Factors affecting community pharmacists' intention to provide medication management program and disease screening in Bangkok

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ABSTRACT

Objectives: To determine factors affecting community pharmacists' intention to provide medication management program (MMP) and disease screening (DS) based on diffusion of innovations theory. **Methods:** A cross-sectional study using self-administered mail survey was conducted in Bangkok. The study assessed knowledge, intention to provide each service, and indentified factors affecting community pharmacists' intention to provide MMP and DS. Community pharmacists were requested to complete the questionnaire. The four-point Likert scale was applied to measure agreement level. **Results:** The respondents reported knowing DS (59.48%) more than MMP (19.17%) and had intention to provide DS (27.60%) and MMP (24.10%) within 1 year. Likert scale data for assessing agreement level revealed that observability had the highest mean scores, whereas pharmacy readiness had the lowest mean scores among all factors. Multivariate analysis indicated that compatibility with pharmacy profession framework, compatibility with routine work procedures, and observability had positive effects, whereas complexity had a negative effect on intention to provide MMP and DS. Pharmacy readiness had positive effects on intention to provide MMP but had negative effects on intention to provide DS. Only compatibility with pharmacy profession framework had statistically significant effect on intention to provide MMP (odd ratio [OR] = 2.995, 95% confidence interval [CI] = 1.034-8.671). Complexity had statistically significant effect on intention to provide DS (OR = 0.328, 95% CI = 0.111-0.968). **Conclusions:** Findings from this study indicated that the service model for MMP must be most compatible with professional pharmacy act and not redundant with other health-care professional roles. The service model for DS must be less complex particularly knowledge and skills requirement, and must be designed to simplify documentation process. Strategies designed to influence community pharmacists' intention to provide MMP and DS should be implemented. National Health Security Office should provide supporting tools such as IT infrastructure and building the capacity of pharmacy readiness.

INTRODUCTION

Nowadays, roles of the community pharmacists have been changed from drug dispensing by expanding to focus more on patient-oriented services [1]. Provision of new extended patient-oriented services in community pharmacy has contributed to the improvement in patient safety, better health outcomes, and continuity of care [2]. The new extended services have been implemented in several developed countries such as the United States (US), the United Kingdom (UK), Canada, and Australia [3-6]. In Thailand, the new extended patient-oriented services were started as pilot projects.

With the increasing prevalence of the elderly with chronic diseases, the National Health Security Office (NHSO) recognized the need to acquire an additional health-care partner. In 2001, NHSO created a pilot project aimed at partnering the accredited community pharmacies as a contracting unit for primary care. The first project began in 2001 at Mahasarakham University pharmacy [7]. The extended services included refill of prescription, pharmaceutical care in chronic disease patients, and common disease management. The pilot project was also conducted in Bangkok metropolitan area. During 2008-2009, there were 15 accredited community pharmacies

which attended the pilot project for providing medication therapy management (MTM) and home pharmaceutical care services. The results from providing MTM to diabetes patients showed that 18% and 26% of the patients adhered and partially adhered to their medical regimen, respectively. The average systolic and diastolic blood pressures were improved in almost half of the patients (48.6%) [8]. The pilot project was continuously expanded among accredited community pharmacies in Bangkok to provide disease screening (DS) for diabetes, hypertension, and metabolic syndrome, and health education program. However, there were only 368 from 1,005 accredited community pharmacies across Thailand (36%) which participated in these extended service pilot projects [9].

Medication management program (MMP) and DS are two potential services according to a 3-year strategic plan (2016-2018), which is supported by the NHSO in cooperation with the pharmacy council and Food and Drug Administration (FDA) [10]. Results from the first phase qualitative study indicated that MMP was unanimously agreed by consumers, physicians, and community pharmacists that they should be provided in Thai community pharmacies [11]. DS got the highest agreement from community pharmacists but were given low agreement from physicians and consumers. In other countries where the extended services were implemented, community pharmacists received more benefits through reimbursement. Despite this increasing revenue, the slow participation rate among community pharmacists still occurred [12,13]. This indicated that opinion of other stakeholders and adoption by community pharmacy may potentially influence service provision. Many studies have been conducted in these countries to assess factors influencing community pharmacists' adoption of new extended services [14-17]. Observability, compatibility, and trialability were the most important perceived characteristics of patient-oriented activities in Dutch community pharmacies [14]. For implementation of prescribing service in Canada, legitimization of previous practices, the model of practice in pharmacy setting, and relationships with physicians were the most important factors influencing pharmacists' adoption [15]. Relative advantage and complexity were prominent characteristics of New Medicines Service as perceived by community pharmacists in England [17].

