

Original Article

Opportunities and barriers to public health nutrition education in Vietnamese universities

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Background and Objectives: A core challenge for low- and middle-income countries (LMICs) in combating the negative effects of the nutrition transition is to implement appropriate prevention strategies to halt the increasing prevalence of obesity and non-communicable diseases (NCDs), against a background of prevailing under nutrition. There have been several proposals for the enhancement of university nutrition education for future health and related professionals who are expected to communicate knowledge of health risks to the broad community. However, little is known about university nutrition education in LMICs. The present study aimed to investigate professional development opportunities and barriers for university nutrition lecturers to teach public health nutrition (PHN). **Methods and Study Design:** An online survey was conducted among 242 Vietnamese health and education professionals and university nutrition lecturers across Vietnam. Purposive sampling was used to recruit participants. Comparisons of between the groups' responses were examined via SPSS Crosstabs. The structures of the perceived barriers and desired PHN training topics were examined via factor analyses. Multiple linear regression examined the influences on lecturers' learning interests in nutrition areas. **Results:** The lecturers' learning interests spanned four areas: basic nutrition, basic food, food policy and 'new' trends (e.g. food policy, marketing). Major impediments to nutrition teaching in universities divided into two groups: resource limitations and professional constraints (e.g. lack of relevant training opportunities). The lecturers' perceptions of professional constraints influenced their interest in learning about 'new' trends. **Conclusions:** The results highlighted the need and opportunities to enhance PHN professional development for nutrition lecturers in Vietnam.

Key Words: Vietnam, university nutrition education, public health nutrition, nutrition transition, nutrition lecturers

INTRODUCTION

Vietnam is a lower middle-income country (LMIC) located in South East Asia. During the second half of the 20th century a large proportion of the Vietnamese population experienced undernourishment and infectious diseases.¹ Amelioration of these health-related conditions has been a major health priority and focus for population health authorities for decades. Economic growth, especially after the initiation of *Doi Moi* (Reform and renovation) in the middle of 1990s, brought important changes in the dietary patterns and lifestyles of the Vietnamese population. The composition of the diet of a large proportion of the population has shifted to include lower amounts of starchy staples, greater amounts of protein- and fat-rich foods and higher energy content.^{2,3} The traditional dietary pattern of a proportion of the urban population have shifted towards including more fast foods and more energy dense-nutrient poor foods (sugar, sweets).³ These dietary shifts have been accompanied by less physical activity and more sedentary habits.⁴⁻⁷ These changes have resulted in the Vietnamese population undergoing a nutrition transition and experiencing a double burden of nutritional problems, the co-existence of underweight and overweight,^{4,8-10} as well as an increased prevalence of non-communicable diseases

(NCDs).^{8,11,12} This is similar to the changes that have occurred in other LMICs such as Thailand, Bangladesh and India.¹³⁻¹⁵

A core challenge for Vietnam in combating the negative effects of the nutrition transition is to implement appropriate prevention strategies to halt the increasing prevalence of obesity and NCDs, against a background of prevailing micronutrient deficiencies and infectious diseases. Critical to these efforts is the capacity development of Vietnamese health professionals with sufficient PHN knowledge, skills and abilities to influence policy-making and program delivery. PHN education and training are key components of this capacity development as they would help contribute understanding and skills to help address the dual burden of malnutrition and NCDs.^{16,17}

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Conventional nutrition science has evolved from medicine and clinical applications centred on undernutrition.¹⁸⁻²⁰ This traditional disciplinary focus has been highly effective in advancing nutrition science and its application to policies and programs to tackle classic nutrient deficiency diseases.¹⁸⁻²⁰ However, the nutrition transition has introduced new nutrition problems. A new way of conceptualising nutrition science is needed so that the discipline is more relevant to contemporary nutrition challenges.^{21,22} One prominent example of a reform agenda for nutrition science is the 'New Nutrition Science' project as captured in 'The Giessen Declaration'. The Giessen Declaration proposes that the scope of the nutrition science discipline should be extended from its traditional biological basis to also encompass environmental and social dimensions.^{23,24} In this paper the term 'traditional nutrition' refers to nutrition science as consisting of a biological dimension alone, whereas 'new nutrition' refers to the extension of the scope of the discipline from the biological dimension to also include social and environmental dimensions.

