Appendix 1. Data collection form for study 1

Questionnaire for postal survey:

Section 1. Demographic data

Please mark an X in the box ☐ corresponding to the most appropriate answer.

1.Gender ☐ 1 Male

☐ 2 Female

2.Year of birth……...

3.Highest education attained

☐ 1 Bachelor Degree ☐ 2 Master Degree in …..…….

☐ 3 Ph.D. in …… ☐ 4 Others….……

4.Dispensing experience of medication in the drugstore (full time and part time)

total……..years.

5.You work full-time at

☐ 1 Government hospital ☐ 2 Private hospital

☐ 3 Drugstore ☐ 4 Faculty of Pharmaceutical Sciences

☐ 5 Others……..

6.Are you the owner of this drugstore?

☐ 1 Yes

☐ 2 No

7.Are you the pharmacist registered at Provincial Health Office?

☐ 1 Yes

☐ 2 No

Definition

Antibiotics mean chemical substances which have the capacity to inhibit the growth of or to kill other microorganisms, and are administered orally.

Section 2. Factors influencing antibiotic dispensing for URI

Please read the statement in the box before answering the questions.

> **Situation 1:** Today a patient aged 18 visits the drugstore, that you work at in order to buy medication for a sore throat.

Which history of this patient would you like to ask?

Please mark an X in the box ☐ at the choice that indicates your opinion for each statement.

Note:

1 2 3 4 5 6 7

1 = Not ask absolutely 2 = Not ask rather absolutely 3 = Not ask

4 = Uncertainly

5 = Ask 6 = ask rather absolutely 7 = ask absolutely

History of Patient	Not ask absolutely ↓			Uncertainly ↓			Ask absolutely ↓
	1	2	3	**4**	5	6	**7**
1.Age of patient							
2.Fever (have/not have)							
3. Nasal congestion (have/not have)							
4. Rhinorrhea (have/not have)							
5. Cough (have/not have)							
6.Others ……							
7.Others ……							
8.Others ……							
9.Others ……							
10.Others ……							

Please read the statement in situation 2 before answering the questions from this part to the end.

Situation 2: Today a patient, 24 years of age, comes into the drugstore which you work at. This patient informs you that since yesterday he/she has had:

-a mild sore throat,

-occasionally sneezing,

-clear watery rhinorrhea,

-occasionally nasal congestion during daytime and nighttime.

These symptoms occur every 5-6 months.

No accompanying symptoms and no other previous medical history was presented.

For answering the questions from these items to the end of the questionnaire, please imagine that the patient in situation 2 is the same as general patients you have met in the drugstore which you work at regarding his/her age, SES and other characteristics.

1. Which drugs would you **dispense** for this patient?

Trade name of drugs	Dosage and Administration	Amount of drug prescribed
Ex: Ranidine® 150 mg	1 x 2 pc or after meal	10 tablets
……	……	……
……...……	……...……	……...……
……	……	……
……...……	……...……	……...……
……	……	……
……...……	……...……	……...……
……	……	……
……...……	……...……	……...……

Please mark an X in the box ☐ at the choice that indicates your opinion for each statement.

2. If you have to treat this patient, **how correct** are the sentences describing your decision making?

	Incorrect completely ↓			Uncertainly ↓			Correct completely ↓
	1	2	3	**4**	5	6	**7**
1) You will dispense antipyretics to this patient certainly.							
2) You will dispense antibiotics to this patient.							
3) The patient will receive antitussives certainly from your dispensing.							
4) If the patient visits you, he/she has to receive antibiotics.							
5) You intend to dispense antipyretics to this patient.							
6) Your intention is antibiotic dispensing to this patient.							

3. How much do you agree with antibiotic dispensing to this patient?

	Disagree absolutely ↓			Uncertainly ↓			Agree absolutely ↓
	1	2	3	**4**	5	6	**7**
1) Antibiotic dispensing for this patient is appropriate.							
2) Antibiotic dispensing is **not** necessary for this patient.							
3) Antibiotic dispensing is helpful for this patient.							

Please answer the questions whether you dispense antibiotics to this patient or not.

The following statements explain the opinions and practice of health professionals and drugstore personnel, who you respect in the dispensing.

4. How much do you agree with the following sentences? (While you are answering these questions, please think about them).

	Disagree absolutely ↓			Uncertainly ↓			Agree absolutely ↓
	1	2	3	**4**	5	6	**7**
1) Most **health professionals and drugstore personnel** will dispense antibiotics to this patient certainly.							
2) If this patient goes to a hospital or a drugstore, he/she will receive antibiotics certainly.							
3) **Health professionals and drugstore personnel** think that antibiotic dispensing to this patient is appropriate.							

5. The following statements explaining the power of other factors, which are **not** reasons in knowledge and in professional (or external factors), for antibiotic dispensing to this patient. How much do you agree with these sentences? (while you are answering these questions, please think about other factors, which are **not** knowledge and professional, that are important to you).

	Disagree absolutely ↓			Uncertainly ↓			Agree absolutely ↓
	1	2	3	**4**	5	6	**7**
1) In dispensing drugs for a patient similar in characteristics to the one in the case study, other factors excluding reasons in knowledge and in professional often request antibiotics from you.							

	Disagree absolutely ↓			Uncertainly ↓			Agree absolutely ↓
	1	2	3	**4**	5	6	**7**
2) In dispensing drugs for a patient similar in characteristics to the one in the case study, other factors excluding reasons in knowledge and in professional often support the antibiotic use.							
3) In dispensing drugs for a patient similar in characteristics to the one in the case study, you are often pressed by other factors excluding reasons in knowledge and in professional in order to dispense antibiotics.							

6.What do you think about the outcomes of antibiotic dispensing for a patient similar to one in situation 2?

	Unlikely absolutely ↓			Uncertainly ↓			Likely absolutely ↓
	1	2	3	**4**	5	6	**7**
1) Antibiotic dispensing is able to cure the disease in this patient sooner.							
2) Antibiotic dispensing is able to prevent the complications of disease in this patient.							
3) Antibiotic dispensing to this patient increases drug resistance in the future.							
4) Antibiotic dispensing causes adverse drug reactions to this patient.							

	Unlikely absolutely ↓			Uncertainly ↓			Likely absolutely ↓
	1	2	3	**4**	5	6	**7**
5) Antibiotic dispensing to this patient shortens the duration of sore throat.							
6) Antibiotic dispensing to this patient causes drug allergy.							
7) For this patient, the complications occur more easily if we do **not** dispense antibiotics.							
8) Antibiotic dispensing would **not** cause the side effects to this patient.							
9) Antibiotic dispensing could **avoid** drug resistance in the future for this patient.							
10) Antibiotic dispensing reduces the course of disease in this patient.							
11) Antibiotic dispensing could prevent bacterial infections in this patient.							
12) In the future, this patient may have drug resistance problems if we dispense antibiotics.							

7. How much do you agree with these sentences?

	Disagree absolutely ↓			Uncertainly ↓			Agree absolutely ↓
	1	2	3	**4**	5	6	**7**
1) If physicians treat this patient, they will prescribe antibiotics certainly.							