The diffusion of innovations theory defines the characteristics of new innovations which influence adopters' decision whether to adopt or reject an innovation. The potential adopters will evaluate new innovations through five attributes of new innovations which included relative advantage, compatibility, complexity, observability, and trialability. If an individual adopter perceived useful attributes of new innovations, so the rate of adoption of new innovations will be significantly increased [18]. Greenhalgh *et al*. developed the expanded framework based on Rogers' diffusion of innovations theory by including potential factors which affect diffusion, dissemination, and implementation of innovations in the organization level [19]. The adopter's characteristics also influence the rate of adoption. Diffusion of innovations theory classified adopter's characteristics into five categories according to individual's innovativeness which consists of innovators, early adopters, early majority, late majority, and laggards. These adopter categories will be used to describe the influence of individual characteristics to the diffusion mechanism through their perspective toward new innovation [18].

NHSO pilot projects are the new initiative to encourage community pharmacists to deliver new extended patient-oriented services which focus more on patient health outcome and continuity of care than product-oriented services. To successfully implement an effective project, NHSO and The Pharmacy Council should have sufficient information. The factors affecting community pharmacists' intention to provide new extended services need to be understood. Only a few studies addressing these issues have been conducted in Thailand [20-22]. The information necessary for implementation was also limited. The purpose of this study was to determine factors affecting community pharmacists' intention to provide MMP and DS under the developed framework based on Rogers' diffusion of innovations theory and included some potential organizational factors as guided by Greenhalgh's model of diffusion, dissemination, and implementation of innovations in health service organizations.

MATERIALS AND METHODS

A cross-sectional study using self-administered mail survey was carried out during 18th January - 1st February 2016. A list of community pharmacies in Bangkok obtained from FDA website was used as a sampling frame [23]. Community pharmacies were sampled by simple random sampling method. The community pharmacists, owner or manager, were requested to complete questionnaires. If more than one community pharmacists were employed in a pharmacy, community pharmacist owner or manager who practiced at least 15 h per week was considered acceptable for inclusion. Community pharmacists who practiced in an accredited community pharmacy which already implemented MMP or DS were excluded from the study.

Sample size was calculated to assure adequate power to detect statistical significance. The G*Power analysis program 3.1.9.2 was used to estimate the necessary sample size for multiple logistic regression analysis [24]. The parameters derived from a small pilot study were computed; the estimated odds ratio was 1.3, probability of an event occurring (Pr [Y = 1] H0) was 0.2, $\alpha = 0.05$, power = 0.80, and the estimated R^2 with other covariates for medium effect size = 0.15. The required sample size was estimated to be 848. Given mail survey usually has 30-40% response rate [25,26], so 2,500 questionnaires were sent to community pharmacies. The self-addressed stamped return envelope was enclosed to encourage respondents to send back the completed questionnaires to researcher within 2 weeks.

A self-administered questionnaire was developed under the conceptual framework. Seven concepts from the conceptual framework were operationalized as follows:

Relative Advantage: The advantage of new extended services which are greater than core dispensing service. If community pharmacists perceive relative advantage of providing new extended services, they will be more likely to provide these in their pharmacies.

Compatibility: The level of new extended services which community pharmacists perceived consistent with their

existing work system. The new extended service which is perceived for this system fit will be enhanced for provision in community pharmacies.

Observability: The visible service outcomes of providing new extended services as perceived by community pharmacists. If community pharmacists perceived observability of new extended services, then the likelihood of implementation is increased.

Complexity: The degree of difficulty to provide new extended services. The new extended services which are perceived as more complex are less likely to be implemented.

