Health Promotion International, 2017;32:840–849 doi: 10.1093/heapro/daw016 Advance Access Publication Date: 22 March 2016 Article

OXFORD

# Awareness of nutrition problems among Vietnamese health and education professionals

Thi Hai Quynh Pham<sup>1,\*</sup>, Anthony Worsley<sup>1</sup>, Mark Lawrence<sup>1</sup>, and Bernie Marshall<sup>2</sup>

<sup>1</sup>School of Exercise and Nutrition Sciences, and <sup>2</sup>School of Health and Social Development, Deakin University, 221 Burwood Hwy, Burwood, VIC 3125, Australia

\*Corresponding author. E-mail: phth@deakin.edu.au

## Summary

Professionals who provide nutrition education and consulting to the public are encouraged to take into account the health, environmental and social contexts that influence health-related attitudes and behaviours in the population. This paper examined the awareness of shifts in population health outcomes associated with the nutrition transition in Vietnam among university nutrition lecturers, health professionals and school education professionals. Most of these professionals held accurate views of the current population health issues in Vietnam. However, they differed in their awareness of the seriousness of overweight and obesity. Although the majority indicated that the prevalence of obesity and non-communicable diseases (NCDs) had increased, nearly half believed that the government should complete its attempts to control undernutrition before trying to control obesity. More health professionals believed that food marketing was responsible for the growing prevalence of children's obesity, and more of them disapproved of the marketing of less healthy food to children. In contrast, the university nutrition lecturers were least aware of food marketing and the seriousness of obesity. Of the three groups, the university nutrition lecturers held less accurate perceptions of nutrition transition problems and their likely drivers. There is an urgent need for greater provision of public nutrition education for all three groups of professionals.

Key words: nutrition transition, public health nutrition, nutrition education, survey, Vietnam

# INTRODUCTION

Vietnam is a lower middle income country located in South East Asia. During the second half of the 20th century, a large proportion of the Vietnamese population experienced high prevalence of undernutrition and associated infectious diseases (Petracchi and Ha, 1999). Amelioration of these conditions has been a major health priority. Economic growth, especially after the initiation of *Doi Moi* (Renovation) in 1986, has brought significant changes in the dietary patterns and lifestyles of the Vietnamese population. The composition of the diet has shifted to include lower amounts of starchy staples, higher amounts of protein- and fat-rich foods and higher energy content (Thang and Popkin, 2004). There has also been a shift to less physically active lifestyles (Tang *et al.*, 2007, 2010; Nguyen *et al.*, 2010; Do *et al.*, 2011). These and other changes have resulted in Vietnam undergoing a 'nutrition transition', which includes the coexistence of undernutrition

© The Author 2016. Published by Oxford University Press. All rights reserved. For Permissions, please email: journals.permissions@oup.com

and obesity (Nguyen and Ha, 2008; Tuan *et al.*, 2008; Do *et al.*, 2011; Le *et al.*, 2013) as well as an increasing prevalence of non-communicable diseases (NCDs) (Le *et al.*, 2004, 2005; Nguyen and Ha, 2008). This is similar to changes in other developing countries such as Thailand, Bangladesh and India (Chavasit *et al.*, 2013; Khan and Talukder, 2013; Khandelwal and Reddy, 2013).

Several reports have called for greater provision of nutrition education for health and other professionals to enable them to effectively support patients and members of the broader community (Calderon, 2001; Jackson, 2001; Turner et al., 2012; WHO, 2014). In particular, there is a need for enhanced nutrition education for medical, allied health and education students (Stang et al., 1998; Jackson, 2001; Touger-Decker et al., 2001; Hark, 2006; Hughes et al., 2011; Ray et al., 2012; Orimo et al., 2013; Kris-Etherton et al., 2014). Better preparedness is critical to enable the future professional workforce to support the public's health and influence health policy-making (Kris-Etherton et al., 2014). However, one of the barriers to the expansion of nutrition education in professional education is the shortage of knowledgeable university lecturers who can transfer knowledge and serve as role models in practice and research (Hark, 2006; Orimo et al., 2013; Lenders et al., 2014).

Nutritional status and resultant human health are affected by social and environmental challenges in many countries (Hawkes, 2007; McMichael, 2007). Professionals who provide nutrition education and consulting to the public are encouraged to take into account the health, environmental and social contexts that influence health-related attitudes and behaviours in the population (Calderon, 2001; Leitzmann and Cannon, 2007; Wahlqvist, 2007). The accuracy of health and education professionals' perceptions of the population's health problems is likely to reflect their preparedness and readiness to advocate for better population health (Pekka *et al.*, 2006; Wahlqvist *et al.*, 2012; Nazmi and Monteiro, 2013).

Therefore, a survey was conducted to examine the opportunities for, and barriers to, the enhancement of nutrition education in Vietnamese universities. In this paper, we present the findings from the first section of the survey which focused on health professionals', school education professionals' and university nutrition lecturers' awareness of health problems associated with the nutrition transition in Vietnam. These professional groups were selected because they play key roles in the communication of health risks to future health professionals and the broader community. The study aimed to establish an understanding of these professionals' current concerns and their preparedness to respond to the nutrition transition.