	Disagree absolutely ↓			Uncertainly ↓			Agree absolutely ↓
	1	2	3	**4**	5	6	**7**
2) If this patient visits the drugstore with a pharmacist on duty, he/she will receive antibiotics certainly.							
3) If this patient visits the drugstore with drug sellers, who are not pharmacists, on duty, he/she will receive antibiotics certainly.							
4) If lecturers in Faculty of Pharmaceutical Sciences treat this patient, they will dispense antibiotics certainly.							
5) Physicians think that antibiotic prescribing to this patient is appropriate.							
6) Other pharmacists think that antibiotic dispensing to this patient is appropriate.							
7) Drug sellers, who are not pharmacists, think that antibiotic dispensing to this patient is appropriate.							
8) The lecturers in Faculty of Pharmaceutical Sciences think that antibiotic dispensing to this patient is appropriate.							
9) Physicians think they should not prescribe antibiotics to this patient.							
10) Other pharmacists think that antibiotic dispensing to this patient involves a **risk** rather than a benefit.							

	Disagree absolutely ↓			Uncertainly ↓			Agree absolutely ↓
	1	2	3	**4**	5	6	**7**
11) The drug sellers, who are not pharmacists, think that it is **not** necessary for this patient to receive antibiotics.							
12) The lecturers in Faculty of Pharmaceutical Sciences think that antibiotic dispensing to this patient should be **discouraged** rather than encouraged.							

Please mark X on the number that indicates your opinion for each statement.
(Please answer every item).

8.For answering these questions, please imagine a patient similar in characteristics to the one in situation 2.

1) You believe that antibiotic dispensing to a patient similar in characteristics to the one in situation 2, **influences** the income of the drugstore. How much does it influence the income?

1.1) Not influence the income of : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Influence the income of drugstore absolutely. drugstore absolutely

1.2) Not increase the profit of : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Increase the profit of drugstore absolutely. absolutely.

1.3) Not increase the income of : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Increase the income of drugstore absolutely. absolutely.

2) You believe that the standard practice guidelines of The Pharmacy Council **mentions** prescribing antibiotics. How much does it mention about this?

2.1) Not have to dispense : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Have to dispense antibiotics certainly antibiotics certainly

2.2) Unnecessary to dispense : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Necessary to dispense antibiotics certainly antibiotics certainly

2.3) Inappropriate to dispense: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Appropriate to dispense antibiotics certainly antibiotics certainly

3) You believe that most patients similar in characteristics to the one in situation 2 need antibiotics. How much does the patient need them?

3.1) Don't need antibiotics at all : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Need antibiotics extremely

3.2) Don't need to purchase : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Need to purchase antibiotics at all antibiotics extremely

3.3) Don't request antibiotics : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Request antibiotics at all extremely

4) You believe about the level of socioeconomic status of the patients similar in characteristics to the one in situation 2. Which level is the socioeconomic status of the patients in drugstore which you work at?

4.1) Lowest socioeconomic status : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Highest socioeconomic status

4.2) Lowest potential client : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Highest potential client

4.3) Unable to purchase : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Able to purchase the expensive drugs certainly the expensive drugs certainly

We are very grateful for your cooperation. If you would like to obtain the copy of the results of this study, please write down your name and address.

Name-lastname..…….

Address……

Appendix 2. Data collection form for study 2

Data collection form for simulated client method

Name of shopper (SC)…..…….

Drugstore's code..……..

Please add information in the blank or mark X in the box ☐ that indicate the detail you received.

1.General information

Date of data collection……..……...

Time to visit the drugstore……Time to leave the drugstore ……..

Provider

(A provider is the person who asks questions on history of disease and selected the drugs).

1.1 Type of provider **For staff only**

☐ 1.Pharmacist

☐ 2.Non-pharmacist

☐ 3.Uncertain ( )

1.2 Gender of provider

☐ 1.Male

☐ 2.Female ( )

1.3 Did the provider wear a gown?

☐ 1.Yes

☐ 2.No

☐ 3.Others (specify)…… ( )

2.Data from secret shopping

2.1 History taking

History taking	**Asked**	**Not asked**	**Shopper told the provider**	
1) Age of patient (child or adult)				( )
2) Duration of disease/symptoms (or onset of disease/symptoms)				( )
3) Fever				( )
4) Headache				( )
5) Facial pain such as frontal pain				( )
6) Sneezing				( )
7) Congestion				( )
8) Rhinorrhea				( )
9) Color of nasal discharge				( )
10) Thickness of nasal discharge				( )
11) Rhinorrhea occur year-round/selected time of year				( )
12) Sore throat				( )
13) Severity of sore throat (or dysphagia)				( )
14) Cough				( )
15) Previous medications				( )
16) Chronic diseases/ previous history				( )
17) Medication currently taking				( )
18) Being pregnant or breast-feeding (females only)				( )
19) History of drug allergy				( )
20) Others (symptoms)……. occur everyday/frequency				( )

2.2 Cause of disease

☐ 1.The pharmacist informed you that you had ( )

- ☐ 1.1 the common cold with viral infection.
- ☐ 1.2 the common cold with bacterial infection.
- ☐ 1.3 Uncertain
- ☐ 1.4 Others (specify)…… ( )

☐ 2. The pharmacist did not inform about cause of disease. ( )

2.3 Advice giving

2.3.1 The person who advised you was

- ☐1.Pharmacist
- ☐2.Pharmacist assistant
- ☐3. Others (specify)…… ( )

The information of advice giving was based on wording of drugstore staff only.

2.3.2 Advice about drugs

Drug 1

Advice giving	**Advised**	**Not Advised**	
1) Name of drug ……..	……	……..	
2) Indications ☐2.1) Relief of colds ☐2.2) Relief of rhinorrhea and congestion ☐2.3) Relief of rhinorrhea ☐2.4) Relief of congestion ☐2.5) Relief of sore throat ☐2.6) Antimicrobial agent ☐2.7) Anti-inflammatory agent ☐2.8) Others (specify)……	……	……	( )
3) Dosage and administration ☐3.1) Advised dosage and administration along with the label of drug ☐3.2) Others (specify)……	……	……	( )
4) Side effects or adverse drug reactions ☐4.1) Taking this drug might cause drowsiness. ☐4.2) Others (specify)……	……	……	( )
5) Precautions or warnings ☐5.1) Caution in driving or operating machinery. ☐5.2) Avoid concurrent use with alcohol. ☐5.3) Taking all drug continuously until finished ☐5.4) Others (specify)……	……	……	( )
6) Resolutions of drug related problems (specify)……	……	……	( )
7) Others (specify)……	……	……	( )
8) Others (specify)……	……	……	( )

Drug 2

Advice giving	Advised	Not Advised	
1) Name of drug ……..	……	……..	
2) Indications ☐2.1) Relief of colds ☐2.2) Relief of rhinorrhea and congestion ☐2.3) Relief of rhinorrhea ☐2.4) Relief of congestion ☐2.5) Relief of sore throat ☐2.6) Antimicrobial agent ☐2.7) Anti-inflammatory agent ☐2.8) Others (specify)……	……	……	( )
3) Dosage and administration ☐3.1) Advised dosage and administration along with the label of drug ☐3.2) Others (specify)……	……	……	( )
4) Side effects or adverse drug reactions ☐4.1) Taking this drug might cause drowsiness. ☐4.2) Others (specify)……	……	……	( )
5) Precautions or warnings ☐5.1) Caution in driving or operating machinery. ☐5.2) Avoid concurrent use with alcohol. ☐5.3) Taking all drug continuously until finished ☐5.4) Others (specify)……	……	……	( )
6) Resolutions of drug related problems (specify)……	……	……	( )
7) Others (specify)……	……	……	( )
8) Others (specify)……	……	……	( )
9) Others (specify)……	……	……	( )

