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COMPARISON OF TREATMENTS FOR UPPER RESPIRATORY TRACT INFECTIONS RECOMMENDED IN COMMUNITY PHARMACIES AND HOSPITALS.

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ABSTRACT

A total of 1,052 URTI patients was studied, 536 in two hospitals and 516 in ten pharmacies. Patients' most common symptoms were cough (73%), fever (65%), sore throat (63%), and runny nose (58%). Most URTI patients attending the hospitals were dispensed antibiotics (86%) and analgesic (82%). In the pharmacies 67% of patients received antibiotics. Amoxicillin was dispensed to 77.6% and 50.4% of patients from hospitals and pharmacies, respectively. In pharmacies 64% of medicines supplied were combinations that comprised analgesics, antihistamines, decongestants, and cough suppressants. Generally only 2-3 days medicine was supplied through pharmacies but 7 days through hospitals. Antibiotics were supplied for 5.6 days at hospitals and 2.9 days by pharmacies ($p < 0.001$). Medicine costs in the hospitals were double those of the pharmacies (average 106 baht and 47 baht, respectively) ($p < 0.001$). A total of 388 patients (36.9%) reported their outcomes by postcard. Clinical outcomes of treatments and the health status after treatment in the hospitals and pharmacies were not different. There were different humanistic outcomes with patients indicating greater satisfaction with the pharmacies in terms of convenience, time spent, and advice given.

Keywords: Upper respiratory tract infections, community pharmacies, hospitals.

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INTRODUCTION

Upper respiratory tract infections (URTIs) are considered the most prevalent common disease worldwide. Most people suffer from URTIs annually. At the family level, 75% of adults suffer from one or more respiratory infections in a year (Fry and Sandler, 1993). Chronic sinusitis, otitis media, lower respiratory tract infections with prolonged illness and abnormal physical chest signs were the most common complications. Due to their high frequency, risks of related complications, work absenteeism, and the direct and indirect costs related to them, URTIs represent a significant health problem.

Most of the common URTI symptoms are relatively benign and self-limiting. Treatment is symptomatic and targeted at the bothersome symptoms. Symptoms caused by URTI typically last one to two weeks, and most patients will feel much better within the first week (Gonzales et al., 2001). Appropriate treatment can prevent serious complications. Symptomatic treatment to relieve discomfort with advice on self-care remedies should be encouraged. Patients should be given an explanation of the possible side effects with appropriate precautions. They should be told the signs and symptoms that might indicate their conditions were worsening and that a physician should be consulted.

In Thailand, medicines for respiratory problems were reported to be the best selling products through drugstores (Charoenvisuthiwong, 1998). Many countries spend 30-40% of their health care budgets on drugs, and much of that money is wasted on irrational drug use and inefficiencies in procurement and distribution. Other serious drug use problems faced by health-care organizations include the overuse of antibiotics, increasing levels of anti-microbial resistance and increasing rates of adverse drug reactions (INRUD, 2002). The emergence of antibiotic resistance is considered to be primarily due to excessive and often unnecessary use of antibiotics (Rao, 1996). A study of the use of anti-bacterial internationally showed that most, approximately three-quarters, was used in the treatment of respiratory tract infections (Carrie and Zhanel, 1999). Antibiotics may reduce return visits for patients with bronchitis and sinusitis, but not for patients with other respiratory illnesses (URTIs, pharyngitis, otitis media, or cough) (Pan et al., 2000) Antibiotics can be supplied legally by pharmacists in Thailand through their pharmacies. The value of antibiotics supplied through pharmacies was 765 million baht in 1994 (Sirinavin, 1996). The majority of patients with URTI did not benefit from antibiotics. Colds, URTIs and bronchitis represent a set of infections that have a viral etiology in the vast majority (>90%) of cases (Kaiser et al., 1996). Most sore throats are due to viral upper respiratory tract infections. Group A beta-haemolytic streptococci (GABHS), the only common cause of sore throat warranting antibiotics, is cultured in 5-17% of adults with sore throat (Linder and Stafford, 2001). There is no need to prescribe or supply antibiotics to those patients who are considered non-risk patients. At least 60 million baht is estimated to be wasted each year in Thailand treating viral pharyngitis (Leelarasamee, 2002). Thirty percent of patients with acute otitis media have presumed viral etiology and do not require antibiotic therapy (McCracken, 1994). In community-acquired sinusitis, only 60% of sinus aspirates yielded bacteria. The sinus was involved in at least 25% of natural rhinovirus infections. Influenza virus and parainfluenza virus are infrequently isolated (Poole, 1999).