Trialability: The degree to which new extended services can be trialed to provide on a limited basis. The extended services that can be trialed will increase the likelihood of implementation.

Significant Others' opinions: Opinions from key stakeholders regarding community pharmacists providing new extended services as perceived by individuals. The negative feedbacks will decrease the likelihood of implementation.

Pharmacy readiness: The ability of community pharmacy in supporting implementation of new extended services as perceived by individuals. The new extended services that fit with pharmacy's structure, supporting technologies, staff, and financial resources are more likely to be implemented.

The developed questionnaire was reviewed by three experts. Content validity was assessed using content validity index score. The questionnaires were then pilot tested in 30 community pharmacists. The ambiguous sentences were adjusted. The items assessing trialability were deleted because they did not have face validity. In Thailand context, it was an extraordinary practice to try out the extended services, and the "trialability" construct was difficult for interpretation [27]. Internal consistency of the questionnaires was measured. All domains were found reliable with Cronbach's alpha >0.7. The proposed conceptual framework was presented in Figure 1.

The final questionnaire composed of three parts with eight-page length. Part I of the questionnaire included questions to measure; (1) knowledge of the specific extended services (true-false evaluation); (2) intention to provide each service (ordinal scale range from intend to provide service within 1 month, 6 months, 1 year, more than 1 year, and no intention). Part II of the questionnaire composed of questions for the six concepts. The four-point Likert scale was applied to measure agreement level on a continuum from strongly agree (4) and strongly disagree (1). Part III of the questionnaire asked about demographic details of the respondents and their community pharmacy.

Factor analysis was used to ensure construct validity. Descriptive statistics was used to analyze respondents' characteristics and domains' scores. The domains' scores derived from mean scores of all Likert scale items within the same domain. The Pearson correlation coefficient was used to measure the relationship among independent variables. Univariate and multivariate logistic regression analysis was conducted to access the potential existence of causal relationships among factors affecting community pharmacists' intention to deliver MMP and DS. Five levels of intention were transformed to dichotomous variables taking on a value of 0 or
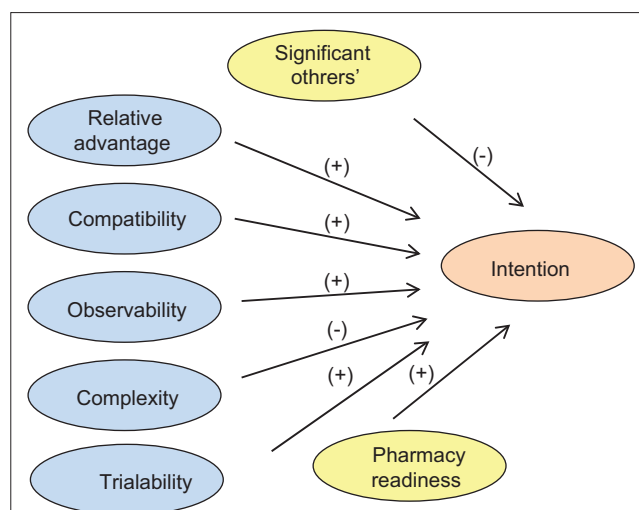

Figure 1: The conceptual framework based on diffusion of innovations theory

1 for logistic regression analysis (0 = no intention and intention >1 year, 1 = intention within 1 month, 6 months, and 1 year). The study was approved by the Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University, on 14th January 2016 with COA No. 003/2559.

RESULTS

A total of 302 questionnaires were returned including 138 completed questionnaires and 164 undeliverable questionnaires. Of these completed questionnaires, which generated response rate 5.52%, 120 cases met the inclusion criteria. In particular for DS, four cases were excluded due to many missing data. Therefore, data analysis for DS was based on 116 cases.