Drug 3

Advice giving	Advised	Not Advised	
1) Name of drug ……..	……	……..	
2) Indications ☐2.1) Relief of colds ☐2.2) Relief of rhinorrhea and congestion ☐2.3) Relief of rhinorrhea ☐2.4) Relief of congestion ☐2.5) Relief of sore throat ☐2.6) Antimicrobial agent ☐2.7) Anti-inflammatory agent ☐2.8) Others (specify)……	……	……	( )
3) Dosage and administration ☐3.1) Advised dosage and administration along with the label of drug ☐3.2) Others (specify)……	……	……	( )
4) Side effects or adverse drug reactions ☐4.1) Taking this drug might cause drowsiness. ☐4.2) Others (specify)……	……	……	( )
5) Precautions or warnings ☐5.1) Caution in driving or operating machinery. ☐5.2) Avoid concurrent use with alcohol. ☐5.3) Taking all drug continuously until finished ☐5.4) Others (specify)……	……	……	( )
6) Resolutions of drug related problems (specify)……	……	……	( )
7) Others (specify)……	……	……	( )
8) Others (specify)……	……	……	( )
9) Others (specify)……	……	……	( )

Drug 4

Advice giving	Advised	Not Advised	
1) Name of drug ……..	……	……..	
2) Indications ☐2.1) Relief of colds ☐2.2) Relief of rhinorrhea and congestion ☐2.3) Relief of rhinorrhea ☐2.4) Relief of congestion ☐2.5) Relief of sore throat ☐2.6) Antimicrobial agent ☐2.7) Anti-inflammatory agent ☐2.8) Others (specify)……	……	……	( )
3) Dosage and administration ☐3.1) Advised dosage and administration along with the label of drug ☐3.2) Others (specify)……	……	……	( )
4) Side effects or adverse drug reactions ☐4.1) Taking this drug might cause drowsiness. ☐4.2) Others (specify)……	……	……	( )
5) Precautions or warnings ☐5.1) Caution in driving or operating machinery. ☐5.2) Avoid concurrent use with alcohol. ☐5.3) Taking all drug continuously until finished ☐5.4) Others (specify)……	……	……	( )
6) Resolutions of drug related problems (specify)……	……	……	( )
7) Others (specify)……	……	……	( )
8) Others (specify)……	……	……	( )
9) Others (specify)……	……	……	( )

2.3.3 Advice about the behavior

☐ 1.Rest ☐ 2.Maintain adequate water intake

☐ 3.Avoid speaking ☐ 4.Gargle with warm water

☐ 5.Others (specify)…….. ( )

3. A person gave the drugs was

☐ 1.Pharmacist

☐ 2.Pharmacist assistant

☐ 3.Others (specify)…… ( )

4.Total cost of drugs was……Baht.

5.While you were shopping, were there any other customers in the shop?

☐ 1.Yes, there were …….. customers.

☐ 2.No ( )

6.Total time of shopping was……minutes ( )

7.For the second shopping.

Did the pharmacist recognize you?

☐ 1.Yes

☐ 2.No

☐ 3.Uncertain (specify)…….. ( )

Appendix 3. Manuscript of study 1

Factors influencing antibiotic dispensing for upper respiratory infections among Southern Thai community pharmacists

Short title: Factors influencing antibiotic dispensing

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SUMMARY

Background and Objective: Thai community pharmacists are qualified to dispense antibiotics without prescription, and are frequently faced with problems of upper respiratory infections (URI). This study used the theory of planned behavior to investigate predictors of intention to dispense antibiotics for URI among community pharmacists.

Methods: Self-administered questionnaires, were mailed to all community pharmacists in the south of Thailand, measuring intention to dispense antibiotics, attitude, subjective norm, perceived behavioral control, behavioral beliefs, normative beliefs, and control beliefs.

Results and Discussion: 656 completed questionnaires were returned out of 833 sent. The pharmacists' intention to dispense antibiotics for URI was low (2.35±1.85) on a 7-point scale and strongly influenced by attitude. The beliefs in no benefit of antibiotics had the strongest effects on attitude. Subjective norm had a weak effect on intention, whereas perceived behavioral control had practically no effect.

Conclusion: Based on this experience of well informed community pharmacists having proper intention of practice and low control effect, future program for rational drug use should emphasize education rather than regulation.

Keywords: community pharmacist, drugstore, antibiotics, upper respiratory infections

INTRODUCTION

Respiratory tract infections are among the leading cause of morbidity and mortality in childhood (1). Upper respiratory infections (URI) are the most common illnesses experienced by people of all ages (2). In developing countries, drugstores are one of the critical sources of health care service (3), which often dispense antibiotics needlessly (4). Not only are antibiotics useless in this case (5), but also drug reactions (6) and development of drug-resistant pathogens are not uncommon (7).

In Thailand, drugstores are staffed with either part-time or full-time pharmacists, whose duties include diagnosis and drug dispensing. A practising pharmacist can legally dispense antibiotics without prescription. There are a number of reports worldwide of improper antibiotic use for URI (8-9). Plianbangchang (10) found that the community pharmacists believed antibiotics would be effective in preventing possible infections and reduce the course of disease. Faulty beliefs can be an important factor influencing inappropriate antibiotic dispensing. Past attempts to change provider behaviors based on knowledge provision was not successful (11). A new approach based on more developed theory is needed to identify determinants of the practice pattern, which could lead to proper future intervention.

The objectives of this study were to describe the level of intention to dispense antibiotics among practising pharmacists and to develop a model explaining dispensing behavior for URI among community pharmacists using the theory of planned behavior as a conceptual framework.

METHODS

Theoretical background

The structure of the theory of planned behavior used in our study is summarized in Fig.1. ***Behavior*** is under volitional control. The investigated behavior in this study is antibiotic dispensing for URI. A factor that indicates the behavior is an individual's ***intention*** to perform a given behavior. Intention is determined by attitude toward the behavior, subjective norm and perceived behavioral control. ***Attitude*** is an individual's favorable or unfavorable evaluation of antibiotic dispensing for URI. ***Subjective norm*** is the perceived social pressure whether to

dispense antibiotics or not. ***Perceived behavioral control*** concerns a pharmacist's perception of controllability of external factors over antibiotic dispensing. As a general rule, a more favorable attitude and subjective norm and a stronger perceived behavioral control result in a greater intention to perform the behavior. At a lower level of the hierarchy, attitude is influenced by beliefs about the outcomes or consequences of antibiotic dispensing (***behavioral beliefs***). Subjective norm results from the beliefs that important individuals or groups (i.e. referents) approve or disapprove of pharmacist's antibiotic dispensing (***normative beliefs***). Perceived behavioral control is related to beliefs concerning the presence of factors that make it easy or difficult to perform the behavior (***control beliefs***) (12).

Conceptual framework and hypotheses

The information obtained from in-depth interviews was used to refine the hypothesized model (Fig. 1). The signs (+/-) indicates the positive and negative relationships hypothesized in the model. The model was used to develop the questionnaires and test the hypothesis statistically.

Study setting

In southern Thailand, with a population of approximately 9 millions (13), there were 862 drugstores registered under regulation of Provincial Public Health Office in 2005. All were privately owned although the responsible pharmacists might sometimes work on only a part-time basis.

Study design

This was a questionnaire survey having all practicing pharmacists in the area as targeted respondents.