#### Survey sample and procedure

During late November 2014 and mid-January 2015, a detailed online survey was conducted among 242 Vietnamese health and school education professionals, and university nutrition lecturers. Initially, third-party introductions were used to recruit potential participants. These included health professionals (general practitioners, nurses and health administrators), school education professionals (kindergarten and primary school principals, teachers) and university nutrition lecturers. The third parties were identified from their participation in two earlier qualitative studies conducted by the senior author for her PhD thesis.

Additional approaches were employed to extend the sampling to include potential participants from different cities and provinces in Vietnam. An email-address list provided by colleagues in the National Institute of Nutrition (NIN) was used to identify and recruit health professionals working in provincial health services, and the websites of seven provincial departments of education were used to contact the heads of secondary, primary and early childhood education divisions who were asked to forward an invitation email to their colleagues in schools. The websites of 18 Vietnamese universities were used to contact individual nutrition lecturers in departments which provided undergraduate courses in education, food science, medicine and health sciences. That is, snowballing, purposive and convenience sampling methods were employed to recruit potential participants for the survey.

Emails were sent to potential participants to request their participation and to forward the email to their colleagues. The email included the invitation letter and links to a plain language statement and the questionnaire. One week after the first email was sent, a reminder email was sent to thank those who had responded and remind nonrespondents to complete the survey.

In total, 1289 emails were sent, including 48 emails to the third parties, 170 emails to potential health professionals (from the list provided by the NIN), 39 emails to education administrators in the provincial departments of education. We contacted the heads of academic faculties and departments who advised us to contact lecturers directly. Because their specialties were unclear from the email listings, we sent blanket emails to 1032 lecturers in these faculties (even though few were likely to be nutrition lecturers).

A screening question was used to ensure that only professionals from the target groups participated in the survey. It asked: 'Are you a health professional (general practitioner, medical doctor, nurse, nutritionist, health administrator), or school education professional (school principal, teacher), or university lecturer who teaches nutrition or other nutrition-related subjects to students in education, or food science, medicine and health sciences (nursing, pharmacy, dentistry, nutrition and public health)?'

Ethics permission was granted by Deakin University Faculty of Health Human Ethics Advisory Group (HEAG-H 185\_2014). No incentives were paid for participation.

#### The questionnaire

The questionnaire was written in Vietnamese. It was divided into five broad sections related to (i) perceptions of nutrition problems in Vietnam, the focus of this paper; (ii) views and experiences of nutrition teaching in university; (iii) barriers to nutrition teaching in university; (iv) interest in having further training in nutrition; (v) background information about the age, gender, residential location (name of province/city), educational background, current occupation, number of years of service and the name of the employing institution of the respondents. In addition, the university lecturers were asked to name their disciplinary speciality as well as the subjects they had taught in the 2 preceding years.

The questions that are relevant to this paper are as follows:

#### Double burden of malnutrition and NCDs

Compared with 10–15 years ago, how would you describe the prevalence of the following conditions at present (2014)? Six response items were administered in rotated order (Table 1, items 1–6). These items were based on the major findings presented in the NIN reports and published studies about the nutrition transition in Vietnam (Do *et al.*, 2011; NIN and Unicef, 2012; Le *et al.*, 2013). Five-point response scales were used: large decrease (i), decrease (ii), no change (iii), increase (iv), large increase (v). The purpose of the response item rotation was to avoid unintended order effects (such as fatigue and the effects of earlier items on answers to later items (Dillman *et al.*, 2009).

To what extent do you agree or disagree with the statements (listed) about the prevalence of chronic diseases (such as diabetes type 2, cardiovascular diseases) in the population? Then followed a list of four items (Table 1, items 7–10) presented in rotated order. These items were based on the findings on the shifts in NCD prevalence in low- and middle-income countries (Monteiro *et al.*, 2004; Mendez *et al.*, 2005; Swinburn *et al.*, 2011; Nazmi and Monteiro, 2013). Five-point scales were used: strongly disagree (i), disagree (ii), not sure (or neutral) (iii), agree (iv) and strongly agree (v) (from hereon called 'five-point agreement scales'). To what extent do you agree or disagree with the statements (listed) about key nutrition problems in Vietnam? Four items were presented in rotated order (Table 1, items 11–14). These items were based on previous research which reflected different viewpoints about the importance of strategies to simultaneously control the coexistence of undernutrition and obesity, NCDs in developing countries (Popkin, 1994, 2002; Swinburn *et al.*, 2011) (items 11, 12 and 14), and the findings of an earlier qualitative study conducted by the authors (item 13, available from the senior author). Again, five-point agreement scales were used.

#### Causes of the increasing prevalence of obesity

To what extent do you agree or disagree with the reasons for the increasing prevalence of overweight and obesity in children (aged under 12)? A list of six items was administered in rotated order (Table 2, items 1–6). The items were based on studies of the nutrition transition in developing countries (Gortmaker *et al.*, 2011; Swinburn *et al.*, 2011; Shrimpton and Rokx, 2012) (items 1–4, 6), and the findings of an earlier qualitative study conducted by the authors (item 5, available from the senior author). Five-point agreement scales were employed.

#### Food marketing aimed at children

To what extent do you agree or disagree with food marketing in school (by food companies, such as giving free food samples to children)? Indicate your opinion on food items listed below. A list of five food items based on children's food marketing literature (Folta *et al.*, 2006; Institute of Medicine, 2006; Weber *et al.*, 2006; WHO, 2010) was administered in rotated order (Table 2, items 7–11). Five-point agreement scales were used.

