Original Article

หน้าที่ของเภสัชกรในการให้บริการด้านผลิตภัณฑ์เสริมอาหาร : มุมมองของ เภสัชกรชุมชน และเภสัชกรโรงพยาบาล

Pharmacists' Responsibilities with Respect to Dietary Supplements : Perceptions of Thai Community and Hospital Pharmacists

ทิพาพร กาญจนราช[*][1], อีเนส คราส[2], โรเบริต์ จี คัมมิ่ง[3]

Tipaporn Kanjanarach[*][1], Ines Krass[2], Robert G Cumming[3]

[1] Pharmacy Practice, Faculty of Pharmaceutical Sciences, Khon Kaen University, Thailand 40002

[2] Faculty of Pharmacy, The University of Sydney, Australia 2006

[3] School of Public Health and Centre for Education and Research on Ageing, The University of Sydney, Australia 2006

Abstract

This study aimed to explore Thai pharmacists' perceptions of their responsibilities when providing services in relation to dietary supplements (DS). Self–administered postal questionnaires were used to collect data from community pharmacists and hospital pharmacists in the North-eastern region of Thailand. Structural Equation Modelling was performed to develop factor models of the tasks which pharmacists perceived as their responsibilities. Data from 207 community pharmacists and 178 hospital pharmacists were used for the analysis. A factor model showed that community pharmacists perceived that their responsibilities should include five tasks: being the public's source of DS information; determining the necessity of DS use; advising clients in choosing DS products; giving education on eating and healthy lifestyles and providing counselling on DS use. This factor model fitted data at a moderate level (χ^2_5= 13.87, n = 207, P =0.021, Relative Chi-square = 2.77, AGFI =0.92, CFI = 0.96, RMSEA = 0.07). The reliability of the factor model was 0.81. A factor model of hospital pharmacists showed that hospital pharmacists perceived that their responsibilities should include six tasks: being the public's source of DS information; determining the necessity of DS use; advising clients in choosing DS products; referring clients to doctors if using DS is not appropriate; providing counselling on DS use and reporting DS adverse effects to the authority. The factor model fitted data well (χ^2_9=11.43, n = 178, P =0.247, Relative Chi-square = 1.27, AGFI =0.95, CFI = 0.99, RMSEA = 0.04). The reliability of the factor model was 0.84. The findings from this study suggested that although community and hospital pharmacists had different views about their responsibilities in relation to DS, both groups of pharmacists appeared to be willing to adopt professional responsibilities for safe use of DS.

Keywords: Dietary supplements, Community pharmacists, Hospital Pharmacists

[*] ผู้เขียนที่สามารถติดต่อได้ : ทิพาพร กาญจนราช คณะเภสัชศาสตร์ มหาวิทยาลัยขอนแก่น โทรศัพท์ 0-4320-2378 โทรสาร 0-4320-2379
email : otipkan@kku.ac.th