Questionnaire development

Development of the questionnaire followed the guidelines suggested by Ajzen and Fishbein (14). Each construct was measured by three items. The items were measured on a 7-

point scale ranging from 1 (strongly disagree/very unlikely) to 7 (strongly agree/very likely). A score lower the 4 reflected disagreement/unlikely, whereas a score higher the 4 implied agreement/likely.

Data collection

Name lists and addresses of all eligible drugstores and of all practising pharmacists were obtained from the Provincial Public Health Offices and the Alumni Association of the Faculty of Pharmaceutical Sciences, Prince of Songkla University, three to four months before the actual survey. Altogether 862 pharmacists were identified.

The questionnaires were mailed to the targeted pharmacists. As a persuasion to complete the questionnaire, two ballpoint pens were also included as an incentive for participants. A reminder postcard followed the questionnaire one to two weeks later. Two weeks after mailing the postcard, a second questionnaire with another two pens was sent to some non-respondents at either the drugstore or the office where the pharmacists also worked. Non-respondents who worked in large hospital, received the questionnaires by a pharmacist who was their colleague. Meanwhile, phone calls were made to the non-respondents who were acquaintances. For pharmacists who did not respond to any mailings, a third distribution was conducted employing a questionnaire enclosed with 40 Baht (0.83 Euro; exchange rate at 48 Baht/Euro).

Statistical analysis

Descriptive statistics and Cronbach alpha reliability coefficient for each construct were computed. Structural equation modeling was used to compute coefficients to derive the relationship of the constructs. Confirmatory factor analysis was used to test the acceptability of the proposed model.

The statistics chosen to determine the fit between the hypothesized model and data were chi-square tests, root mean square error of approximation (RMSEA) with 90% confidence interval, standardized root mean square residual (SRMR), Tucker-Lewis Index (TLI), and comparative fit index (CFI). The RMSEA values of 0.05 or less and SRMR values below 0.08 indicate a good fit to the data. TLI and CFI with values greater than 0.90 reflect an

acceptable fit (15-16). A type I error level of 0.05 was used to decide the statistical significance for all tests.

Sample size

The number of parameters estimated for our structural equation model was 160 (Fig. 1). It has been recommended that 5 respondents are needed for each parameter (17). Thus, the required sample size was 800.

Ethical approval

This study was approved by the ethics committee of the Faculty of Pharmaceutical Sciences, Prince of Songkla University.

RESULTS

Descriptive statistics

Of the 862 drugstores where the questionnaires were sent, 29 were out of business and 661 questionnaires were returned. Of these, 656 (78.8%) were acceptable. The majority of respondents were female (59.6%), 30 to 39 years of age (54.8%), having a bachelor degree (83.2%), with less than 10 years experience practice in a drugstore (67.5%). Thirty six percent of subjects were full-time community pharmacists.

As shown in Table 1, the reliability of each construct ranged from 0.76 to 0.95, except for drug resistance and adverse drug reactions (ADR) (0.59 and 0.62, respectively). However, the drug resistance and ADR scales were retained in the subsequent analysis because of their theoretical importance to behavioral attitude. On average, the pharmacists exhibited a strong intention not to dispense antibiotics (2.35$\pm$1.85) and had unfavorable attitude toward antibiotic use for URI (2.61$\pm$2.00). In relation to beliefs, most pharmacists believed that antibiotic dispensing could cause drug resistance (5.29$\pm$1.71). In addition, they strongly disagreed that lecturers (2.57$\pm$1.62) and the future standard practice guidelines of the Pharmacy Council (2.21$\pm$1.50) supported the use of antibiotics.

Testing the research model

From structural equation modeling analysis, the initial model with 16 constructs failed to converge due to collinearity within the pairs of: cure and complications, ADR and drug resistance, and physicians and other pharmacists (see the lower part of Table 1). After the pairs were merged, resulting in 13 constructs, the problem of collinearity was solved. A summary of fit statistics for tested models is displayed in Table 2. The model with 13 correlated constructs (model 2) was much better than that with uncorrelated constructs (model 1) ($\Delta\chi 2$ (78) = 6610, P < 0.001). Further improvement of the model was met when the modified constructs (model 3) were used instead of the initial one ($\Delta\chi 2$ (30) = 254, P < 0.001). Other statistics of this final hypothesized model are in acceptable limits (RMSEA = 0.054, SRMR = 0.056, TLI = 0.97, and CFI = 0.98). Item-total correlations within each final construct were high (more than 0.50) indicating that the questions reflect the construct well (convergent validity). Correlation coefficients among different constructs were low (less than 0.50) indicating divergent validity of the model.

Fig. 2 illustrates effects of various constructs of the conceptual model. Attitude has the strongest influence (path coefficient = 0.89), within which pharmacists' beliefs in benefit of antibiotics has a rather high effect (path coefficient = 0.71). Subjective norm, although having a significant effect, has a fairly low coefficient (path coefficient = 0.07). Among the perceived norm, perceived beliefs and practice of physicians and other pharmacists are the most influential (path coefficient = 0.74). Perceived behavioral control has no significant effect (path coefficient = 0.03).

DISCUSSION

In this nearly 80% response rate study, most practising pharmacists in southern Thailand have a low level of intention to dispense antibiotics for viral URI or common cold. This is highly influenced by their attitude of low benefit of antibiotics. The perceived subjective norm of indifference to this practice, has rather small influence on intention. Perceived behavioral control is also somewhat against the use of antibiotics and has also practically no influence to the intention.

Despite the evidence that antibiotics neither shorten the duration of URI nor prevent secondary bacterial infections (18), these drugs are frequently used to treat this disease (33% pediatric URI in the US, 74% of concurrent URI patients in Thailand reported the treatment with antibiotics) (19-20). In Vietnam, 83% of drugstore personnel dispensed antibiotics for such a condition (8). The intention to use rate in our study was lower than that previously reported. However, the variability of results in antibiotic use may depend on the study design. Moreover, the context of hospital-based physicians or practising pharmacists in other countries, and that of pharmacists here are different. Walker *et al.* (21), similarly to us, found that attitude is an important influential factor on intention of UK general practitioners to prescribe antibiotics for URI. Plianbangchang (10), based on the theory of reasoned action, also reported a high influence of attitude on intention to dispense antibiotics for this disease among central Thai pharmacists. This consistent high level of influence of attitude may be explained by the contexts in which such providers are able to control their own decisions under the condition of high level of freedom in community practice.

The pharmacists in the current study had low intention and also low attitude to dispense antibiotics, which were better predicted by perceived benefit than perceived problems of antibiotics. Several studies found the opposite. Previous Thai (10) and Korean studies (22) reported that pharmacists believed antibiotics would speed up the patients' recovery as well as prevent secondary infections. Perhaps these practitioners were less exposed to such information compared to our sample, who are in a new generation (67.5% less than 10 years experience in 2005).

Subjective norm was the second predictor of intention to dispense antibiotics, with weak impact, but a statistically significant effect. Lambert *et al.* (23), using the theory of reasoned action, and Liabsuetrakul *et al.* (24), using theory of planned behavior, found that subjective norm had strong influence on physicians' intention to use antibiotics for ambulatory patients in a managed care setting and for prevention of post-caesarean infections in a hospital, respectively. In those institute contexts where the members of the same or similar professions actively interact, subjective norm would be automatically developed and may become more influential than one's own beliefs and attitude. On the other hand, subjective norm has weak influence on pharmacists' dispensing intention probably because of the low level of professional

interaction with their peers. Among the potential norm creators, Liabsuetrakul *et al.* (24) showed that supervisors during residency training were the most important referents for physicians' practice patterns, whereas same-level or senior colleagues were less important. In our study, faculty of schools of pharmacy had less influence than did physicians and other pharmacists. This reflects the waning role of the school after the pharmacists have gone into community practice. Physicians and other pharmacists were more important probably because of some degree of professional competition.