There have been several proposals for the enhancement of university nutrition education in developed countries such as Australia, England, Japan, the United States, and other high-income European countries, in particular, the integration of PHN into the curricula for medical and allied health students.²⁵⁻²⁹ However, there is little knowledge about university nutrition education in developing countries where the socioeconomic situation and university education context are quite distinct from those in developed countries. An investigation in 11 Latin American countries revealed that the term 'public health nutrition' is still poorly understood (even among nutrition students and professionals).³⁰ Investigations in India found that PHN has not developed as an independent discipline in colleges and universities and is not taught in the programs of related disciplines.³¹ A report to provide background information on academic programmes (undergraduate and graduate) on human nutrition in 16 West African countries found that West African nutrition academic programmes and research institutes do not adequately meet the demand for nutritionists and technical services in the region.³² Several studies have found that one of the barriers to the expansion of nutrition education in higher education in both developing countries and developed countries is the shortage of knowledgeable lecturers who can transfer knowledge and serve as role models in practice and research.^{27,33,34}

PHN is not available as an independent subject, program, or discipline in Vietnamese colleges or universities. Instead, the subjects named 'Nutrition' or 'Nutrition and Food Safety' are regulated by the Vietnamese Ministry of Education and Training (MOET) as required courses in university programs for undergraduates in early childhood education, food science, medical and allied health sciences (e.g. nursing, public health, dentistry).

Nutrition issues are multi-sectoral problems that require multi-sectoral solutions, and multi-sectoral nutrition responses strengthen nutrition outcomes.^{35,36} In discussing how to mitigate the burden of malnutrition and NCDs, the WHO has called for incorporation of the public health and nutrition aspects of NCD prevention and control in

the teaching curricula for medical and allied health personnel and in the provision of in-service training.³⁷ Several researchers have emphasized the importance of PHN training for client-oriented professionals (such as teachers, community partitioners, dietitians, agriculturists).³⁸⁻⁴¹ As the building of the Vietnamese nutrition and dietetics workforce has just commenced (the enrolment for the first bachelor program was in 2013), it is particularly critical to enhance the nutrition training that is already integrated into available training curricula for undergraduate students in associated disciplines such as medicine, nursing, public health, allied health sciences, food science and processing, and education.

At present, we know little about opportunities and barriers to the enhancement of nutrition in professional education in LMICs. For example, little is known about health and education professionals' views and experiences about nutrition teaching in university. As shown in studies in high income countries, the views of these professional groups are important because they play key roles in the communication of nutrition and health knowledge to future health and education professionals and the broader community, and influence policy-making.^{42,43}

This study aimed to examine health professionals', school education professionals' and nutrition lecturers' views and experience of nutrition teaching in university, as well as professional development opportunities and barriers for nutrition lecturers to enhance PHN teaching in Vietnamese universities. Our main research questions are: *Do we need to improve the current situation of PHN teaching, and, if so, why and how?*

MATERIALS AND METHODS

Survey sample and procedure

During late November 2014 and mid-January 2015, an online survey was conducted among Vietnamese health and school education professionals and university nutrition lecturers. Initially, purposive sampling was used to recruit potential participants who were identified from their participation in two earlier qualitative studies (interviews). These included health professionals (general practitioners, nurses, health and nutrition administrators), school education professionals (school principals, teachers), and university nutrition lecturers. Each of these respondents then asked to suggest colleagues who could be contacted for inclusion in the study - 'snowballing'.

In order to extend the sampling to include potential participants from different cities and provinces in Vietnam, additional approaches were used. 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. 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 (principals and teachers) in schools. The websites of 18 Vietnamese universities were used to contact individual nutrition lecturers in academic departments which provided undergraduate courses in education, food science and processing, medicine and health sciences.

Initial communication with possible participants was made via email to request their participation and to forward the email to their colleagues who might be potential participants (snowballing). The email included the invitation letter, links to a plain language statement and the questionnaire. A reminder email was sent to potential participants one week after the first email was sent.

In total, 1,289 emails were sent, including 48 emails to the third parties, 170 emails to potential health professional participants (from the list provided by the NIN), 39 emails to education administrators in the provincial departments of education. We contacted heads of academic departments who advised us to contact lecturers directly. Because their specialties were unclear from the email listings, we sent blanket emails to 1,032 lecturers in these faculties (even though few were likely to be nutrition lecturers).