Validity and reliability of measurement scales were evaluated. The exploratory factor analysis was used to access the construct validity of the questionnaire and to combine the highly associated variables into a factor. The Kaiser-Meyer-Olkin measure of sampling adequacy was >0.6 (MMP = 0.731, DS = 0.738). The Bartlett's test of sphericity showed significance <0.05. These parameters were considered acceptable for data for factor analysis. The principal component analysis method was used for factor extraction with varimax rotation procedure. The component matrix output excluded items with factor loading <0.3 which revealed 12 components and 11 components with eigenvalues >1 that explained 73.1% and 73.7% of total variance for MMP and DS, respectively. Compatibility was divided into two components for pharmacy profession framework and routine work procedures. Two new compatibility constructs were re-operationalized as the following definition.

Compatibility with pharmacy profession framework: The level of new extended services which community pharmacists perceived consistent with existing work conditions, particular with the scope of professional pharmacy act.

Compatibility with routine work procedure: The level of new extended services which community pharmacists perceived consistent with their routine dispensing work procedures.

The factors that explained the least amount of variance were removed. Consequently, seven major factors were focused on. Reliability of the adjusted measurement scales were reported through Cronbach's alpha which ranged from 0.768-0.873 for MMP and 0.794-0.886 for DS.

Demographic Characteristics

The majority of community pharmacist respondents were female (54.2%), and the average age of respondents in this study was 42.91 ± 13.53 years old. Most of the respondents graduated with a bachelor's degree (66.7%) and had work experiences in community pharmacies more than 6 years (63.2%). The community pharmacies were mainly located in residential areas (79.3%) and 69.1% were single pharmacies. Only 21.4% of the community pharmacy respondents earned their accreditation through the community pharmacy development and accreditation program by the Pharmacy Council. Most community pharmacists who responded to this study were pharmacy owner (63.6%) and 83.3% had only one community pharmacist on duty. Table 1 showed the demographic characteristics of all respondents who were included in this study.

Intention to Provide MMP and DS

Community pharmacists reported their intention to provide MMP and DS in their pharmacies as presented in Table 2. Around one-fourth of respondents had a high intention to provide MMP (24.10%) and DS (27.60%) within a year. Most respondents had intention to provide MMP (75.90%) and DS (72.40%) in more than 1 year or longer. The respondents had more intention to provide DS rather than MMP.

Description of Key Variables Affecting Intention to Provide MMP and DS

Overall, observability (MMP = 3.42 ± 0.14, DS = 3.53 ± 0.01) had the highest mean scores among all factors. Relative advantage (MMP = 3.33 ± 0.31, DS = 3.26 ± 0.36) and compatibility with pharmacy profession framework (MMP = 3.16 ± 0.11, DS = 3.16 ± 0.11) were in the high range. Complexity for providing MMP (3.00 ± 0.24) was in the borderline high range, while DS (2.80 ± 0.29) was in moderate range. Compatibility with routine work procedures (MMP = 2.68 ± 0.28, DS = 2.73 ± 0.27) was in moderate range of mean scores. Significant others' opinions (MMP = 2.40 ± 0.22, DS = 2.59 ± 0.24) were in a quite low range of mean scores. Pharmacy readiness (MMP = 2.12 ± 0.26, DS = 2.17 ± 0.25) was in the low range of mean scores as presented in Table 3.

In general, DS obtained the higher mean scores than MMP in observability, compatibility with routine work procedures, significant others' opinions, and pharmacy readiness. Respondents gave high scores to observability of DS in warning people for their risk of disease. They also agreed that DS procedures were more compatible with dispensing work than MMP. Documentation process was given the lowest compatibility scores in this domain. For significant others' opinions, respondents mostly agreed with physicians' opinions rather than patients' opinions. The statement which was most agreed, was that physicians always ignored screening

Table 1: Demographic characteristics (*n*=120)

Characteristic	*n* (%)
Sex	
Male:female (%)	54:64 (45.8:54.2)
Age	
Mean±SD (range)	42.91±13.53 (25-86)
Education (%)	
Bachelor's degree	78 (66.7)
Pharm D	7 (6.0)
Master's degree	32 (27.4)
Community pharmacy experience (%)	
<1	4 (3.4)
1-4	20 (17.1)
4-6	19 (16.2)
>6	74 (63.2)
Community pharmacy location (%)	
Residential area	92 (79.3)
Working/office area	13 (11.2)
Shopping area	11 (9.5)
Type of community pharmacy Single:Chain/Franchise (%)	76:34 (69.1:30.9)
Accredited pharmacy (%)	25 (21.2)
Pharmacy ownership (%)	75 (63.6)
Number of pharmacists per store (%)	
1	100 (83.3)
2	17 (14.2)
>2	3 (2.5)
Knowledge of service (%)	
MMP	23 (19.17)
DS	69 (59.48)