#### Data analysis

The responses were analysed via IBM SPSS Statistics (2014, version 22). Frequency analyses were used to summarize the demographic characteristics of the sample including details of the respondents' present occupations which were combined into three groups: nutrition lecturers (i); health professionals (general practitioners, medical doctors, nurses, and health administrators) (ii); school professionals (school principals and teachers) (iii).

The  $\chi^2$  tests were used to compare the responses of the three professional groups across the items. The original five-point rating scales used in the questionnaire were recoded to three-point scales. Change ratings of 1 and 2 were combined into a general 'decrease' category (DEC combining 'large decrease' and 'decrease' coded as '1'), the no change rating was recoded as '2', and the change

No	Item	Nutrition lecturers, n = 139	Health professionals, $n = 57$	School professionals, n = 46	Total, <i>n</i> = 242	$\chi^2 (\mathrm{df}),\\ n=242$	p (two-sided)
1	Underweight in children aged 1–12 years (in both boys and girls) <sup>a</sup>	79.9	94.7	76.1	82.6	7.94 (2)	0.019
2	Underweight in adults aged 25–64 years (in both male and female adults) <sup>a</sup>	72.7	78.9	78.3	75.2	1.14 (2)	0.565
3	Deficiency diseases in children (such as Vitamin A, Vitamin D, iron insufficiency) <sup>a</sup>	70.5	73.7	71.7	71.5	5.73 (4)	0.220
4	Overweight and obesity in children aged 1–12 years (in both boys and girls) <sup>b</sup>	95.7	9	98.1	96.7	0.43 <sup>c</sup> (1)	0.472 <sup>d</sup>
5	Overweight and obesity in adults aged 25–64 years (in both male and female adults) <sup>b</sup>	94.2	9	02.2	93.4	0.13 <sup>c</sup> (1)	0.605 <sup>d</sup>
6	Chronic diseases in adults (such as type 2 diabetes, cardiovascular diseases, cancers) <sup>b</sup>	95.0	9	99.0	96.7	1.92 <sup>c</sup> (1)	0.143 <sup>d</sup>
7	Chronic diseases (such as type 2 diabetes, cardiovascular diseases) are more common in high-income groups than low-income groups <sup>e</sup>	45.3	47.4	34.8	43.8	4.78 (4)	0.311
8	Chronic diseases (such as type 2 diabetes, cardiovascular diseases) are becoming more common among low-income people than in the past <sup>e</sup>	51.1	57.9	60.9	54.5	2.05 (4)	0.727
9	Chronic diseases (such as type 2 diabetes, cardiovascular diseases) are becoming more common among young adults <sup>e</sup>	92.1	9	00.3	91.3	0.07 <sup>c</sup> (1)	0.650 <sup>d</sup>
10	Chronic diseases (such as type 2 diabetes, cardiovascular diseases) are more common in people aged over 60 compared with younger adults <sup>e</sup>	55.4	70.2	54.3	58.7	4.92 (4)	0.296
11	Undernutrition is a serious problem in Vietnam <sup>e</sup>	59.7	59.6	67.4	61.2	0.93 (4)	0.920
12	Overweight and obesity is a serious problem in Vietnam $^{\rm e}$	59.7	71.9	82.6	66.9	9.97 (4)	0.041
13	It is much easier to control undernutrition than to control overweight and obesity <sup>e</sup>	46.0	49.1	56.5	48.8	6.35 (4)	0.175
13	It is much easier to control undernutrition than to control overweight and obesity <sup>f</sup>	30.3	31.6	13.1	27.2	6.35 (4)	0.175
14	The government should complete its attempts to control undernutrition before trying to control overweight and obesity <sup>e</sup>	44.6	47.4	63.0	48.8	5.00 (4)	0.287
14	The government should complete its attempts to control undernutrition before trying to control overweight and obesity <sup>f</sup>	36.0	35.1	21.7	33.1	5.00 (4)	0.287

When the  $\chi^2$  test assumptions were still not satisfied with the two-point scales (as described in the 'Methods' section), the three occupational categories were recoded into two categories: 'nutrition lecturers' and 'professionals' (combining 'health professionals' and 'school professionals'). For 2 × 2 tables (df = 1), Yates' correction for continuity values were reported instead of Pearson  $\chi^2$  values. Fisher's exact probability test values were reported instead of the Continuity correction *p*-values when the  $\chi^2$  assumptions for 2 × 2 tables were violated (Field, 2013; Pallant, 2013).

<sup>a</sup>% who believed there had been a decrease.

<sup>b</sup>% who believed there had been an increase.

- 'Yate's correction for continuity.
- <sup>d</sup>Fisher's exact probability test.
- °% who agreed.
- <sup>f</sup>% who disagreed.
- Bold P-values indicate significance (P < 0.05).