A screening question (*Have you been a health professional (general practitioner, medical doctor, nurse, nutritionist, health administrator), or school education professional (school principal, teacher), or university lecturer who taught nutrition or other nutrition related subjects to students in education, food science and processing, medicine or health sciences (nursing, pharmacy, dentistry, nutrition and public health?)*) was used to ensure that only professionals from the targeted groups participated in the survey.

There was no incentive paid for participation.

The questionnaire

The questions were based on several sources. In particular, the questions about barriers to nutrition teaching, and organisations suitable to provide nutrition training courses to lecturers were mainly based on the findings from two earlier qualitative studies (available on request from the corresponding author) and also on several health workforce development reports.^{26,34,44,45} The questions about the PHN topics for lecturers' further training (questions only for respondents who identified themselves being lecturers) were informed by The Core Curriculum for Nutrition in the Education of Health Professionals,^{46,47} and the Competency Framework for Global Public Health Nutrition Workforce Development.¹⁷ Questions about actions proposed for the improvement of university nutrition teaching were informed by the Building Global Alliances for Public Health Nutrition Training report.⁴⁸

The survey items were administered in rotated order for each of the main questions. Five-point response scales: Strongly disagree (1), Disagree (2), Not sure (or Neutral) (3), Agree (4), Strongly agree (5) were employed for the questions about barriers to university nutrition teaching, and actions to improve university nutrition teaching. Three-point response scales: No (1), Maybe (2), and Definitely (3) were used for the questions about lecturers' interest in PHN training topics, and organisations suitable to provide nutrition training courses to lecturers. The final section of the survey inquired about respondents' demographic and professional information, including age, gender, residential location (name of province/city), educational degree and background, current occupation, number of years of service, name of institution of the respondents. The lecturers were asked to name their disci-

plinary speciality as well as the subjects they had taught in the two preceding years.

Data analysis

The responses were analysed via IBM SPSS Statistics (version 22, 2014). Frequency analyses of the demographic factors summarised the characteristics of the sample. The respondents' occupations were divided into three groups: (1) nutrition lecturers; (2) health professionals (general practitioners, medical doctors, nurses, and health administrators); (3) school professionals (school principals, teachers). Within the nutrition lecturer group, three subgroups were determined: (a) education lecturers; (b) food science lecturers; (c) health lecturers. Comparisons of responses between the three main professional groups, as well as between the three lecturer subgroups were examined via the Crosstabs program (Table 1, 2).

Exploratory factor analysis (principal components with Varimax rotation) was conducted to understand the structures of the perceived barriers to university nutrition teaching (Table 1), and of the PHN training courses that the lecturers desired to learn (Table 2). The internal reliability of the factors was assessed via Cronbach's α .

The percentages of 'strongly agree' and 'agree' responses to barriers facing university nutrition education in the three professional groups were aggregated and the three professional groups were compared by one-way ANOVA (with Tamhane post hoc tests) to test the hypothesis that the *patterns* of responses differed between the three groups. Hypothesized differences between the three lecturer subgroups in the *patterns* of responses to desired nutrition topics were also examined in a similar manner.

Finally, the relationships between the factor scores and likely predictor variables were examined through multiple linear regression, including regression with dummy variable (the health lecturer subgroup being chosen as the reference category) to explore the influences on lecturers' learning interests in PHN topics (Table 3). $p < 0.05$ was accepted as the level of statistical significance.

RESULTS

Two hundred and forty-two Vietnamese professionals completed the survey. They were composed of three occupation groups: health professionals (57 respondents, 23.6%), school professionals (46 respondents, 19.0%), and nutrition lecturers (139 respondents, 57.4%). Sixty-five percent of the respondents were female. The mean of age of the sample was 37.4 years (SD: 9.6). The mean of number of years of service in current occupation was 12.9 (SD: 9.3). Almost 62% of the respondents had postgraduate degrees, including more than one-fifth (21.5%) having doctoral degrees. The respondents were from many institutions across 29 provinces and major cities in Vietnam.