บทคัดย่อ

การศึกษานี้มีวัตถุประสงค์ เพื่อสำรวจมุมมองของเภสัชกรไทยต่อหน้าที่ของเภสัชกรในการให้บริการด้านผลิตภัณฑ์เสริมอาหาร โดยเก็บข้อมูลจากเภสัชกรชุมชนและเภสัชกรโรงพยาบาล ซึ่งปฏิบัติงานในภาคตะวันออกเฉียงเหนือด้วยแบบสอบถาม วิเคราะห์ข้อมูลโดย อาศัยเทคนิค Structural Equation Modelling ในการสร้าง Factor model เพื่อหาว่างานใดที่เภสัชกรเห็นว่าเป็นหน้าที่ที่ต้องปฏิบัติเมื่อมีการให้บริการด้านผลิตภัณฑ์เสริมอาหาร ข้อมูลที่ใช้ในการวิเคราะห์มาจากเภสัชกรชุมชนจำนวน 207 ราย และจากเภสัชกร โรงพยาบาล 178 ราย. เภสัชกรชุมชนมองว่าหน้าที่ของเภสัชกรชุมชนในการให้บริการด้านผลิตภัณฑ์เสริมอาหารควรประกอบด้วย 5 งาน คือ การให้ความรู้เรื่องผลิตภัณฑ์ การช่วยพิจารณาความจำเป็นของการใช้ผลิตภัณฑ์ การให้คำแนะนำเกี่ยวกับการเลือกผลิตภัณฑ์ การให้ความรู้เกี่ยวกับการบริโภคอาหารและการดำรงชีวิตเพื่อสุขภาพที่ดี การให้คำปรึกษาเกี่ยวกับการใช้ผลิตภัณฑ์ Factor model สามารถเป็นตัวแทนของข้อมูลได้ในระดับปานกลาง (χ^2_5= 13.87, n = 207, P =0.021, Relative Chi-square = 2.77, AGFI =0.92, CFI = 0.96, RMSEA = 0.07) และมีความเที่ยง = 0.81. เภสัชกรโรงพยาบาลมองว่าหน้าที่ของเภสัชกรโรงพยาบาลในการให้บริการด้านผลิตภัณฑ์เสริมอาหารควรประกอบด้วย 6 งาน คือ การให้ความรู้เรื่องผลิตภัณฑ์ การช่วยพิจารณาความจำเป็นของการใช้ผลิตภัณฑ์ การให้คำแนะนำเกี่ยวกับการเลือกผลิตภัณฑ์ การส่งต่อผู้ใช้ผลิตภัณฑ์ให้ปรึกษาแพทย์หากเห็นว่าการใช้ผลิตภัณฑ์ดังกล่าวอาจเป็นการไม่เหมาะสม การให้คำปรึกษาเกี่ยวกับการใช้ผลิตภัณฑ์ การรายงานอาการไม่พึงประสงค์จากการใช้ผลิตภัณฑ์ให้หน่วยงานที่รับผิดชอบทราบ Factor model สามารถเป็นตัวแทนของข้อมูลได้ในระดับดี (χ^2_9=11.43, n = 178, P =0.247, Relative Chi-square = 1.27, AGFI =0.95, CFI = 0.99, RMSEA = 0.04) และมีความเที่ยง = 0.84. ผลการศึกษานี้แสดงว่า ถึงแม้เภสัชกรชุมชนและเภสัชกรโรงพยาบาลจะมีมุมมองเกี่ยวกับหน้าที่ของเภสัชกรในการให้บริการด้านผลิตภัณฑ์เสริมอาหารที่แตกต่างกัน แต่เภสัชกรทั้งสองกลุ่มเห็นเหมือนกันว่า การส่งเสริมความปลอดภัยในการใช้ผลิตภัณฑ์เสริมอาหารเป็นหน้าที่ของเภสัชกร

คำสำคัญ: ผลิตภัณฑ์เสริมอาหาร, เภสัชกรชุมชน, เภสัชกรโรงพยาบาล

Introduction And Objectives

Thailand, like many other countries, is now facing potential risks posed by the widespread unnecessary use of dietary supplement products (DS). It is known that the traditional Thai diet is rich in vitamins and minerals obtained from aquatic animals, plants and herbs. Fresh ingredients routinely used in Thai traditional cooking are also much cheaper than DS. Hence, there seems to be no need for manufactured dietary supplementation. Nevertheless, the sales statistics show that the demand for DS in Thailand is high and continues to increase: the sales were 1,673.2million Baht in 2001, 2,324.8million Baht in 2005 and are estimated to reach 2,921.4million Baht by 2010 (Euromonitor International, 2007). The increasing demands have been claimed to be the result of lifestyle changes, heightened concerns about health in the community, and aggressive direct-to-consumer marketing (Anantachoti, 2001; Euromonitor International, 2007; MOPH, 2005). The rise in the use of DS has raised concerns within the healthcare community regarding the appropriate use and the potential risk of these products. Recent studies have found that some DS may interact with other medicines used by patients, can cause adverse effects, and were contaminated by poisonous substances (Almeida and Grimsley, 1996; Bradley, 1991; Fung-Berman, 2000; Haller and Benowitz, 2000; Lake et al., 1990; Pentel, 1984). Since pharmacists already have an established role in providing drug information and counselling on medicine, it seems logical that these counselling activities should be expanded to

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address the appropriate use of DS. However, in Thailand, community pharmacists are not accessible to the majority of the population and not all Thai pharmacies are staffed by pharmacists. In 2003, there were 8,801 pharmacies staffed by pharmacists, 40% of these pharmacies were concentrated in Bangkok which has only 10% of the national population (BMA, 2004; MOPH, 2005). Unlike pharmacies, government hospitals are located in every district and are readily accessible to the public, making hospital pharmacists well placed to fulfil this role. However, it is not known whether or not pharmacists are willing to take on this responsibility.