No	Item	Nutrition lecturers, n = 139	Health professionals, $n = 57$	School professionals, n = 46	Total, <i>n</i> = 242	Chi-sq. (df), n = 242	p (two-sided)
Increas	ing prevalence of obesity in children (age	d under 12)	due to:				
1	Increasing consumption of unhealthy food <sup>a</sup>	95.0	96.1		95.5	0.01 <sup>b</sup> (1)	0.763 <sup>c</sup>
2	Lack of physical activity at school <sup>a</sup>	81.3	86.0	78.3	81.8	1.08 (2)	0.584
3	Increased prosperity <sup>a</sup>	81.3	86.0	87.0	83.5	1.14 (2)	0.566
4	Food marketing to children <sup>a</sup>	65.5	86.0	71.7	71.5	8.33 (2)	0.015
5	Over-pampering by parents, grandparents <sup>a</sup>	82.7	86.0	87.0	84.3	0.62 (2)	0.733
6	Genetic factors <sup>a</sup>	21.6	19.3	6.5	18.2	5.37 (4)	0.252
Food n	narketing in school (e.g. food company g	ive free food	sample to child	en) is acceptable	e for:		
7	Fruit, vegetables <sup>a</sup>	78.4	86.0	67.4	78.1	5.64 (4)	0.227
8	Milk, dairy products (e.g. cheese) <sup>a</sup>	90.6	91.2	89.1	90.5	0.14 (2)	0.933
9	Soft drinks <sup>d</sup>	74.8	89.5	73.9	78.1	5.66 (2)	0.059
10	Chips, fast-food <sup>d</sup>	82.0	91.2	87.0	85.1	2.86 (2)	0.239
11	Confectionary <sup>d</sup>	63.3	70.2	50.0	62.4	10.55 (4)	0.032

Table 2: Summary of three professional groups' views about reasons for increasing prevalence of obesity and views about food marketing to children

<sup>a</sup>% who agreed.

<sup>b</sup>Yate's correction for continuity.

'Fisher's exact probability test.

<sup>d</sup>% who disagreed.

Bold *P*-values indicate significance (P < 0.05).

ratings of 4 and 5 were combined into a general 'increase' category (INC combining 'large increase' and 'increase' coded as '3'). The agreement ratings were treated similarly: ratings of 1 and 2 were combined into a general 'disagreement' rating (DISAGR combining 'strongly disagree' and 'disagree' coded as '1'), not sure/neutral was coded as '2' and the agreement ratings of 4 and 5 were combined in a general 'agreement' rating (AGR combining 'agree' and 'strongly agree', coded as '3'). Whenever cells had expected frequencies <5, these three-point scales were reduced to two categories by removing the middle 'no change' or 'not sure/neutral' categories from further analyses. *p* < 0.05 was accepted as the level of statistical significance.

## RESULTS

Two hundred and forty-two respondents including 57 health professionals (23.6%), 46 school education professionals (19.0%) and 139 university nutrition lecturers in education, food science, medicine and health sciences (57.4%) took part in the survey. Sixty-five percent of the respondents were female. The mean of age of the sample was 37.4 years (SD = 9.6). The mean number of years of service in their current occupations was 12.9 (SD = 9.3). Almost 63.0% of the respondents had postgraduate qualifications, including more than one-fifth who had doctoral degrees

(21.1%). The respondents were from many institutions across 29 provinces and major cities in Vietnam.

Perceived increases in the prevalence of obesity and decreases in the prevalence of undernutrition More than four-fifths of the respondents indicated that there had been a decrease in the prevalence of undernutrition in children (82.6%, Table 1). Similarly, decreased prevalence of undernutrition in adults was reported by three-quarters of the respondents (75.2%). While no differences were found between the groups' views of the reduced prevalence of adult undernutrition, they differed in their perceptions of the decreased prevalence of children's undernutrition. More health professionals were aware of the decreased prevalence of underweight children than the other groups (Table 1). In contrast, almost all the respondents shared the views that obesity is increasing in children (97.6%) and adults (93.4%).

## Perceived increases in the prevalence of NCDs

Nearly all the respondents agreed that there had been an increase in the prevalence of chronic diseases in adults in past years (96.7%, Table 1). No group differences were found in these perceptions. Although 43.8% of the respondents believed that chronic diseases are more

common in high-income population groups, 54.5% reported that the prevalence of NCDs had increased in lowincome population groups. Nine out of 10 respondents agreed that chronic diseases have become more prevalent in young adults (91.3%).

## Control of the double burden of undernutrition and obesity

Both obesity and undernutrition were viewed as serious health problems (66.9 and 61.2%, respectively, Table 1). Although the groups viewed the seriousness of undernutrition similarly, their perceptions of the seriousness of overweight and obesity differed significantly. More school professionals than the other groups saw obesity as a serious health problem in Vietnam.

Nearly half of the respondents believed that it was much easier to control undernutrition than overweight and obesity (48.8%, Table 1). Moreover, the same proportion of respondents held the view that the government should complete its attempts to control undernutrition before trying to control overweight and obesity.

## Reasons for increases in the prevalence of overweight and obese children

Almost all of the respondents agreed that increases in the consumption of unhealthy food had led to the rise in the prevalence of children's overweight and obesity (95.5%, Table 2). More than four-fifths of them saw overpampering by parents and grandparents as a reason for the growth in child obesity (84.3%, Table 2).

#### Food marketing

Fewer respondents saw food marketing as a cause of the increasing prevalence of obesity compared with other reasons such as the consumption of unhealthy food and increased prosperity (71.5, 95.5 and 83.5%, respectively, Table 2). Although 86.0% of the health professionals believed that food marketing was responsible for the growth in children's overweight and obesity, only 71.7% of the school professionals and 65.5% of the lecturers held this view (p < 0.05, Table 2).