University lecturers' interest in learning about PHN topics

The three topics that most lecturers were interested having further training in were 'nutrition-related chronic diseases', 'pregnancy - breast-feeding - infant nutrition', and 'dietary recommendations and guidelines' (Table 1, over 60%). The three topics that attracted the lowest interest

Table 1. Summary of the three professional groups' views of barriers impeding university nutrition teaching[†]

No	Item	Rotated factor loadings	University lecturers n=104 [‡]	Health professionals n=45 [‡]	School teachers n=32 [‡]	Total n=181 [‡]	Chi-sq. (df) n=181
1	Large classes prevent lecturers from using interactive teaching methods	0.477	81.7	75.6	90.6	81.8	2.85 (2)
Factor 1: Resource limitations (Cronbach's $\alpha=0.836$)							
2	Ministry of Education and Training's curriculum frameworks are too rigid	0.564	70.2	77.8	81.3	74.0	1.99 (2)
3	Lack of up-to-date materials for teaching nutrition (e.g. research papers)	0.654	69.2	77.8	81.3	73.5	2.38 (2)
4	Inadequacy of time provided for the subject	0.620	67.3	73.3	71.9	69.6	0.633 (2)
5	Lack of accurate teaching materials in nutrition (e.g. textbooks)	0.641	59.6	84.4	78.1	69.1	16.0 (4)**
6	Lecturers' inadequate knowledge of some specific topics	0.526	64.4	77.8	71.9	69.1	2.77 (2)
7	Lack of interest in learning nutrition among some students	0.511	55.8	71.1	78.1	63.5	6.76 (2)*
Factor 2: Lecturer problems (Cronbach's $\alpha=0.910$)							
8	Lack of on-the-job training for nutrition lecturers	0.627	78.8	77.8	81.3	79.0	0.140 (2)
9	Limited ability to use English among lecturers	0.580	70.2	73.3	71.9	71.3	0.158 (2)
10	Lack of information about the development of the discipline among lecturers	0.763	69.2	71.1	71.9	70.2	0.107 (2)
11	Lack of support from academic departments to nutrition teaching	0.774	66.3	71.1	62.5	66.9	0.654 (2)
12	Lecturers do not keep update with the development in nutrition	0.803	57.7	68.9	62.5	61.3	3.99 (4)
13	Lack of cooperation among colleagues to enhance nutrition teaching	0.674	50.0	66.7	59.4	55.8	5.73 (4)

Cramer's V values were checked, these ranged between 0.024 and 0.210, presenting small to medium size effects according to Cramer's criteria.^{29,30}

[†]Only respondents who answered 'Yes' to the previous question of 'There are any barriers which prevent improvements and changes in nutrition teaching in universities' continued with the questions to indicate the items of specific barriers.

[‡]% who agreed or strongly agreed.

* $p<0.05$, ** $p<0.01$.

included 'food policy', 'impacts of food policy on food supply and demand', and 'impacts of food marketing on food consumption' (approximately 30%). Three differences between the three lecturer subgroups were found: the health lecturers were more interested in learning about 'nutrition-related chronic diseases', 'dietary recommendations and guide lines' and 'basic cooking skills' than their education and food science colleagues (Table 1).

The factor analysis of the lecturers' desired nutrition topics derived four factors. Factor 1 represents 'basic nutrition' topics, factor 2 represents 'food policy', factor 3 represents 'basic food science', and factor 4 represents topics in 'new trends' (Table 1).

Differences in the lecturer subgroups' patterns of desired training topics

The One way ANOVA (with Tamhane post hoc tests), conducted on the aggregated data from the percentages of 'definitely' responses to the multi-pronged question of lecturers' interest in PHN training topics, showed that the patterns of desired training topics differed between the three lecturer subgroups: $F(2, 81)=11.8$, $p<0.001$; in particular the pattern for the health lecturers ($M=52.6$, $SD=14.7$) differed significantly from that of the education

lecturers ($M=36.5$, $SD=12.1$) and the food science lecturers ($M=44.3$, $SD=9.93$). The pattern for the education lecturers differed significantly from that of the food science lecturers.

Barriers to nutrition teaching

When asked about the barriers to nutrition teaching in university, three-quarters of all the respondents (74.8%) and of the lecturer group (74.6%) believed that there were barriers that prevented the improvement of nutrition teaching in university. Chi-square analyses showed no differences between the three professional groups, or between the three subgroups of lecturers in their perceptions of barrier existence to nutrition teaching in university. The respondents who said 'yes' to the question of the existence of barriers to nutrition teaching went on to identify specific barriers that they felt were impeding nutrition teaching in university.