Being a part of the relatively new conceived theory of planned behavior, perceived behavioral control has been rarely mentioned in previous studies on antibiotic prescribing or dispensing. In fact, this factor does exist. For example, antibiotic overuse and misuse by physicians in Korea (22) was influenced by patient (or parent) demand. Nonetheless, in a Canadian study, children from households with higher incomes were less likely to receive antibiotic prescriptions for viral respiratory tract infection (25). In the context of Thai community pharmacy, where the majority of clients are from a lower socio-economic group, the clients would have rather little perceived control over the pharmacists, as shown in our results.

As respiratory tract infection is very common in the community, one would expect that antibiotic dispensing would be an important source of income to the pharmacy (3, 26). This in turn would be expected to control dispensing behavior. Fortunately, this pessimism was falsified in our sample. The majority of respondents (64%) were part-time practitioners, who are usually hired on a per hour basis. Under such a condition, the income is quite independent of whether antibiotics are dispensed.

Beliefs standard practice guidelines of the Pharmacy Council failed to be a part of perceived behavioral control. Contrary to these results, Thamlikitkul and Apisitwittaya (20) found that clinical practice guidelines on antibiotic use in adults with URI were important tools for reducing the antibiotic prescription rate in physicians in their teaching hospital. Again, the difference of their and our findings could be explained by the difference between the relatively independent context of community pharmacy and the more strictly controlled context of the teaching hospital.

The strength of this study is in its large sample size (656 compared to 27-202 in similar previous studies) and high response rate (78.8%). The use of structural equation modeling

allows in-depth examination of various constructs in the theory. All previous studies with small sample size analyzed by multiple regression may suffer from the limited linear pattern and number of constructs. Applying separate multiple regression on each section of relationship is invalid because the intermediate terms, such as attitude, subjective norm and perceived behavioral control are in fact not independent. Self-report was the method used to collect data which may be related to the willing of respondents and the accuracy of information obtained. The reporters' intention should be further validated by observation of actual practice.

The pharmacists' intention not to dispense antibiotics to adults with URI should be further supported. The high level of influence of attitude of no benefit of antibiotics in such a case suggests that providing education to the community pharmacists is an effective way of improving the practice, and thus should be continued. Subjective norm and perceived behavioral control in this context are less influential. Application of practice guidelines for these pharmacists in the future may have rather weak impact and therefore should be planned and implemented with a more novel idea.

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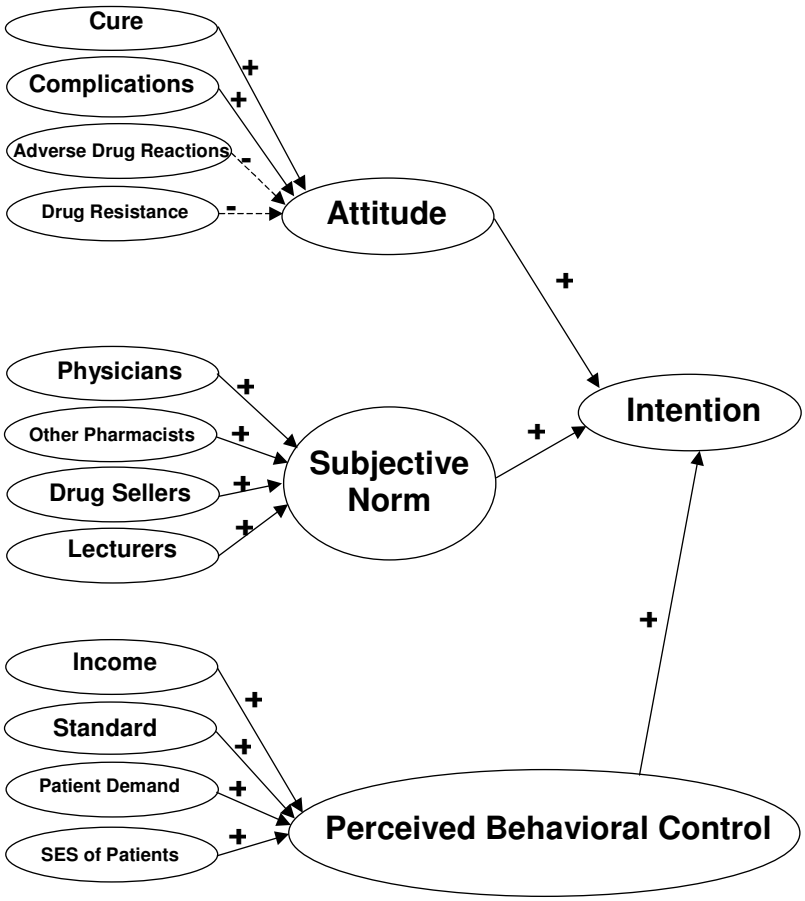

Fig. 1 Model explaining dispensing behavior of pharmacists

Table 1 Descriptive statistics of constructs[a] (N = 656)

	No. of items	Mean	SD	Reliability[b]
Intention	3	2.35	1.85	0.94
Attitude	3	2.61	2.00	0.82
Subjective Norm	3	4.01	1.80	0.89
Perceived Behavioral Control	3	3.74	1.93	0.87
Behavioral Beliefs in				
Cure	3	3.38	1.91	0.90
Complications	3	3.52	1.87	0.83
ADR	3	4.57	1.45	0.62
Drug resistance	3	5.29	1.71	0.59
Normative Beliefs				
Physicians	3	3.77	1.81	0.84
Other pharmacists	3	3.42	1.63	0.78
Drug sellers[c]	3	5.05	1.56	0.76
Lecturers	3	2.57	1.62	0.80
Control Beliefs				
Income	3	4.08	1.70	0.91
Standard	3	2.21	1.50	0.95
Patient demand	3	4.26	1.71	0.91
SES of patients	3	4.13	1.02	0.91

Table 1 (continued)

Modified constructs				
	No. of items	**Mean**	**SD**	**Reliability**[b]
Behavioral Beliefs in				
Cure + complications (benefit)	6	3.44	1.89	0.91
ADR + drug resistance (problems)	4[d]	4.90	1.62	0.73
Physicians + other pharmacists	6	3.59	1.72	0.89

[a] Response options for each item ranged from 1 to 7 (midpoint 4)

[b] Cronbach's alpha for internal consistency

[c] Who were drugstore personnel, but not pharmacists.

[d] Two indicators were excluded from the model due to their low factor loadings (approximately 0.30).