Similarly more health professionals disapproved of the marketing of confectionary to children compared with nutrition lecturers and school professionals (70.2%, 63.3 and 50.0%, respectively; p < 0.05, Table 2). However, there were no differences between the groups in their support for the marketing of healthy foods (such as milk, fruit and vegetables and their disapproval of the marketing of unhealthy foods (such as soft drinks and fast food, Table 2).

# DISCUSSION

The purpose of this study was to examine health and school education professionals' and nutrition lecturers' awareness of health problems associated with the nutrition transition in Vietnam. Previous studies of the nutrition transition have focused mainly on its drivers and effects on populations. This study, to our knowledge, is one of the first to investigate the views of health communication professionals and university nutrition educators in a developing country.

The present findings are consistent with the results presented in the NIN's reports and previous studies of the changes in the Vietnamese population's nutrition status in recent years. For example, Do et al. (2011) found that the double nutrition burden is clearly present in Vietnam and the distribution of BMI across the Vietnamese population groups underwent a shift towards higher BMI levels in 2005 when compared with 2000. There is substantial evidence of the rise in overweight and obesity prevalence along with the decline in undernutrition across various population age groups including children, adolescents and adults in urban areas (Tang et al., 2007; Tran et al., 2007; Huynh et al., 2009). On the other hand, the NIN's recent reports reveal that undernutrition and deficiency diseases are still the major health problems in rural and disadvantage areas in Vietnam (NIN and Unicef, 2012).

The school professionals were most aware of the seriousness of overweight and obesity, though least aware of the decline in the prevalence of underweight children. This may be explained by the rapid increase in overweight and obesity among school-aged children in recent years especially in major cities and urban areas, and by the existing high prevalence of underweight children particularly in rural areas in Vietnam. A NIN report showed that the rate of overweight and obesity among preschool children in 2010 was six times higher than in 2000 (NIN and Unicef, 2012). Likewise, ~29% of urban children (aged 0.5-11.9 years) were either overweight or obese (Le et al., 2013). In contrast, the prevalence of underweight (weightfor-age Z-score < -2.00) among preschool children had reduced to 17.5% nationwide by 2010, but, in 20 out of 63 provinces the prevalence of underweight children remained >20%, which is considered to be a high level by the WHO's classification (NIN and Unicef, 2012). Additionally, over 22% of school-aged children (aged 0.5-11.9 years) were underweight (Le et al., 2013). This illustrates the complexity of nutrition problems in Vietnam. In this study, it is reflected in the school professionals' awareness of the coexistence of these opposing conditions: over- and undernutrition in school children.

The lowest awareness of the seriousness of overweight and obesity was among the nutrition lecturer group. This may be because that lecturers communicate and work mainly with young people aged 18–30 years who may be more likely to be underweight or of normal weight. Indeed, young men and women (25–34 years old) in Vietnamese urban areas suffer most from adult underweight prevalence (Do *et al.*, 2011).

Nearly half of the respondents shared the view that it is much easier to control undernutrition than control overweight and obesity. There is little knowledge about the views of similar professionals in other developing countries concerning the professional challenges that the double nutrition burden poses. More investigation of these perceptions is needed to better prepare professionals who deliver public health and education programs to the broad community.

Although the majority of respondents indicated that there had been increases in the prevalence of obesity and NCDs, nearly half of them believed that the government should complete its attempts to control underweight before trying to control overweight and obesity. This shows that some health and education professionals may be misinformed about current national priorities in dealing with nutrition transition problems. One of the significant challenges facing developing countries' responses to the nutrition transition is the misunderstanding among policy-makers and health professionals who still hold the view that obesity and NCDs afflict only the affluent and the elderly (Popkin, 1994; Yach et al., 2004; Kapil and Sachdev, 2012). They believe these conditions arise from personal choice, that their control is ineffective and too expensive and should wait until undernutrition and infectious diseases have been controlled (Popkin, 1994; Yach et al., 2004; Kapil and Sachdev, 2012).

Undernutrition and obesity need to be addressed together for several important reasons. First, fetal and infant undernutrition, followed by adult overweight or obesity, has a double effect on the later burden of NCDs (Barker et al., 2002; Victora et al., 2008). Secondly, the underlying drivers within the food system (e.g. food quality and food distribution) are often common to both disorders (Swinburn et al., 2011; Stuckler et al., 2012). Thirdly, NCDs cannot be ignored while efforts to reduce undernutrition continue because NCDs worsen health inequalities in developing countries (Beaglehole et al., 2011). The similarities between the professional groups' misconceptions of the importance of simultaneous responses to the double nutrition burden suggest there is a lack of public health knowledge among health and education professionals, and nutrition lecturers in Vietnam.

Although 95.5% of the respondents believed that the consumption of unhealthy food had caused the increasing

prevalence of children's overweight and obesity, only 71.5% saw food marketing to children as a cause of the increase in obesity prevalence. Clearly, some respondents did not see an association between food marketing and consumption of unhealthy food. Many previous studies have shown that food marketing to children is composed almost entirely of messages which promote nutrient-poor, calorie-dense foods (Hastings et al., 2003; Folta et al., 2006; Institute of Medicine, 2006). Reduction of food marketing to children has been proposed as a critical way to address children's obesity globally as well as in individual countries (Harris et al., 2009). The finding that the nutrition lecturers had the lowest perceptions of the three groups about the influence of food marketing to children's obesity raises a question about their knowledge and preparedness to teach about this and related issues.