Key identified barriers to nutrition teaching included: 'lack of on-the-job training for lecturers', 'inflexibility of available curriculum frameworks', and 'lack of information about developments in disciplinary teaching'. The lecturers were less likely than the other two groups to identify 'lack of accurate nutrition teaching materials' and

Table 2. Summary of nutrition training courses lecturers would like to attend

No	Item	Rotated factor loadings	Education lecturers n=38 [†]	Food lecturers n=51 [†]	Health lecturers n=45 [†]	Total n=134 [†]	Chi-sq. (df) n=134
Factor 1: Basic Nutrition (Cronbach's $\alpha=0.855$)							
1	Nutrition-related chronic diseases	0.644	56.3	62.0	95.2	71.8	17.6 (2)****
2	Peri-natal nutrition (e.g. pregnancy, breast-feeding, infant nutrition)	0.651	59.4	56.0	78.6	64.5	5.58 (2)
3	Dietary recommendations and guidelines	0.698	37.5	52.0	85.7	59.7	19.6 (2)****
4	Identification of bio-markers of nutrition status	0.517	43.8	58	64.3	56.5	3.20 (2)
5	The diets of different population groups (e.g. men, women, children, aged groups)	0.567	43.8	44.0	59.5	49.2	2.71 (2)
Factor 2: Food Policy (Cronbach's $\alpha=0.917$)							
6	Food legislation and regulation	0.770	25	42.0	47.6	39.5	6.71 (4)
7	Food security and sustainability	0.635	28.1	40.0	42.9	37.9	1.83 (2)
8	Food system	0.636	18.8	48.0	38.1	37.1	8.75 (4)
9	Food policy	0.684	18.8	36.0	40.5	33.1	5.41 (4)
Factor 3: Basic Food (Cronbach's $\alpha=0.856$)							
10	Nutritional composition of food	0.578	53.1	54.0	69.0	58.9	2.72 (2)
11	Basic food science	0.686	56.3	40.0	45.2	46.0	6.01 (4)
12	Basic cooking skills	0.693	43.8	26.0	50.0	38.7	12.1 (4)*
Factor 4: New Trends (Cronbach's $\alpha=0.959$)							
13	Nutrition research skills (qualitative and quantitative)	0.609	40.6	60.0	61.9	55.6	3.98 (2)
14	Skills of assess of nutritional status	0.485	50.0	52.0	57.1	53.2	0.423(2)
15	Developing trends in nutrition research	0.773	40.6	52.0	52.4	49.2	1.27 (2)
16	Nutrition and environmental sustainability	0.719	40.6	52.0	50.0	48.4	1.08 (2)
17	Developing trends in nutrition training	0.775	37.5	50.0	45.2	45.2	1.23 (2)
18	Influences on food choice and consumption	0.565	37.5	50.0	40.5	43.5	1.48 (2)
19	Trends in the populations' health and nutrition status	0.658	28.1	48.0	47.6	42.7	3.77 (2)
20	Nutritional surveillance	5.17	31.3	40.0	52.4	41.9	7.98 (4)
21	Food and ecology	0.553	37.5	38.0	47.6	41.1	1.11 (2)
22	Nutritional intervention in community	0.671	25.0	40.0	52.4	40.3	7.80 (4)
23	Stakeholders' roles (e.g. government, food industry, social organisations) in shaping food environment	0.648	25.0	40.0	38.1	35.5	4.73 (4)
24	Skills of working with the community	0.700	25.0	28.0	47.6	33.9	6.15 (4)
25	Nutrition advocacy skills	0.685	28.1	28.0	45.2	33.9	4.98 (4)
26	Impacts of food marketing on food consumption	0.532	18.8	34.0	40.5	32.3	4.22 (4)
27	Impacts of food policy on food supply and demand	0.659	25.0	34.0	31.0	30.6	1.06 (4)
Other							
28	Food labelling	0.493	46.9	36.0	47.6	42.7	4.28 (4)

Cramer's V values were calculated, these ranged between .065 and .398, presenting small to moderate size effects according to Cramer's criteria.^{29,30}

[†]Who indicated 'Definitely'.

* $p<0.05$, ** $p<0.01$, *** $p<0.001$, **** $p<0.0001$.

'lack of interest in learning nutrition among some students' as barriers (Table 2).

The factor analysis of the perceived barriers derived two main 'barrier' factors. Factor 1 represented 'resource limitations', and factor 2 represents 'professional constraints' including the barriers related to the lack of relevant professional development opportunities for lecturers to teach nutrition (Table 2).