MMP: Medication management program, DS: Disease screening, SD: Standard deviation

Table 2: Intention to provide MMP and DS

Intention to provide	MMP (*n*=120)	DS (*n*=116)
	(%)	(%)
No intention	25.0	20.7
>1 year	50.9	51.7
Within 1 year	15.8	15.6
Within 6 months	5.8	6.0
Within 1 month	2.5	6.0

Five level categorical variables were transformed to dichotomous variables taking on a value of 0 or 1 (0=no intention and intention>1 year, 1=intention within 1 month, 6 months and 1 year). MMP: Medication management program, DS: Disease screening

results from community pharmacy and did the duplicate screening. Pharmacy readiness got the lowest scores from respondents in both MMP and DS, particularly in readiness for supporting technology and information system to manage patient information. The given scores for having enough staff

and time to provide extended services were low also. Some respondents agreed that they had enough knowledge and skill, and appropriate area for providing both MMP and DS, but the domains' scores were still very low compared with other factors.

MMP had the higher mean scores than DS for relative advantage and complexity domains. Relative advantage for MMP was agreed to reveal community pharmacists' roles and strengthen community pharmacy profession. For complexity, provision of MMP was agreed on higher skill and knowledge requirement rather than dispensing service. However, respondents had a low agreement with certification examination as a condition for providing extended services. Review and prepare patients' record, and documentation was identified as the most difficult procedures in providing both services. The mean scores of compatibility with pharmacy

profession framework in both services were equal but were higher than compatibility with routine work procedures domain. Respondents highly agreed for compatibility with pharmacy profession framework that the scope of providing MMP and DS must comply with the professional pharmacy act.

Relationships of Key Variables

Tables 4 and 5 showed Pearson correlation coefficient indicated the strength of the association between the two factors. For MMP, it was found that relative advantage had a high correlation with compatibility with pharmacy profession framework (0.796) and observability (0.556). Compatibility with pharmacy profession framework had a high correlation with observability (0.556). Complexity had correlation with pharmacy readiness (−0.493).

Table 3: Mean scores for each factor affecting intention to provide MMP and DS

Factors	MMP (n=120)	DS (n=116)
	Mean±SD (min, max)	Mean±SD (min, max)
Observability	3.42±0.14 (3.23, 3.55)	3.53±0.01 (3.53, 3.54)
Relative advantage	3.33±0.31 (2.80, 3.61)	3.26±0.36 (2.64, 3.54)
Compatibility with pharmacy profession framework	3.16±0.11 (3.06, 3.34)	3.16±0.11 (3.06, 3.34)
Complexity	3.00±0.24 (2.58, 3.23)	2.80±0.29 (2.22, 3.09)
Compatibility with routine work procedures	2.68±0.28 (2.43, 3.02)	2.73±0.27 (2.35, 3.11)
Significant others' opinions	2.40±0.22 (2.18, 2.63)	2.59±0.24 (2.29, 2.86)
Pharmacy readiness	2.12±0.26 (1.80, 2.46)	2.17±0.25 (1.86, 2.44)

MMP: Medication management program, DS: Disease screening, SD: Standard deviation

Table 4: Pearson correlation coefficient for factors affecting intention for MMP

Factors	F1	F2	F3	F4	F5	F6	F7
F1 relative advantage	1.000	0.796**	0.279**	0.556**	0.030	0.031	0.094
F2 compatibility with pharmacy profession framework	0.796**	1.000	0.326**	0.556**	0.009	0.043	0.151
F3 compatibility with routine work procedures	0.279**	0.326**	1.000	0.361**	−0.286**	−0.111	0.387**
F4 observability	0.556**	0.556**	0.361**	1.000	−0.062	−0.108	0.125
F5 complexity	0.030	0.009	−0.286**	−0.062	1.000	0.230*	−0.493**
F6 significant others' opinions	0.031	0.043	−0.111	−0.108	0.230*	1.000	-0.014
F7 pharmacy readiness	0.094	0.151	0.387**	0.125	−0.493**	−0.014	1.000