The greater support for the marketing of confectionary to children by the school professionals might be due to misconceptions about the nutritional properties of these products among some school professionals. In the prevailing conditions of undernutrition, these products might be regarded as sources of energy. However, with the increase in the obesity prevalence confectionary is often regarded as sources of 'empty calories' and their marketing to children should be limited, similar to fast food, savoury snacks and soft drinks (Folta et al., 2006; Institute of Medicine, 2006; WHO, 2006). The finding that half of the school professionals supported the marketing of confectionary to children suggests more effective strategies need to be implemented to provide them with current public health nutrition knowledge. This is critical particularly given the rapid increases in children' obesity and the strong focus on marketing to children by the food industry in many countries (Folta et al., 2006; Institute of Medicine, 2006; Weber et al., 2006; WHO, 2006).

Surprisingly, in this study, the nutrition lecturers did not show any greater awareness of the nutrition transition than their extramural colleagues. More experienced lecturers might be expected to have had higher levels of knowledge and perceptions. This leaves us to speculate that the problem may stem from insufficient opportunities for lecturers to acquire up-to-date knowledge and the absence of topics related to the nutrition transition in university nutrition curricula.

# IMPLICATIONS FOR VIETNAMESE HEALTH

Although most of the surveyed professionals correctly understood the recent changes in nutrition-related health conditions in Vietnam, many had less accurate perceptions of the underlying drivers and actions needed to address these problems. The lesser awareness of the influence of food marketing and its impacts on children among nutrition lecturers suggests that they may not adequately understand the drivers of the nutrition transition. Furthermore, the views expressed by half of the respondents that undernutrition should be controlled before tackling obesity suggests they may misunderstand current Vietnamese and international public health priorities (WHO, 2013).

In its discussions of core strategies to mitigate the double burden of malnutrition diseases, the WHO has called for the incorporation of public health nutrition aspects of NCD prevention and control in the teaching curricula for medical, nursing and allied health personnel and in the provision of in-service training (WHO, 2014). The challenge for Vietnam in combating the negative effects of the nutrition transition is to implement appropriate prevention strategies to halt the growing trend in obesity and NCDs, against a background of prevalent micronutrient deficiencies and infectious diseases. Critical to these efforts is the development of Vietnamese health professionals with sufficient public health nutrition knowledge and skills to influence policy-making and program delivery. The present findings suggest novel approaches are required to effectively disseminate information and public health nutrition knowledge to health and education professionals. This will be a major task for university nutrition lecturers. The results also suggest the need for better preparedness among university lecturers to incorporate aspects of public health nutrition into their teaching.

## LIMITATIONS

An important limitation of this study relates to the lack of adequate sampling frames in Vietnam. As in many other developing countries there are few master lists of professionals which can be used for research purposes. Hence, we had to use snowballing, purposive and convenience sampling. Our email communication attempts to recruit potential participants had some limitations. Some professionals expressed unwillingness to forward the invitation email to their colleagues because of concerns that the email might be misconstrued as being related to commercial purposes. Instead they advised us to contact their colleagues directly. To our knowledge, online surveys are still new in Vietnam. We found that there is not a strong culture of email use in Vietnamese universities. Use of free, private email accounts (e.g. @gmail.com and @yahoo. com) for communication is common among Vietnamese university lecturers; only a few universities provide their staff with official email accounts. Although surveys have high-external validity (generalizability; Dillman et al., 2009), these findings should be interpreted cautiously and regarded as preliminary. More efforts are required

to build suitable sampling frames to facilitate future research.

# CONCLUSIONS

A substantial majority of Vietnamese health and school education professionals and university nutrition lecturers correctly perceived the changes in key indicators of Vietnamese health associated with the nutrition transition. However, they tended to have less accurate perceptions of the drivers and actions needed to address nutrition transition problems. The results suggest that greater provision of nutrition education for health and other professionals is essential, to enable them to support public health policies and programs. In the same vein, better resourcing and public health nutrition education of university nutrition lecturers is required to enable them to enhance the education of future health and education professionals.

## ACKNOWLEDGEMENTS

We acknowledge the contributions of the participants who took part in the survey. This study received funding from the School of Exercise and Nutrition Sciences, Deakin University. Thi Hai Quynh Pham is supported by a Vietnamese Government PhD Scholarship.

## FUNDING

This work was supported by the School of Exercise and Nutrition Sciences, Deakin University. Q.P. is supported by a Vietnamese Government PhD Scholarship.

### REFERENCES

- Barker D., Eriksson J., Forsen T., Osmond C. (2002) Fetal origins of adult diseases: strength of effects and biological basis. *International Journal of Epidemiology*, 31, 1235–1239.
- Beaglehole R., Bonita R., Horton R., Adams C., Alleyne G., Asaria P., et al. (2011) Priority actions for the non-communicable disease crisis. *Lancet*, 377, 1438–1447.
- Calderon T. A. (2001) Nutrition education training of health workers and other field staff to support chronically deprived communities. *Public Health Nutrition*, 4, 1421–1424.
- Chavasit V., Kasemsup V., Tontisirin K. (2013) Thailand conquered under-nutrition very successfully but has not slowed obesity. *Obesity Reviews*, 14, 96–105.
- Dillman D. A., Smyth J. D., Christian L. M. (2009) Internet, Mail, and Mixed-Mode Survey—The Tailored Design Method. John Wiley & Sons, Inc., New Jersey, 54–62.
- Do T. P. H., Feskens E. J., Deurenberg P., Le B. M., Nguyen C. K., Kok F. J. (2011) Nationwide shifts in the double burden of overweight and underweight in Vietnamese adults in 2000

and 2005: two national nutrition surveys. *BMC Public Health*, 30 January 2011. doi:10.1186/1471-2458-11-62.