Differences in the groups' patterns of perceived barriers

The comparisons on aggregated data (conducted from the percentages of 'strongly agree' and 'agree' responses to the question of barriers to university nutrition education) showed that the *patterns* of perceived barriers differed between the three professional groups: $F(2, 36) = 4.4$, $p < 0.05$; in particular, the *pattern* for the health professionals ($M = 74.4$, $SD = 4.76$) was significantly different from that of the lecturers ($M = 66.2$, $SD = 8.85$). The

Table 3. Summary of regression analyses of the scores of 4 factors of nutrition courses that lecturers would like to learn

	Standardised β			
	Basic nutrition score [†]	Food policy score [†]	Basic food score [†]	New trends score [†]
R ²	23.4% (16.6%)	15.5% (8.0%)	23.1% (16.3%)	18.8% (11.6%)
Nutrition importance	0.206*	0.203*	0.196*	0.201*
Barriers - Lecturer problems [‡]	–	–	0.306*	0.253*
Barriers - Resource limitation [‡]	–	–	–	–
Age	–	–	–	–
Women	–	–	–	–
Education level	–	–	–	–
Years of service	–	–	–	–
Five main cities	–	–	–	–
Education lecturers vs Health lecturers	-0.256**	–	–	–
Food lecturers vs Health lecturers	-0.204*	–	-0.231*	–

[†]Factor 1, 2, 3, 4 (Table 2).

[‡]Factor 1, 2 (Table 1).

R²=the proportion of variance in the scores accounted for by the predictor variables.

* $p < 0.05$, ** $p < 0.01$.

Nutrition Importance: Total scores of agreement for the need of nutrition knowledge for professional practices - Strongly disagree (1) ... Strongly agree (5).

Age: 5 age groups; under 25 (1), 26-35 (2), 36-45 (3), 46-55 (4), 56 and older (5).

Education level: 3 levels; Bachelor degree (1), Master degree (2), Doctoral degree (3).

Years of service: 7 groups; under 5 (1), 6-10 (2), 11-15 (3), 16-20 (4), 21-25 (5), 26-30 (6), over 31 (7).

Five main cities: living in one of the five main cities of Vietnam (Hochiminh City, Hanoi, Danang, Cantho and Haiphong).

pattern for the school professionals ($M=69.6$, $SD=6.95$) did not differ significantly from either of the *patterns* of the health professionals or the lecturers.

The differences between the three lecturer subgroups' perceptions of barriers to nutrition teaching was also examined. Although no major differences were found between the three lecturer subgroups in their perceptions of the specific barriers, the *patterns* of perceived barriers differed between the three lecturer subgroups groups: $F(2, 36)=5.7$, $p < 0.01$; in particular, the *pattern* for the health lecturers ($M=73.4$, $SD=11.4$) was significantly different from that of the food science lecturers ($M=59.1$, $SD=11.4$). The *pattern* for the education lecturers ($M=66.5$, $SD=9.16$) did not differ significantly from those of the health lecturers or the food science lecturers.

Influences on lecturers' interest to have further training in PHN topics

Multiple regression analysis showed positive relationships between the lecturers' beliefs about 'nutrition importance' for professional practice and their learning interests in all four nutrition knowledge areas; positive relationships between lecturers' awareness of 'professional constraints' and their learning interests in 'basic food science' and 'new trends' (Table 3). A regression analysis with dummy variable, the health lecturer subgroup being chosen as the reference category, showed that the health lecturers had more interest in learning about 'basic nutrition', and food science lecturers had less interest in learning about 'basic food science'. However, no differences were found between the lecturer subgroups in their interest in learning about 'food policy' and 'new trends'. Demographic factors did not influence lecturers' interest in learning about nutrition topics (Table 3).

Likely course providers

When asked to identify the organisations that could pro-

vide PHN training courses for university lecturers, the National Institute of Nutrition was the most popular, being chosen by three quarters of the lecturers (76.0%), followed by the professional health or nutrition associations (60.8%), and Hochiminh City Centre of Nutrition (53.6%). More than one-fifth of the lecturers believed food companies were suitable to provide nutrition training courses to them (20.8%). No differences were found between the three lecturer subgroups in these views.

University lecturers' intended actions to gain nutrition knowledge

In order to improve their nutrition knowledge and teaching, more than half of the lecturers expressed their willingness to join a nutrition society (54.7%), or a PHN society (43.4%). Similar proportions of lecturers indicated their willingness to take online (69.8%) and face-to-face training courses (68.6%).

Actions for improving university nutrition teaching

The substantial majority of lecturers expressed their support for the development of a system that recognises advanced practice in nutrition education and training (86.4%), establishment of an accreditation system for university nutrition courses (84.0%) and a registration system for nutrition lecturers (77.6%).