*Correlation is significant at the 0.05 level, **Correlation is significant at the 0.01 level. MMP: Medication management program

Table 5: Pearson correlation coefficient for factors affecting intention for DS

Factors	F1	F2	F3	F4	F5	F6	F7
F1 relative advantage	1.000	0.737**	0.395**	0.562**	0.056	−0.067	0.081
F2 compatibility with pharmacy profession framework	0.737**	1.000	0.491**	0.596**	−0.122	−0.188*	0.270**
F3 compatibility with routine work procedures	0.395**	0.491**	1.000	0.322**	−0.221*	0.100	0.274**
F4 observability	0.562**	0.596**	0.322**	1.000	−0.071	−0.126	0.110
F5 complexity	0.056	−0.122	−0.221*	−0.071	1.000	0.280**	−0.527**
F6 significant others' opinions	−0.067	−0.188*	0.100	−0.126	0.280**	1.000	−0.051
F7 pharmacy readiness	0.081	0.270**	0.274**	0.110	−0.527**	-0.051	1.000

*Correlation is significant at the 0.05 level, **Correlation is significant at the 0.01 level. DS: Disease screening

For DS, relative advantage had high correlations with compatibility with pharmacy profession framework (0.737) and observability (0.562). Compatibility with pharmacy profession framework had a high correlation with observability (0.596). Compatibility with routine work procedures had correlation with compatibility with pharmacy profession framework (0.491). Complexity had correlation with pharmacy readiness (-0.572).

The variance inflation factor (VIF) was calculated to detect if multicollinearity exists. The VIF values for all factors were <4 which considered acceptable. However, relative advantage highly correlated with compatibility with pharmacy profession framework as 0.796 and 0.737 in MMP and DS, respectively. Therefore, relative advantage was discarded to reduce the impact of multicollinearity which may occur. Finally, compatibility with pharmacy profession framework, compatibility with routine work procedures, observability, complexity, significant others' opinions, and pharmacy readiness were included for logistic regression analysis.

Factors Affecting Intention to Provide MMP and DS

The simple logistic regression was used to determine the impact of each potential factor toward community pharmacists' intention to provide MMP and DS as presented in Tables 6 and 7. The result from univariate analysis indicated that compatibility with pharmacy profession framework (MMP; odd ratio [OR] = 3.822; 95% confidence interval [CI] = 1.632-8.947, DS; OR = 3.832, 95% CI = 1.717-8.554), compatibility with routine

work procedures (MMP; OR = 2.591; 95% CI = 1.362-5.065, DS; OR = 2.138, 95% CI = 1.106-4.134), and observability (MMP; OR = 2.700, 95% CI = 1.081-6.740, DS; OR = 3.365, 95% CI = 1.323-8.559) had significant positive impact on intention to provide MMP and DS. Pharmacy readiness (MMP; OR = 2.361, 95% CI = 1.093-5.102) had significant positive impact on intention to provide MMP only. Complexity (DS; OR = 0.291, 95% CI = 0.114-0.743) had significant negative impact on intention to provide DS only. Significant others' opinions, which had a non-significant impact on intention to provide MMP and DS with the least magnitude, were not included for multivariate analysis. Demographic characteristics of respondents had no significant effect on intention to provide both services.