The aim of this study was to identify the tasks which pharmacists perceived as their responsibilities when providing services in relation to DS. It should be noted that prior to the start of this study, there was no Thai official definition of dietary supplements. For the purposes of this study, the term 'dietary supplements' (DS) refers collectively to vitamins, minerals, amino acids, herbs, a concentrate, metabolites, constituents, botanical or animal extracts. The products must be used by ingestion in the form of pills, capsules, tablets, powder or liquid. The term 'DS' did not cover herbal tea which was consume as food, or dry plants which were considered as traditional medicines e.g. traditional Thai medicines, traditional Chinese medicines, etc.

Materials And Methods

Study subjects and sampling

Subjects were community pharmacists and hospital pharmacists working in five randomly selected provinces in the North-eastern region of Thailand. This region was selected because the ratio of population to pharmacists is the worst in Thailand (MOPH, 2005), meaning that each

pharmacist is likely to see larger number of population and might have more problems in delivering DS services. The Province was used as the unit of sampling instead of pharmacist because an updated and reliable list of pharmacists can only be found at provincial level. The minimum sample size to ensure appropriate use of maximum likelihood estimation in Structural Equation Modelling is about 100 but the optimal sample size should be about 200 (Hair et al., 1998). Hence it was aimed to recruit at least 150 subjects for each pharmacist group (community and hospital). It was estimated that the response rate would be 60% and that about 50% of pharmacists in each province worked in community pharmacies. Therefore at least 500 pharmacists needed to be contacted. The following steps were taken when selecting provinces. First, the 19 provinces in the region were classified into three groups according to the number of pharmacists: four large provinces which had about 150 to 250 pharmacists; seven medium provinces of 70 to 100 pharmacists and eight small provinces of 30 to 50 pharmacists. Then five provinces were randomly selected: one large province; two medium provinces and two small provinces. After the provinces were identified, lists of pharmacists were provided by the individual Provincial Health Office. In total, there were 603 pharmacists in these five randomly selected provinces.

Survey questionnaire development and data collection

Self-administered postal questionnaires were used to collect data. The development of the survey instrument commenced with qualitative in-depth face to face interviews with ten pharmacists working in the North-eastern region of Thailand. Four were full time community pharmacists, two were full-time hospital pharmacists, and four worked

both in community pharmacies and hospitals. The aim of the interviews was to gather information about how pharmacists currently provide service in the area of DS and what tasks should be included as parts of pharmacists' responsibilities when providing services in the area of DS (Kanjanarach et al., 2006). Data from the interviews and job description of community pharmacists and hospital pharmacists were combined to develop the survey questionnaire (MOPH, 1996; Pitaknitinan, 2003; Subvibulechai, 2003; Thai Pharmacy Council, 2002). The draft of the questionnaire was given to a convenience sample of seven Thai pharmacists who worked in pharmacies and hospitals and had a research background. These pharmacists were asked to answer the questionnaire and record any comprehension difficulties with the questions and/or any construction defects in the questionnaires. Following the feedback of these seven participants, some questions were reworded to increase their clarity.

Pharmacists' perceptions of their responsibilities in relation to DS were measured using 10 opinion items. Respondents were asked to indicate their level of agreement with each of the 10 items on a scale from 1 (strongly disagree) to 5 (strongly agree). Questionnaires were sent directly to each pharmacist. For the purposes of this study, pharmacists who worked both in community pharmacies and in hospitals were asked to answer the questionnaire from the perspective of community pharmacists.

Data were collected between September and December 2004. The deadline for returning the questionnaire was the fourth week after the questionnaires were sent out. Reminder letters were sent at the end of weeks 5, 8, 11 and 14 to follow-up unreturned questionnaires. This study was approved by the Human Ethics Committee of the University of Sydney

Statistical analysis

Descriptive statistics, performed in SPSS Windows Release 11.5 (SPSS Inc., Chicago, USA), were used to present demographic information of the respondents. Structural Equation Modelling (SEM) technique performed in the statistical software AMOS version 7.0 (Arbuckle, 2006), was used to develop factor models of the tasks which pharmacists perceived as their responsibilities. Separate analyses were conducted for community pharmacists and hospital pharmacists.