DISCUSSION

The purpose of this study was to examine nutrition lecturers', health professionals' and school professionals' views and experience of nutrition teaching in university, as well as professional development opportunities and barriers for nutrition lecturers to enhance their teaching. Previous research in the area of university nutrition teaching has mainly been in developed countries. This study, to our knowledge, is the first to investigate the issues related to the education and training of nutrition professionals who

will themselves communicate nutrition knowledge to the future nutrition professional workforce and the broader community in Vietnam.

The topics for extended training that the lecturers were most interested in receiving included the conventional areas of nutrition science such as peri-natal nutrition (e.g. pregnancy, breast-feeding, infant nutrition), nutritional composition of food rather than 'newer' areas such as food policy and food marketing. Indeed, the 'food policy' factor had the lowest mean interest scores. Our observation of current nutrition curricula in Vietnamese universities indicates that topics such as food policy, food marketing, and food environments and systems are generally absent from programs (QP's unpublished PhD thesis). In other words, the lecturers maintained their traditional focus on the biological dimension of nutrition science. This suggests either that the lecturers are already familiar with the 'new' knowledge areas or, more likely, they were unaware or poorly informed about nutrition science's social and environmental dimensions as identified in the 'new nutrition science'. The explanation above is likely because the lack of up-to-date materials for teaching and information about recent developments in disciplinary teaching were identified as major professional development barriers to the improvement in nutrition teaching. It is also likely that overemphasis on traditional didactic teaching approaches presents challenges for lecturers to think critically and conceptually about the nature and scope of nutrition science. We did not examine this issue in the present study. However, given the lack of culture of critical reflection and thinking towards challenging conventional orthodoxy and bringing in new concepts is common in less developed countries, this is a reasonable explanation for the results and high lights the need of further research on this area. Frenk and his colleagues, in discussing the urgent demand to transform the education of health professionals to strengthen health systems, commented that a narrow technical focus without broader contextual understanding results in professional education not keeping pace with contemporary challenges.⁴⁹

The similarities between the three lecturer subgroups' relatively poor awareness of the importance of new areas of nutrition science such as food policy and food environment raise a question about their knowledge and preparedness to teach about these and related topics. This is concerning because it suggests that future professionals who will serve in a wide range of professions and social positions may not be adequately prepared to support and deliver food and nutrition policies and programs. In the context of Vietnam undergoing the nutrition transition and experiencing the double burden of malnutrition and diseases, this is a critical shortage.

The differences in the *patterns* of preferred PHN topics between the three lecturer subgroups might be explained by differences in their perceptions of the relevance of nutrition knowledge for professional practice. Education lecturers might focus on the role of nutrition in the context related to nutrition education in school, whilst health lecturers are likely to focus the role of nutrition in disease treatment, and food science lecturers might draw on their nutrition knowledge to support food production.

There was general agreement that the major impediments to nutrition teaching in university included large classes, lack of training for lecturers, lack of up-to-date teaching materials, lack of information about recent disciplinary developments, as well as limited English proficiency amongst lecturers. These findings are consistent with the results of an earlier qualitative study conducted by the authors (available on request) and other studies in developing countries which identified similar themes.^{50,51} The two main sets of barriers identified in this study are similar to those identified in studies of nutrition education for medical and allied health undergraduates in the United States, specifically the lack of resources and trained nutrition experts.^{45,52}

In the present study, 70.2% of the lecturers felt that compliance with curriculum frameworks (regulated by MOET) impeded their teaching. This is inconsistent with our earlier qualitative study that showed that most nutrition lecturers did not see the compliance with the frameworks as a barrier. The nutrition lecturers in our earlier qualitative study commented that MOET's curriculum frameworks permit new developments within a general set of curriculum guidelines, and that university lecturers should take responsibility to develop specific topics and contents within this framework. This difference may be because of the abbreviated nature of the items in the survey questionnaire in contrast to the more open questions asked during the interviews.

The present study's findings about students' disinterest in nutrition are consistent with the results of previous studies about nutrition education for medical students in the United States. Hark found that medical and health students need to be challenged and stimulated in their learning of nutrition. Course content should include topics which are directly relevant to students' intended professions and more engaging pedagogies should be employed.^{34,53-56} This leaves us to speculate that current tertiary nutrition curricula in Vietnam might not meet student's expectations, or there may be need for the use of more engaging teaching pedagogies.