Table 2 Practice patterns by client gender and SES, and by pharmacist gender

	Total	Client characteristics				Pharmacist gender vs. client gender			
		Male with moderate SES	Male with poor SES	Female with moderate SES	Female with poor SES	Male pharmacists with male clients	Male pharmacists with female clients	Female pharmacists with male clients	Female pharmacists with female clients
	N=128	N=32	N=32	N=32	N=32	N=56	N=56	N=72	N=72
History taking [a] (mean±SD)	4.2±2.2	3.9±2.4	4.1±2.1	4.2±2.1	4.5±2.2	3.0±2.2	3.4±2.0	4.8±2.0	5.1±2.0
Advice giving [b] (mean±SD)	0.3±0.6	0.4±0.7	0.2±0.5	0.4±0.8	0.3±0.6	0.3±0.5	0.4±0.7	0.3±0.6	0.3±0.7
Drug cost (Baht) (mean±SD)	52.4±17.5	54.0±21.3	53.1±15.9	52.9±18.6	49.3±13.8	48.0±19.0	48.9±13.1	57.9±17.4	52.9±18.5
Antibiotic dispensing	112 (87.5%)	27 (84.4%)	30 (93.8%)	27 (84.4%)	28 (87.5%)	23 (41.1%)	25 (44.6%)	34 (47.2%)	30 (41.7%)

[a] Full score for male is 11 and for female is 12.

[b] Full score is 2 for both genders.

Table 3 Results from the final mixed effects model

	Client effect				Pharmacist effect	
	Male vs. female		Moderate vs. poor SES		Male vs. female	
	Beta (SE)	**95% CI**	**Beta (SE)**	**95% CI**	**Beta (SE)**	**95% CI**
History taking	-0.35 (0.49)	-2.21, 1.64	-0.20 (0.27)	-0.68, 0.38	-1.64 (0.54)*	-2.61, -0.43
Advice giving	-0.03 (0.11)	-0.36, 0.33	0.19 (0.10)	-0.03, 0.38	0.05 (0.14)	-0.22, 0.32
Drug cost (Baht)	2.45 (2.64)	-11.77, 16.30	2.23 (2.60)	-3.04, 7.36	-6.94 (4.20)*	-15.24, -0.42
	Odds ratio	**95% CI**	**Odds ratio**	**95% CI**	**Odds ratio**	**95% CI**
Antibiotic dispensing	1.38	0.43, 4.43	0.52	0.16, 1.71	0.73	0.18, 2.99

* statistical significance

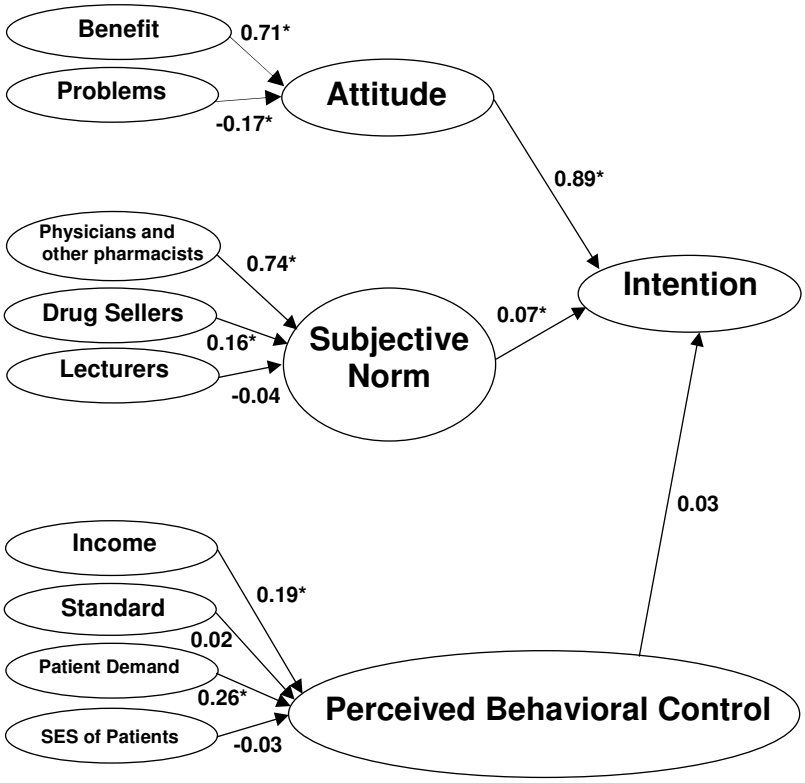

Fig. 2. The effects of all constructs in the conceptual mode

* indicates significance at $P < 0.05$.

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Appendix 4. Manuscript of study 2

The effects of gender and socioeconomic status appearance of clients on practising behaviors for upper respiratory infections among community pharmacists: a simulated client study

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Abstract

Objectives To assess the quality of care provided by community pharmacists for simulated clients (SCs) with upper respiratory infections (URI) and to examine the effects of gender and socioeconomic status (SES) appearance of the SCs on the practice.

Setting 32 drugstores in the south of Thailand with four male and four female SCs.

Method Each SC visited eight drugstores twice, one month apart, one with moderate and another with low SES appearance in random order. Key outcome variables were history taking, advice giving, and antibiotic dispensing, based on international guidelines. Descriptive statistics and mixed effects models with nesting of SCs and drugstores were analyzed.

Key findings The mean scores of history taking and advice giving were low. Proportions of 128 encounters ending up with antibiotics, corticosteroids and nonsteroidal anti-inflammatory drugs were 87.5%, 12.5%, and 7.8%, respectively. Pharmacist practice did not differ by SCs'gender and SES appearance.

Conclusion Such practice of pharmacists needs improvement. Further studies to confirm the lack of effect of clients' gender and SES are needed.

Key words gender, socioeconomic status, SES, simulated client, simulated client method, drugstore, pharmacist

Introduction

The use of simulated client method (SCM) to evaluate health provider behaviors or to derive outcome measures for their practice research has received much attention in recent years,[1,2] including investigation of quality of pharmacy practice in developing countries.[3]

In developing countries, drugstore personnel de facto diagnose, dispense medication, and advise the patients in their vast contribution to primary care.[4] While gender and socio-economic status (SES) of the clients have been shown to be factors of inequality in quality of care in hospitals,[5,6] previous studies provided little insight into the effects of such factors on pharmacist behaviors, which should be rather different from those of physicians. The majority of the early studies on this issue were of observational design, open to unreported confounding.

Client factors in SCM are supposed to be well controlled under the experimental setting. However, most SCM studies have not covered the issue of gender and SES of the simulated clients (SCs). There is a need to document the effects under the SCM setting. Bettering understanding of such effects can improve design of future SCM resulting in better quality of assessment of pharmacy care.

This study used upper respiratory infections (URI) as a model due to its commonness in the population,[7] and the important role of drugstore as the first professional care for this condition.[4] Practice guidelines for pharmacy care serving this problem have also been established,[8] and include appropriate history taking, dispensing medication, and advice giving. Antibiotics are recommended not to be given since most URI are viral origin and taking antibiotics in this case may increase the adverse effects and development of resistant pathogens.[9] There have been previous reports that dispensing practice for this condition was often not up to standard.[10,11] With this solid guideline, it is feasible to design a SCM to test the effect of the aforementioned factors.

The objectives of this study were to evaluate the quality of health service of community pharmacists based on history taking, advice giving, and choice of drug dispensed and to investigate whether gender and SES appearance of SCs presenting with URI influenced the practice patterns of the pharmacists.

Methods

Study setting

This study was conducted in 2005 in a city in the south of Thailand with a population of about 160,000.

The study was confined to type I drugstores, where a pharmacist is available as care provider. By Thai law, he/she is allowed to dispense antibiotics without prescription.

Study design

The tested factors were based on visits of four male and four female SCs, aged 21-23 years. Each visited the same drugstore twice, one month apart, with different appearance indicating moderate and poor SES. The sequences of visits were at random.