Multiple logistic regression was used to identify factors that best predicted community pharmacists' intention to provide MMP and DS. With the sample size of 120 respondents for MMP, Table 6 showed that compatibility with pharmacy profession framework, compatibility with routine work procedures, observability, and pharmacy readiness had positive effects on intention to provide MMP, whereas complexity had a negative effect on intention to provide MMP. Only compatibility with pharmacy profession framework had statistically significant effect on intention to provide MMP (OR = 2.995, 95% CI = 1.034-8.671). The result showed that if one unit of compatibility with pharmacy profession framework increases, respondents will increase intention to provide MMP 2.995 times when controlled for other variables to be constant. Observability was less likely

Table 6: Univariate and multivariate comparison of MMP

Factors	Univariate			Multivariate		
	OR	95% CI		Adj OR	95% CI	
		Lower	Upper		Lower	Upper
Compatibility with pharmacy profession framework	3.822**	1.632	8.947	2.995*	1.034	8.671
Compatibility with routine work procedures	2.591**	1.326	5.065	1.642	0.754	3.575
Observability	2.700*	1.081	6.74	1.145	0.356	3.679
Complexity	0.555	0.224	1.377	0.764	0.255	2.285
Significant others' opinion	1.294	0.693	2.416	-	-	-
Pharmacy readiness	2.361*	1.093	5.102	1.572	0.601	4.109

*Statistically significant at $P<0.05$. **Statistically significant at $P<0.01$. MMP: Medication management program, OR: Odds ratio, CI: Confidence interval

Table 7: Univariate and multivariate comparison of DS

Factors	Univariate			Multivariate		
	OR	95% CI		Adj OR	95% CI	
		Lower	Upper		Lower	Upper
Compatibility with pharmacy profession framework	3.832**	1.717	8.554	2.644	0.926	7.550
Compatibility with routine work procedures	2.138*	1.106	4.134	1.123	0.518	2.433
Observability	3.365*	1.323	8.559	1.670	0.534	5.225
Complexity	0.291**	0.114	0.743	0.328*	0.111	0.968
Significant others' opinions	0.773	0.418	1.429	-	-	-
Pharmacy readiness	1.815	0.920	3.580	0.846	0.359	1.992

*Statistically significant at $P<0.05$. **Statistically significant at $P<0.01$. DS: Disease screening, OR: Odds ratio, CI: Confidence interval

to impact intention to provide MMP because the odds ratio was close to 1.

As for DS, with the sample size of 116 respondents, results in Table 7 indicated that compatibility with pharmacy profession framework, compatibility with routine work procedures, and observability had positive effects on intention to provide DS, whereas complexity and pharmacy readiness had negative effects on intention to provide DS. Only complexity had statistically significant effect on intention to provide DS (OR = 0.328, 95% CI = 0.111-0.968) when controlled for other variables to be constant. It means that the change of one unit of complexity decreased intention to provide DS 67.2%. The odds ratio of compatibility with routine work procedures and pharmacy readiness were close to 1 which indicated the less relationship of these two factors with intention to provide DS.

DISCUSSION

Currently, MMP and DS are provided only in accredited community pharmacies who participate with NHSO pilot projects. These two services were considered as new practices for Thai community pharmacists. In this study, community pharmacists reported knowing MMP (19.17%) less than DS (59.48%). One main reason is that MMP is not integrated into Thai pharmacy curriculum. Community pharmacists had opportunity to learn MMP through continuing education program or academic conference.

This study's results demonstrated that around one-fourth of the respondents had a high intention to provide MMP (24.10%) and DS (27.60%) within 1 year. According to Roger's diffusion of innovations theory, respondents with high intention were categorized in early adopters (MMP = 2.5%, DS = 6.0%) and early majority category (MMP = 21.6%, DS = 21.6%). However, most respondents intended to provide MMP and DS in more than 1 year (MMP = 75.9%, DS = 72.4%). This group of respondents was consistent with the late majority category [18]. Late, majority people will adopt an innovation after most people adopted it. They are typically skeptical about an innovation, unlike early majority people. Change agency's promotion had more influence on people in early majority and early adopters than late majority. To facilitate rate of MMP and DS adoption among community pharmacists, the pharmacy organization leaders which play the important role as change agencies should have strategies to promote and encourage people in the early adopters' category to adopt MMP and DS first. These strategies such as knowledge training and workshops and continuing educational program should be included. Usually, the early adopters who have the highest degree of opinion leadership will provide advice and information about new innovation to other adopters. The shared experience from early majority and early adopter people is necessary to motivate late majority people who were the large population in this study to adopt MMP and DS. Therefore, the strategies such as academic conference or publication should implement in which the experience of early majority adopters could be shared to other non-adopters for learning from current adopters. Furthermore, preconditions and procedures for providing MMP and DS must be uncomplicated and safe.