Our qualitative study throws some light on the differences between the three professional groups' views of the barriers which impede nutrition teaching. There is no evaluation system in Vietnam to encourage lecturers to gain feedback from students to improve their teaching. This may partly explain why the lecturers were less aware of students' lack of interest in nutrition than the extramural professionals. Our qualitative study also revealed that in-service health and education professionals expect to learn more practical, professionally relevant teaching content rather than being provided with only theoretical knowledge. This may be the reason why the health professionals and the school teachers felt the lack of nutrition teaching materials as a barrier more strongly than the lecturers. This also provides an explanation for the differences in the *patterns* of perceived barriers between health professionals and lecturers.

The perceived barriers to nutrition teaching were a major influence on lecturers' interest in learning about 'new trends' in nutrition, but the demographic factors were not. One interpretation might be that the more aware they were of the importance of 'new trends' in nutrition teach-

ing, the more they perceived the barriers constraining them. Alternatively, recognition of teaching barriers may foster lecturers' interest in learning about new nutrition topics. The lecturers' disciplinary speciality did not influence their interest in learning about 'food policy' and 'new trends' suggests two things: firstly, it reinforces the widespread shortage of these knowledge areas among Vietnamese nutrition lecturers, and secondly, there are opportunities to enhance PHN education in Vietnamese universities. The respondents were highly educated, which might partly explain why the demographic factors did not influence their interest in learning about nutrition.

Implications of the findings for university nutrition teaching practice in Vietnam

The results suggest that novel approaches to nutrition teaching in Vietnamese universities might include increased dissemination of information, research reports, quality training materials, as well as the provision of novel training courses for lecturers that would promote learnings in critical and conceptual thinking. Furthermore, because limited proficiency in English is still a great obstacle for many lecturers, the translation of key papers and important reports (originally written in English) into Vietnamese is worth consideration to help improve access to up-to-date materials among university teaching staff.

The lesser priority given to food policy and the impacts of food marketing on food consumption by the lecturers suggests that they may not fully understand the drivers and effects of the nutrition transition. They may require more professional development opportunities and support to meet the educational challenges of teaching about the nutrition transition and PHN.

To foster the enhancement of nutrition education in developing countries, learning and sharing experiences and lessons with professionals in other countries are important. Collaboration between Vietnamese and overseas higher education institutions as well as participation in global alliances in PHN education should be encouraged.⁴⁸ This would help with the sharing of professional experiences and supporting access to new approaches in nutrition teaching and research.

Limitations and future research direction

Lack of adequate sampling frames was a key limitation of this study. As in many other LMICs, there are few master lists of professionals in Vietnam which can be used for research purposes. Hence we had to use several approaches to recruit participants, including purposive sampling and snowball sampling. We found that there was not a strong culture of email use in Vietnamese universities. Use of free email accounts (e.g. @gmail.com, @yahoo.com) for communication is common among Vietnamese university lecturers; only a few universities provide their staff with official email accounts. 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. Although surveys have

high external validity (generalizability⁵⁷), these findings should be interpreted cautiously and regarded as preliminary. More effort is required build suitable sampling frames to facilitate future research.

Another limitation of this study was the omission of some important questions. For example, we did not ask about which nutrition topics the extramural professionals had learnt (or not) in their university programs, or which nutrition knowledge they felt was relevant and important for their current occupation. Future studies should include these topics and also elicit the views of current university students to provide a thorough picture, reflecting multifaceted properties of nutrition teaching in professional education from the perspectives of both learners and teachers.

The identified challenges and opportunities suggest future research into the broader determinants of the nutrition transition in the Vietnamese context, including the political, social and economic aspects. These are likely to impact on the readiness of health and education ministries to support broader approaches to nutrition education and the readiness of the universities to address these issues.

Conclusions

There is a significant need for PHN training of nutrition educators in Vietnam and it is encouraging to identify the substantial amount of interest and enthusiasm among Vietnamese nutrition lecturers towards receiving further nutrition training. However, the professionals participating in this study maintained a strong preference for training in the traditional focus on the biological dimension of nutrition science. This preference may be because of insufficient professional development opportunities for them to keep up-to-date with knowledge in nutrition research and teaching. This suggests several opportunities to enhance PHN professional development among university lecturers in Vietnam. Strong leadership at national and departmental levels will be required to set a clear agenda for changes in this area.

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