- Folta S. C., Goldberg J. P., Economos C., Bell R., Meltzer R. (2006) Food advertising targeted at school-age children: a content analysis. *Journal of Nutrition Education and Behavior*, 38, 244–248.
- Gortmaker S. L., Swinburn B. A., Levy D., Carter R., Mabry P. L., Finegood D. T., et al. (2011) Changing the future of obesity: science, policy, and action. *Lancet*, 378, 838–847.
- Hark L. A. (2006) Lessons learned from nutrition curricular enhancements. American Journal Of Clinical Nutrition, 83, 968S–970S.
- Harris J. L., Pomeranz J. L., Lobstein T., Brownell K. D. (2009) A crisis in the marketplace: how food marketing contributes to childhood obesity and what can be done. *Annual Review of Public Health*, 30, 211–225.
- Hastings G., Stead M., McDermott L., Forsyth A., MacKintosh A. M., Rayner M., et al. (2003) Review of Research on the Effects of Food Promotion to Children. Glasgow, UK.
- Hawkes C. (2007) Globalisation and the nutrition transition: A case study. In Pinstrup-Andersen P., Cheng F. (eds), Food Policy for Developing Countries: The Role of Government in the Global Food System. Cornell University, New York.
- Hughes R., Shrimpton R., Recine E., Margetts B. (2011) A competency framework for global public health nutrition workforce development. World Public Health Nutrition Association, 2–43.
- Huynh T. T. D., Dibley M. J., Sibbritt D. W., Tran T. M. H. (2009) Trends in overweight and obesity in pre-school children in urban areas of Ho Chi Minh City, Vietnam, from 2002 to 2005. *Public Health Nutrition*, **12**, 702–709.
- Institute of Medicine. (2006) Food Marketing to Children and Youth: Threat or Opportunity? The National Academies Press, Washington, DC.
- Jackson A. A. (2001) Human nutrition in medical practice: the training of doctors. *The Proceedings of the Nutrition* Society, 60, 257–263.
- Kapil U., Sachdev H. P. (2012) Urgent need to orient public health response to rapid nutrition transition. *Indian Journal of Community Medicine*, 37, 207–210.
- Khan S. H., Talukder S. H. (2013) Nutrition transition in Bangladesh: is the country ready for this double burden. Obesity Reviews, 14, 126–133.
- Khandelwal S., Reddy K. S. (2013) Eliciting a policy response for the rising epidemic of overweight-obesity in India. Obesity *Reviews*, 14, 114–125.
- Kris-Etherton P. M., Pratt C. A., Saltzman E., Van Horn L. (2014) Introduction to nutrition education in training medical and other health care professionals. *American Journal Of Clinical Nutrition*, 99, 1151S–1152S.
- Le N. D. T. S., Kusama K., Nguyen T. K. H., Tran T. L., Nguyen V. C., Kunii D., et al. (2004) Prevalence and risk factors for diabetes in Ho Chi Minh City, Vietnam. *Diabetic Medicine*, 21, 371–376.

- Le N. T. D. S., Daisuke K., Nguyen T. K. H., Tohru S., Shigeru Y. (2005) The metabolic syndrome: prevalence and risk factors in the urban population of Ho Chi Minh City. *Diabetes Research & Clinical Practice*, 67, 243–250.
- Le N. B. K., Le T. H., Nguyen D. V. A., Tran T. N., Nguyen H. C., Do T. T., et al. (2013) Double burden of undernutrition and overnutrition in Vietnam in 2011: results of the SEANUTS study in 0.5-11-year-old children. *British Journal of Nutrition*, 110, S45–S56.
- Leitzmann C., Cannon G. (2007) Dimensions, domains and principles of the new nutrition science. *Public Health Nutrition*, 8, 787–794.
- Lenders C. M., Deen D. D., Bistrian B., Edwards M. S., Seidner D. L., McMahon M. M., et al. (2014) Residency and specialties training in nutrition: a Call for action. *American Journal Of Clinical Nutrition*, **99**, 1174S–1183S.
- McMichael P. (2007) The impact of globalisation, free trade and technology on food and nutrition in the new millennium. *Proceedings of the Nutrition Society*, **60**, 215–220.
- Mendez M., Monteir C., Popkin B. (2005) Overweight exceeds underweight among women in most developing countries. *American Journal of Clinical Nutrition*, 81, 714–721.
- Monteiro C. A., Moura E. C., Conde W. L., Popkin B. M. (2004) Socioeconomic status and obesity in adult populations of developing countries: a review. *Bull World Health Organ*, 82, 940–946.
- Nazmi A., Monteiro C. (2013) The nutrition transition: the same, but different. *Public Health Nutrition*, 16, 571–572.
- Nguyen C. K., Ha H. K. (2008) Double burden of malnutrition: the Vietnamese perspective. Asia Pacific Journal of Clinical Nutrition, 17, 116–118.
- Nguyen T. H., Tang H. K., Kelly P., van der Ploeg H. P., Dibley M. J. (2010) Association between physical activity and metabolic syndrome: a cross sectional survey in adolescents in Ho Chi Minh City, Vietnam. *BMC Public Health*, **10**, 141.
- NIN and Unicef. (2012) A Review of the Nutrition Situation in Vietnam 2009-2010. Hanoi, Vietnam.
- Orimo H., Ueno T., Yoshida H., Sone H., Tanaka A., Itakura H. (2013) Nutrition education in Japanese medical schools: a follow-up survey. *Asia Pacific Journal of Clinical Nutrition*, 22, 144–149.
- Pekka P., Pirjo P., Ulla U. (2006) Part III. Can we turn back the clock or modify the adverse dynamics? Programme and policy issues. *Public Health Nutrition*, 5, 245–251.
- Petracchi C., Ha K. (1999) Nutrition Country Profiles of Vietnam. Food and Agriculture Organization (FAO), Rome.
- Popkin B. M. (1994) The nutrition transition in low-income countries: an emerging crisis. *Nutrition Reviews*, 52, 285–298.
- Popkin B. M. (2002) The shift in stages of the nutrition transition in the developing world differs from past experiences! *Public Health Nutrition*, 5, 205–214.
- Ray S., Udumyan R., Rajput-Ray M., Thompson B., Lodge K. M., Douglas P., et al. (2012) Evaluation of a novel nutrition education intervention for medical students from across England. *BMJ Open*, 2, e000417.