This study determined factors affecting community pharmacists' intention to provide MMP and DS using diffusion of innovations theory as a theoretical framework. The univariate analysis revealed the significantly positive effect of compatibility with pharmacy professional framework, compatibility with routine work procedures, and observability on intention to provide MMP and DS. Pharmacy readiness had significant positive effect only for MMP. Complexity had significant negative effect on intention to provide DS only. These findings were in line with the previous studies that perceived benefit, perceived compatibility, and perceived complexity were most important significant predictors for extended services adoption [13,14,17].

When all factors were included in multiple logistic regression analysis, only compatibility with pharmacy professional framework was the significant predictor of intention to provide MMP, whereas complexity was the best predictor for intention to provide DS. The other significant factors from bivariate analysis were not detected statistically significant in multivariate analysis due to the small sample size [28]. The findings in this study emphasized that these dominant characteristics of MMP and DS must be considered when designing service model and strategies for implementation. The service model for MMP must be most compatible with professional pharmacy act, and not redundant with other health-care professional roles. The service model for DS must be less complex particularly knowledge and skills requirement which should not be included certification examination. Documentation process must be developed to eliminate complexity. NHSO should provide supporting tools such as IT infrastructure and building the capacity of pharmacy readiness. Since the findings in this study revealed that community pharmacist known DS rather MMP, intended to provide DS rather than MMP and perceived DS was less complicated than MMP. Therefore, DS is recommended to be the extended service that should be implemented in Bangkok at the initial stage of the pilot project.

Limitations of this study were explored. The study was conducted in Bangkok metropolitan area where health-care context was different from other provinces in Thailand. The findings from this study may not be generalized to other provinces where primary care units were distributed evenly. Most people who live in Bangkok are working people. These people do not have time to receive health services from primary care units in operation hours. They are more likely to visit community pharmacy instead due to easy access at any time and no need for an appointment. Therefore, the extended community pharmacy services should be supported for implementation in Bangkok as the potential area. Further studies should be conducted in community pharmacies in Bangkok's vicinity and the other urbanized provinces in Thailand to confirm these findings and for better generalization.

Another concern was about response rate which was lower than other studies that used postal questionnaires as data collection method. In this study, questionnaires were sent to cover the amount of required sample size. The follow-up questionnaires were not sent due to a limited budget. Many questionnaires were unable to be delivered due to address change or no receiver. The main reason was the obsolete address information of community pharmacy database used.

In addition, the postal delivery rate was slower than expected. These problems affected on response rate and reliability of study results. Future research should find the appropriate data collection methods instead of using postal questionnaires such as stratified random sampling and face-to-face interview, e-questionnaires, or convenient sampling method. This is to increase response rate and maximize sample size for increasing power for significant detection. Furthermore, subsequent research should be conducted in accredited community pharmacies who are early adopters which participated in NHSO pilot project group to determine factors affecting their adoption of new extended services.

CONCLUSION

This study provided the crucial factors which had significantly effect on community pharmacist intention to provide MMP and DS. These findings were useful for NHSO and the pharmacy organization in the strategic planning development to facilitate adoption. Most community pharmacists in this study were classified as late majority. The shared experience from current adopters, and uncomplicated and safe work procedures, are important to increase their intention to provide MMP and DS. Compatibility with pharmacy profession framework was the key characteristic of MMP, and complexity was the key characteristic of DS which affected community pharmacists' intention to provide these services. To increase intention to provide MMP and DS, strategies designed by included these dominant characteristics of MMP and DS should be implemented. The NHSO should provide supporting tools such as IT infrastructure and building the capacity of pharmacy readiness. Finally, the formal business model of the extended services and the remunerated roles of community pharmacists must be developed as tools for the sustainable practice of community pharmacy profession.

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