Understanding the cause of various respiratory tract infections enables primary care providers to avoid unnecessary antibiotic use, decreasing adverse effects owing to medications and preventing the rise in anti-microbial resistance (Wei and Norwood, 2001). The primary care provider needs to identify those patients with URTIs who require specific anti-microbial therapy. In most

cases this can be accomplished by considering the epidemiologic setting, the history, and the physical findings, plus the results of a few readily available laboratory tests (Bisno, 2001). The criteria for differentiating between viral and bacterial infections, and the protocol for prescribing antibiotics are given in the Thai Standard Guidelines for the treatment of respiratory tract infections (FDA, 1997).

Thirty percent of symptoms reported at general practitioner (GP) consultations were upper respiratory (Fry, 1993), and this was similar in pharmacies (Smith, 1993) where members of the public often ask advice about their symptoms (Blenkinsopp and Paxton, 1998). The most frequently stated advantages of using a pharmacy for advice on health matters were reported by Ghalamkali et al. (1997) that 77% of the clients said that there was no need to bother the doctor, 71 % of the clients said that no appointment was needed. About 65% of the clients expressed that it was very convenient, and 56% of them spur of the moment visits were possible.

No evaluation of the effectiveness of the treatment offered by community pharmacists to patients with URTI symptoms has been undertaken. Neither has been there any comparison of the treatments offered by pharmacists in community pharmacies with the treatments offered by physicians based in hospital outpatient departments. This descriptive study of URTI treatments in community pharmacies and hospitals will be compared in terms of drug therapies and outcome measurements.

The objectives of this study were aimed to compare treatments for upper respiratory tract infections (URTIs) in terms of drug therapies, costs and outcomes in community pharmacies and hospitals.

METHODS

A cross-sectional survey of URTI treatments was undertaken in two hospital outpatient departments and ten community pharmacies in Mahasarakham province. The province is located in the central part of northeast Thailand. A pilot study was conducted in order to develop patient medication records (PMRs) and an appropriate questionnaire for use in the main study. PMR was developed for recording the patient data, past medical history, current medications, signs and symptoms, duration of illness, treatment, advice, cost of medicines, and other relevant information. The questionnaire was developed for obtaining information of socio-economic, health behavior, and patient satisfaction.

Data collection from the total of 90 URTI patients was conducted in the general hospital (30 cases) and 60 cases from the two community pharmacies (30 cases from each pharmacy). Validity and reliability tests were performed. Patient questionnaires were sent to experts (physicians and pharmacists) for comment and adjustment in order to best achieve the intended purpose. Cronbach's alpha coefficient was used to determine the internal consistency of the items with each of the devised factors. The reliability coefficient was 0.7688.

The proportion of URTI patients in the pilot study period was used to calculate the sample size for the main study. The number of cases having URTI symptoms represented 20.2% of the outpatients attending the hospital and represented 20.4% of those visiting the pharmacies. It was calculated that a sample size of 492 patients per group was required in order to obtain a confidence level of 95% at five percentage points of absolute precision (Lwanga and Lemeshow, 1991). A quota sampling method was conducted to recruit the study population from two hospitals and ten community pharmacies. That is a total of 1,000 URTIs patients was required as the study population, 500 patients from community pharmacies (50 patients from each pharmacy) and 500 patients from hospitals (250 patients from each hospital). Every patient presenting with URTIs during the data collection period (March-August 2000) at the two hospitals and the ten community pharmacies was included.

Patient medication records (PMRs) were completed by trained personnel and interview questionnaires were used to obtain patient data immediately after they had received their medicines. Their parents supplied data obtained from young patients, under 15 years old. After the patients had been interviewed, they were requested to send back the stamped and addressed postcard follow-up questionnaires in two weeks. This was to obtain information on patient outcomes and satisfaction. Non-respondents were further followed up by telephone.

The treatment outcomes were compared by evaluating the patient's perception of symptoms resolved after two weeks. Four levels of outcome were assessed as 'completely resolved', 'partially resolved', 'no change', or 'worse than before treatment'. Health status measures for common symptoms were self-administered by the patient and had a five-point scale. This was 'great' = 5, 'very well' = 4, 'okay' = 3, 'not very well' = 2, and 'very bad' = 1. Patient's health status before and after treatment was measured. Patients' perceptions of satisfaction acknowledged by the URTI patients were assessed in terms of general patient satisfaction plus five aspects of satisfaction of services in the following areas; convenience, confidence in the practitioner, time spent, advice received, and payment. Four estimates of satisfaction were used to avoid the respondent opting for the central and neutral position. These levels of satisfaction were 'very satisfied' = 4, 'satisfied' = 3, 'dissatisfied' = 2, and 'very dissatisfied' = 1.

The data collected were analyzed using SPSS for Windows version 9.0. Statistical analysis consisted of descriptive statistics: percentage, mean and standard deviation. Chi-square tests were used to calculate the differences between percentage of each category and t-tests for differences between means. Multivariate logistic regression was used to analyse the relationship between patient's characteristics and the outcomes. The statistically significant level was accepted at the P-values equal to or less than 0.05 ($p \leq 0.05$).