Field work preparation

Name list of drugstores in the study area was obtained from the Provincial Health Office. Those involved with faculty staff of the university were excluded due to possible bias from awareness of the study.

Four research assistants who were not SCs were employed to visit drugstores in the study area. The owners of the drugstores and the pharmacists were identified by having research assistants consulted with the pharmacists on various drug problems. Only drugstores with a pharmacist on duty were eligible in this study.

Sample

Out of 60 eligible drugstores, 32 were randomly selected for the study. Given a level of significance of 0.05, type II error of 0.20, effect size of 0.20, and correlation among the treatment combinations (gender and SES of SCs) of 0.30, the sample size required was 32 shops.[12] Since each shop was visited by one male and one female SCs, each in two different dressings, the number of total visits was 32x2x2=128.

The timing of the visit was late afternoon or early evening, after official working hours where the same pharmacist was known to be on duty in each drugstore. Based on this setting and

additional SC's memory, all visits in the same drugstore were targeted to interact with the same pharmacist.

Scenario presentation

The SC solicited to talk to the pharmacist who was then approached with the question, "What do you recommend for sore throat?" Additional information was given by the SC only when asked. The full scenario included the following: since yesterday the client him/herself had had mild sore throat, clear rhinorrhea, sometimes sneezing and congestion during daytime and nighttime. The symptoms occurred 1-2 times per year. He/she had no cough, no fever, no chronic illnesses, had not taken any medication and had no history of drug allergy.

In case that the pharmacist asked for preference of the SC on type of drugs, the SC would leave all decisions to the pharmacist.

Assessment for pharmacy practice

Core checklist items to be observed and subsequently recorded by SCs were adapted from guidelines for URI management by Ministry of Public Health in Thailand [13] and American Pharmaceutical Association.[8] The items were reviewed by two clinical pharmacy specialists with 10 years of experiences in pharmacy practice and an otolaryngologist. The final version was as shown in Table 1, grouped into three parts: history taking, advice giving, and antibiotic dispensing. In addition, the charge was also recorded. The pharmacists were expected to ask all questions in accordance with the guideline (full score=11 for male patient, 12 for females). History taking is poor when the score is less than half of the maximum scores.

The simulated clients and training

The SCs were recruited from the fifth-year pharmacy students whose hometowns were not in the study site.

The tasks of SC were to present themselves to the pharmacist and ask for service, employing the proposed scenario, memorize the key response of the pharmacist in accordance with the checklist aforementioned, purchase the drugs, depart and fill up the data form as soon as he/she was out of sight of the drugstore personnel.

The SCs underwent repeated rounds of role play and intensive feedback given by two independent experienced practising pharmacists who were university staff. Manipulation of SES appearance was through dressing and make-up. For moderate SES, the clients dressed in a typical office uniform: blue shirt, black slacks, belt, and loafers for male; blue shirt, black suit, short black skirt, black handbag, and high heels for female. For low SES, both gender groups wore old T-shirts, old long pants and sandals.

To improve the accuracy of information gathering, further training was conducted in a real drugstore run by training team member. The whole event in the drugstore was audiotaped and played back to validate information from the note-taking by the SCs. Overall proportion of errors in the checklist was reduced to below 5% before the real data collection was carried out.

Statistical analysis

In addition to routine descriptive statistics, mean$\pm$SD of scores were calculated for each subgroup of combinations between SC gender and SC SES appearance and between gender of pharmacists and of SCs. These allowed clear comparisons among the combinations.

Dependent variables included scores (continuous variable) on history taking, advice giving, and drug cost and binary outcome of dispensing/not dispensing antibiotics. Since the observations were carried out separately nested on both the same SCs and drugstores, mixed effects modeling under 'lme4' [14] of R software version 2.4.0 was used.[15] Fixed effects included the gender and SES appearance of clients, and gender of pharmacists. Interaction terms, both between client gender and pharmacist gender and between client SES and pharmacist gender, were also tested as fixed effects and retained in the model only if significant. Random effects were from SCs and drugstores, which mean that each drugstore and each SC had their own baseline estimated scores or probability of having antibiotics dispensed, which were assumed to be random variables (without any coefficient). The 95% confidence limits for continuous variables were achieved using Markov Chain Monte Carlo sample from the posterior distribution of the parameter estimates and the HPDinterval function from 'coda' package.[16] For the binary outcome, odds ratios and 95% confidence interval (CI) were directly calculated from the coefficients and standard errors based on Z distribution assumption.

Ethical approval

The study was approved from the Ethics Committee, Faculty of Pharmaceutical Sciences, Prince of Songkla University. Informed consent from the pharmacists was not obtained, because the consent process may have changed their behaviors.

Results

The average practice of pharmacists

Of 32 study pharmacists, 18 were female and 27 were owners of drugstores. During the 128 encounters, the most common history taken was that of drug allergy (83.6%), cough (57.0%), rhinorrhea (57.0%), fever (52.3%), and nasal congestion (42.2%) (Table 1). Importantly, none of the female clients was asked about pregnancy. Other mimicking conditions such as allergic rhinitis were not ruled out since seasonality and chronicity was rarely asked. Concurrently taken drugs was a rare question. With overall low frequency, female SCs from both apparent SES groups were asked about the age of the patients more often than the males ($P < 0.05$).

Only ten out of 32 pharmacists had mean of the four visits in history taking scores higher than 5. Sixteen pharmacists never gave any advice to the SCs. Fifteen gave some advice with a mean score below 1, the remaining one had a mean advice score of 1.75. The mean drug cost, was 52 Baht (or 1.1 Euro), approximately the cost of an ordinary meal at a local food center. The average number of drug items dispensed was 1.75 (range 0-3). The percentage of antibiotic dispensing was generally quite high (87.5%).

All pharmacists gave antibiotics on at least two encounters. Twenty one dispensed antibiotics in all four encounters. Corticosteroids (e.g. prednisolone) (12.5%), and items containing non-steroidal anti-inflammatory drugs (NSAIDs) (7.8%) were also dispensed.

The influence of gender and SES of clients on pharmacist behaviors

In columns 3 to 6 of Table 2, the level scores of history taking, advice giving, and drug cost are not remarkably different among subgroups, suggesting rather little effect of SCs' gender and SES appearance. In columns 7 to 10, female pharmacists had a distinctly higher score of history taking, charged a higher price, and were more likely to give antibiotics than male pharmacists, regardless

of the gender of the SC. Effects of pharmacist gender on history taking and drug cost were confirmed to be significant after adjustment for other factors in the mixed effects models in Table 3.

Discussion

In this SCM study, there was general low level of necessary history taking for URI patients, especially among the male pharmacists. Advice was also uncommon but antibiotics, which are usually not recommended by the standard guidelines, were very frequently dispensed. Drug charge from female pharmacists was higher than that from the males. Gender and SES of SCs had no influence on dispensing practice among the pharmacists.

History taking is the initial parameter of the quality of pharmacy care. For a patient presenting him-/herself as URI, without sufficient information, the possibility of other mimicking diseases, such as allergic rhinitis, and more serious complications, such as sinusitis, and lower respiratory tract infections could not be ruled out.[17] Insufficient information on concurrent drugs used, the patient may suffer from interaction of these drugs and the newly dispensed one.[18,19] Thus, history taking performance among the studied pharmacists was poor.

