Statistical significance of the cross-product term between serum micronutrient levels (continuous) and modifier variable (ever-smoker vs non-smoker, regular alcohol-drinker vs non-regular alcohol drinker)

^c For every decile increase of micronutrient concentrations; adjusted for age, education, family history of cancer, BMI, sun exposure and skin/eye pigment