The models were assessed in term of parsimony, absolute fit and incremental fit. Relative Chi-square (χ^2/df) was used to determine model parsimony. Adjusted Goodness-of-fit Index (AGFI) and the Root Mean-Square Error of Approximation (RMSEA) were used to assess absolute fit of the model. The Comparative Fit Index (CFI) was used to assess incremental fit. A factor model was considered adequate fit when the Relative Chi-square is between 2.1 and 3.0, the AGFI and CFI are >0.90 and the RMSEA is $\leq$0.08 and a good fit is obtained when the Relative Chi-square is between 1.0 and 2.0, the AGFI and CFI are >0.95 and the RMSEA is $\leq$0.05 (Holmes-Smith, 2006). Construct validity and convergent validity of the factor models were computed in AMOS. Construct validity of the factor model was assessed using Model Chi-square. A P-value > 0.05 indicated that the construct of the factor model was valid. Convergent validity was achieved when the standardised regression coefficient was significantly different from zero. Reliability (ρ_η) of the factor model was computed using the formula suggested by Fornell and Larcker (1981), as shown below. The reliability values $\geq$ 0.7 indicated that the factor model was reliable (Fornell and Larcker, 1981).

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$$\rho_{\eta} = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum \varepsilon_i}$$

λ_i is the standardized loading for each observed variable

ε_i is the error variance associated with each observed variable

ρ_{η} is the reliability

Results

Summary of the response and demographic data of the survey responders

Of 603 questionnaires sent to all pharmacists working in the five selected provinces, 437 were returned. Thirty seven questionnaires were discarded because they did not contain enough information for further analysis and another 15 questionnaires were discarded because they were from pharmacists who worked in organizations which did not interact with patients or DS users. The remaining 385 questionnaires were retained for analysis, giving a response rate of 64% (385/603). Of these 385 questionnaires, 207 were from community pharmacists (CPs) and the remaining 178 were from hospital pharmacists (HPs). Selected demographic information of the respondents is presented in Table 1.

Perceptions about pharmacists' responsibilities in relation to DS

Factor model of pharmacists' responsibilities which develop from data provided by community pharmacists (CPs) comprised five items. This factor model fitted data at a moderate level (χ^2_5= 13.87, n = 207, P =0.021, Relative Chi-square = 2.77, AGFI =0.92, CFI = 0.96, RMSEA = 0.07). The standardised factor loadings of all five items in the model were significantly different from zero, suggesting the achievement of convergent validity. The reliability of the model was 0.81, indicating good reliability.

For hospital pharmacists (HPs), the factor model comprised six items. This factor model fitted data well (χ^2_9=11.43, n = 178, P =0.247, Relative Chi-square = 1.27, AGFI =0.95, CFI = 0.99, RMSEA = 0.04). The standardised factor loadings of all six items in the model were significantly different from zero, suggesting the achievement of convergent validity. The reliability of the model was 0.84, indicating good reliability.

The standardised factor loadings, the mean level of agreement with the opinion items and the correlations among all the items in the CPs' model and HPs' models are shown in Table 2 and Table 3 respectively.

Discussion

The views of CPs and HPs regarding their responsibilities in relation to DS were similar in that pharmacists should take on the responsibilities of providing DS information to the public, assisting clients to determine the necessity of DS use and providing advice to clients in choosing DS products. It should be noted that at present there is no statutory requirement for HPs to take responsibility in relation to DS (MOPH, 1996). The finding that HPs recognise that they have a role to play in the safe use of these products is an encouraging sign as it suggests that HPs would be willing to adopt professional responsibilities for safe use of DS if the government decided to introduce a statutory requirement.

The one task which CPs perceived as their responsibility but HPs did not was providing education about eating behaviour and healthy lifestyles. This can be explained by the fact that in

the hospitals there are public health nurses and nutritionists to whom pharmacists can refer patients for counselling on diet and healthy lifestyles. In contrast, in community pharmacies, pharmacists are usually the sole practitioner and are required to complete the entire service. This same reason is likely to be extended to explain why HPs felt that clients should be referred to doctors if using DS is not appropriate.