In concordance with previous studies in Vietnam and Uganda,[20,21] antibiotics were commonly dispensed in this study, despite the evidence of their uselessness.[9] Health providers' practice of using antibiotics for URI was explained by faulty beliefs that the drugs could shorten the duration and reduce the complications of common cold,[22] perception of patient expectations for antibiotics,[23] and financial motivation for antibiotic use associated with increase of the providers' income.[24]

One in eight encounters ended up with corticosteroid dispensing which are harmful.[19] This is against the requirement of the Thai law that medical prescription is needed. NSAIDs, were dispensed in 8% of the encounters, known to cause adverse reactions, particularly in gastrointestinal tract and renal function.[25,26] Their high frequency of unnecessary dispensing may explain the fact that NSAIDs were the most frequently drugs found in Thai household survey.[27]

Female clients were reported to get poorer quality of health services in outpatients. Women tended to experience a longer health systems delay in tuberculosis diagnosis, relative to

men in a Chinese [28] and a Thai study,[29] although statistical significance was reached only in the former. From a study on sexually transmitted diseases service, physicians were more likely to order a laboratory test and to schedule a follow-up for the female patients but less likely to instruct them to advise their partners on disease and treatment, and to counsel use of condoms.[30] Effect of client gender in pharmacy practice has, however, been rarely shown. SCM studies exploring sensitive issues related to sexuality, such as dispensing of contraceptive pills, emergency contraceptive pills [31] and condom promotion [32] failed to address whether there was any effect of SC's gender. In the current study, although no gender effect was detected, none of pharmacists asked about pregnancy status of the female SCs. As a result, patients who are pregnant may receive a drug for URI that causes teratogenic effects, such as pseudoephedrine.[19] Thus, the quality of care for women was still inadequate.

Female pharmacists in this study were more likely to ask questions. A prior meta-analysis also concluded that female physicians were more likely to have positive talk and positive inter-person relationship with the patients.[33] On the other hand, the phenomenon that female pharmacists charged more should be further explored.

Our clients' apparent SES did not affect any practice of the pharmacists. This conclusion is in contrast with a meta-analysis on physicians' performance,[34] where patients from lower social classes received less-positive communication. Perhaps, in the Thai drugstore business, clients are mostly from a low socio-economic class with which the pharmacists are acquainted.

Using SCM in the design, the current study, as well as a previous one, was able to falsify the self-reported low use of antibiotics by drugstore personnel.[20] Systematic arrangement of dressing incorporated with structural observation allowed us to test the impact of apparent SES on the pharmacist practice. The crossover design also reduced the need for a large sample size of SCs and drugstores. Had the SCs been selected from their real SES, there would be no problem due to quality of faking but the problem of difference among individual personality of SCs will arise.[35]

This study confined the investigation to URI only, thus the findings may not be generalized to other diseases. Although the SCs were well-trained as having moderate and low SES, the pharmacists might not perceive the differences, thus treated them in the same way.

Moreover, this study was based on repetition of SC-pharmacist pairing, which may provide different results from observational studies where all encounters are independent.

Conclusions

In this SCM, gender and apparent SES did not influence the practice of pharmacists on URI care. The quality of service was generally poor, especially dispensing too many antibiotics and provision of too little counselling. Further improvement is needed.

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Table 1 Items listed in the URI treatment guideline for community pharmacy practice scoring system and frequency of practice patterns of pharmacists

Items	**Score**	**Frequency (%)**[a]
History taking:		
(maximum score = 11 for male, 12 for female)		
Age of patient (child or adult)	1	52 (40.6%)
Duration of disease (or onset of disease)	1	52 (40.6%)
Symptoms of disease:		
Fever (yes/no)	1	**67 (52.3%)**
Sneezing (yes/no)	1	50 (39.1%)
Nasal congestion (yes/no)	1	**54 (42.2%)**
Rhinorrhea	1	
-Yes/No (0.25 point)		**73 (57.0%)**
-Color (0.25 point)		16 (12.5%)
-Thickness (0.25 point)		6 (4.7%)
- Chronicity (0.25 point)		0 (0.0%)
Sore throat		
-Severity (or dysphagia)	1	42 (32.8%)
Cough (yes/no)	1	**73 (57.0%)**
Chronic diseases / previous history (yes/no)	1	13 (10.2%)
Medication currently taking (yes/no)	1	1 (0.8%)

History of drug allergy (yes/no)	1	**107 (83.6%)**
Being pregnant or breast-feeding for female only (yes/no)	1	0 (0.0%)

Table 1 (continued)

Items	**Score**	**Frequency (%)**[a]
Advice giving:		
Rest	1	19 (14.8%)
Maintaining adequate fluid intake	1	21 (16.4%)
Antibiotic dispensing: Do not dispense antibiotics.		
Antibiotic dispensing		112 (87.5%)
No antibiotic dispensing		16 (12.5%)

[a] Percent was based on 128 drugstore encounters.

Table 2 Practice patterns by client gender and SES, and by pharmacist gender

	Total	**Client characteristics**				**Pharmacist gender vs. client gender**			
		Male with moderate SES	**Male with poor SES**	**Female with moderate SES**	**Female with poor SES**	**Male pharmacists with male clients**	**Male pharmacists with female clients**	**Female pharmacists with male clients**	**Female pharmacists with female clients**
	N=128	**N=32**	**N=32**	**N=32**	**N=32**	**N=56**	**N=56**	**N=72**	**N=72**
History taking [a] (mean±SD)	4.2±2.2	3.9±2.4	4.1±2.1	4.2±2.1	4.5±2.2	3.0±2.2	3.4±2.0	4.8±2.0	5.1±2.0
Advice giving [b] (mean±SD)	0.3±0.6	0.4±0.7	0.2±0.5	0.4±0.8	0.3±0.6	0.3±0.5	0.4±0.7	0.3±0.6	0.3±0.7
Drug cost (Baht) (mean±SD)	52.4±17.5	54.0±21.3	53.1±15.9	52.9±18.6	49.3±13.8	48.0±19.0	48.9±13.1	57.9±17.4	52.9±18.5
Antibiotic dispensing	112 (87.5%)	27 (84.4%)	30 (93.8%)	27(84.4%)	28 (87.5%)	23 (41.1%)	25 (44.6%)	34 (47.2%)	30 (41.7%)

[a] Full score for male is 11 and for female is 12.

[b] Full score is 2 for both genders.

Table 3 Results from the final mixed effects model

	Client effect				**Pharmacist effect**	
	Male vs. female		**Moderate vs. poor SES**		**Male vs. female**	
	Beta (SE)	**95% CI**	**Beta (SE)**	**95% CI**	**Beta (SE)**	**95% CI**
History taking	-0.35 (0.49)	-2.21, 1.64	-0.20 (0.27)	-0.68, 0.38	-1.64 (0.54)*	-2.61, -0.43
Advice giving	-0.03 (0.11)	-0.36, 0.33	0.19 (0.10)	-0.03, 0.38	0.05 (0.14)	-0.22, 0.32
Drug cost (Baht)	2.45 (2.64)	-11.77, 16.30	2.23 (2.60)	-3.04, 7.36	-6.94 (4.20)*	-15.24, -0.42
	Odds ratio	**95% CI**	**Odds ratio**	**95% CI**	**Odds ratio**	**95% CI**
Antibiotic dispensing	1.38	0.43, 4.43	0.52	0.16, 1.71	0.73	0.18, 2.99

* statistical significance