- Shrimpton R., Rokx C. (2012) The Double Burden of Malnutrition: A Review of Global Evidence. World Bank, Washington, DC.
- Stang J., Story M., Kalina B. (1998) Nutrition education in Minnesota Public Schools: perceptions and practices of teachers. *Journal of Nutrition Education*, 30, 396–404.
- Stuckler D., McKee M., Ebrahim S., Basu S. (2012) Manufacturing epidemics: the role of global producers in increased consumption of unhealthy commodities including processed foods, alcohol, and tobacco. *PLoS Medicine*, 9, e1001235.
- Swinburn B. A., Sacks G., Hall K. D., McPherson K., Finegood D. T., Moodie M. L., Gortmaker S. L. (2011) The global obesity pandemic: shaped by global drivers and local environments. *Lancet*, 378, 804–814.
- Tang K. H., Dibley M. J., Sibbritt D., Phan N. T. B., Nguyen H. H. D. T., Tran T. M. H. (2007) Overweight and obesity are rapidly emerging among adolescents in Ho Chi Minh City, Vietnam, 2002-2004. *International Journal of Pediatric Obesity*, 2, 194–201.
- Tang K. H., Nguyen H. H. D. T., Dibley M. J., Sibbritt D. W., Phan N. T. B., Tran T. M. H. (2010) Factors associated with adolescent overweight/obesity in Ho Chi Minh City. *International Journal Of Pediatric Obesity*, 5, 396–403.
- Thang N. M., Popkin B. M. (2004) Patterns of food consumption in Vietnam: effects on socioeconomic groups during an era of economic growth. *European Journal of Clinical Nutrition*, 58, 145–153.
- Touger-Decker R., Benedict Barracato J. M., O'Sullivan-Maillet J. (2001) Nutrition education in health professions programs. *Journal of the American Dietetic Association*, 101, 63–69.
- Tran Q. C., Dibley M. J., Bowe S., Tran T. M. H., Tran T. L. (2007) Obesity in adults: an emerging problem in urban areas of Ho Chi Minh City, Vietnam. *European Journal of Clinical Nutrition*, 61, 673–681.

- Tuan N. T., Tuong P. D., Popkin B. M. (2008) Body mass index (BMI) dynamics in Vietnam. *European Journal of Clinical Nutrition*, 62, 78–86.
- Turner L. W., Knol L., Meyer M. K. (2012) A reaction to: What about health educators? Nutrition education for allied health professionals. *American Journal of Health Education*, 43, 317–319.
- Victora C. G., Adair L., Fall C., Hallal P. C., Martorell R., Richter L., Sachdev H. S. (2008) Maternal and child undernutrition: consequences for adult health and human capital. *The Lancet*, 371, 340–357.
- Wahlqvist M. L. (2007) The new nutrition science: sustainability and development. *Public Health Nutrition*, 8, 766–772.
- Wahlqvist M. L., McKay J., Chang Y.-C., Chiu Y.-W. (2012) Rethinking the food security debate in Asia: some missing ecological and health dimensions and solutions. *Food Security*, 4, 657–670.
- Weber K., Story M., Harnack L. (2006) Internet food marketing strategies aimed at children and adolescents: a content analysis of food and beverage brand web sites. *Journal of the American Dietetic Association*, 106, 1463–1466.
- WHO. (2006) Marketing of Food and non-Alcoholic Beverages to Children. World Health Organization (WHO), Oslo.
- WHO. (2010) Set of Recommendations on the Marketing of Foods and non-Alcoholic Beverages to Children. World Health Organization (WHO), Geneva.
- WHO. (2013) Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020. World Health Organization (WHO), Geneva.
- WHO. (2014) Global Status Report on Noncommunicable Diseases 2014. World Health Organization (WHO), Geneva.
- Yach D., Hawkes C., Gould C. L., Hofman K. J. (2004) The global burden of chronic diseases: overcoming impediments to prevention and control. *Journal of American Medical Association*, 291, 2616–2622.