In addition, the factor model for CPs suggested that CPs were not prepared to take on the responsibility of reporting adverse effects. This is not surprising as in Thailand at present, reporting adverse effects of health products is carried out mainly by pharmacists in government hospitals, not by pharmacists in the private sector. Further, the reporting of adverse effects of medicines and health products is not yet specified in the Standard of Drugstore (Thai Pharmacy Council, 2002).

Conclusion

In this study we have explored the views of community pharmacists and hospital pharmacists about what should be the responsibilities of pharmacists in relation to DS. Overall, both community pharmacists and hospital pharmacists agreed that counseling and providing information about these products is the pharmacists' responsibilities. However, the views of community pharmacists and hospital pharmacists with respect to some tasks were different and appeared to be influenced by the environment in which they were working. Barriers to delivering DS services and any additional support required to fulfil their responsibilities in relation to DS need to be explored.

Table 1 Selected demographic information of the respondents.

		Community pharmacists (CPs) n=207	Hospital Pharmacists (HPs) n=178
Age (years)	Mean (SD)	35.4 (9.11)	29.1 (4.91)
	Min, Max	24, 75	23, 56
Gender	Male, n (%)	90 (43.5)	33 (18.5)
	Female, n (%)	117 (56.5)	145 (81.5)
Position in a	Pharmacy owner, n (%)	141 (68.1)	-
pharmacy	Employed pharmacist, n (%)	66 (31.9)	-

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Table 2   A factor model of responsibilities of pharmacists in relation to DS: Community pharmacists' perceptions

	Standardised factor loading (P value)	Error variance	Level of agreement (ranged from 1 to 5)		Correlations among variables in the model				
			Mean	SD	R1	R2	R4	R7	R8
I want the public and health colleagues to think of pharmacists as a source of information about DS (R1)	0.82 (<0.001)	0.21	4.3	0.80	1.00				
It is pharmacist's responsibility to determine whether or not clients should use DS (R2)	0.74 (<0.001)	0.30	4.2	0.83	0.62	1.00			
Pharmacists should advise clients in choosing DS (R4)	0.56 (<0.001)	0.44	4.2	0.82	0.45	0.38	1.00		
When counselling about DS, clients should be given education about proper eating behaviour and healthy lifestyles.(R7)	0.39 (<0.001)	0.25	4.7	0.54	0.29	0.32	0.22	1.00	
Counselling and providing information about DS is not the pharmacist's responsibility (R8)	0.34 (<0.001)	0.76	4.2	0.93	0.26	0.19	0.34	0.21	1.00

Note: Scales of statement R8 were reversed before being included in the model

Table 3   A factor model of responsibilities of pharmacists in relation to DS: Hospital pharmacists' perceptions

	Standardised factor loading (P value)	Error variance	Level of agreement (ranged from 1 to 5)		Correlations among variables in the model					
			Mean	SD	R1	R2	R4	R6	R8	R9
I want the public and health colleagues to think of pharmacists as a source of information about DS (R1)	0.56 (<0.001)	0.31	4.4	0.67	1.00					
It is the pharmacist's responsibility to determine whether or not clients should use DS (R2)	0.72 (<0.001)	0.26	4.2	0.74	0.39	1.00				
Pharmacists should advise clients in choosing DS (R4)	0.76 (<0.001)	0.22	4.3	0.71	0.41	0.56	1.00			
Clients should be referred to doctors if using DS is not appropriate (R6)	0.42 (0.002)	0.30	4.5	0.60	0.23	0.27	0.31	1.00		
Counselling and providing information about DS is not the pharmacist's responsibility (R8)	0.43 (<0.001)	0.48	4.3	0.77	0.28	0.28	0.32	0.18	1.00	
Pharmacists should report adverse effects of DS to the Adverse Drug Reactions Advisory Committee (R9)	0.36 (<0.001)	0.37	4.5	0.66	0.20	0.26	0.21	0.32	0.17	1.00

Note: Scales of statement R8 were reversed before being included in the model

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