RESULTS

The total population in the study was 1,052 URTI patients, 536 patients in 2 hospitals where physicians diagnosed and prescribed, and 516 patients in 10 pharmacies. A total of 388 (36.9%) patient follow-up and satisfaction questionnaires were returned.

The number of male URTI patients was 491 (46.7%) and the number of female URTI patients was 561 (53.3%). Patients with URTIs attending the hospitals were likely to be younger, lower education level and less income (Table 1). For the past medical history (PMR) in last month, the URTI patients attending the hospitals had more diseases than URTI patients attending the pharmacies (22.8% and 10.5%, respectively). The health status (1-5 scales) of URTI patients attending the hospitals was worse than that attending the pharmacies (mean = 2.90 and 3.25 respectively, $p < 0.001$).

The mean duration of illness was not different (3.8 and 3.5 days, respectively). Patients' most common symptoms were cough (73%), fever (65%), sore throat (63%), and runny nose (58%). The common symptoms diagnosed were acute URTI (39%), cold (33%), pharyngitis (17%), tonsillitis (3.2%), sinusitis (2.8%), laryngitis (2.3%), and otitis media (1.1%).

Medications

The average number of medicines dispensed in the hospitals was significantly more than that of the pharmacies. The medicines dispensed in pharmacies frequently involved combination forms (64%) consisting of analgesics, antihistamines, decongestants, and cough suppressants. The effect of the greater number of combination products supplied from the pharmacies resulted in the patients at the hospitals receiving less different

Table 1. The demo-sociographics data of URTI patients attending the hospitals and the pharmacies.

	Hospitals		Pharmacies		Total		Statistical analysis
	No.	%	No.	%	No.	%	
Age group (yrs)							
< 3	**103**	**19.2**	3	0.6	106	10.1	X^2 = 317.2
3 – 5	101	18.8	13	2.5	114	10.8	df = 8
6 – 15	91	17.0	41	7.9	132	12.6	p < 0.001
16 – 25	65	12.1	**241**	**46.7**	**306**	**29.1**	
26 – 35	54	10.1	89	17.3	143	13.6	
36 – 45	40	7.5	75	14.5	115	10.9	
46 – 55	34	6.3	30	5.8	64	6.1	
56 – 65	25	4.7	6	1.2	31	2.9	
> 65	23	4.3	18	3.5	41	3.9	
Total	536	100.0	516	100.0	1052	100.0	
Not studied	28	7.8	4	0.8	32	3.8	X^2 = 338.1
Primary school	**232**	**65.0**	50	10.5	282	33.7	df = 4
Secondary school	22	6.2	43	9.0	65	7.8	p < 0.001
Post-secondary school	56	15.7	**255**	**53.2**	**311**	**37.2**	
Graduate	19	5.3	127	26.5	146	17.5	
Total	357	100.0	479	100.0	836	100.0	
Government official	16	6.6	55	12.0	71	10.1	X^2 = 217.2
Agricultural worker	**98**	**40.7**	9	1.9	107	15.3	df = 7
Employee	41	17.0	96	20.9	137	19.6	p < 0.001
Business	8	3.3	45	9.8	53	7.6	
Housewife	25	10.4	25	5.5	50	7.1	
Student	41	17.0	**204**	**44.4**	**245**	**35.0**	
Others/not identified	12	5.0	25	5.5	37	5.3	
Total	241	100.0	459	100.0	700	100.0	
< 6,000	**195**	**82.6**	**262**	**57.1**	**457**	**65.3**	X^2 = 84.6
6,000 – 9,999	8	3.3	84	18.3	92	13.1	df = 6
10,000 – 19,999	14	5.8	49	10.7	63	9.0	p < 0.001
20,000 – 29,999	2	0.8	15	3.2	17	2.4	
> 30,000	-	-	11	2.4	11	1.6	
not constant/ not identified	22	9.2	38	8.3	60	8.3	
Total	241	100.0	459	100.0	700	100.0	

* in the patients 5 years old and over ; ** in the patients over 15 years old.
Bold shows the largest number of each patient characteristic.

medicines overall than the patients attending the pharmacies (mean = 3.58 and 3.90, respectively, $p = 0.001$). The duration of treatment for medicines dispensed in the hospitals was normally one week but in the pharmacies duration of therapy was significantly shorter, 2-3 days as shown in Table 2.

Table 3 indicates that the pattern of drug therapies provided by the physicians and pharmacists was significantly different. Antibiotics and analgesics were frequently dispensed to more than 80% of the URTI patients attending the hospitals. Pharmacists supplied antibiotics to 67.6% of URTI patients, and analgesics, antihistamines, decongestants and cough suppressants were dispensed to half (50%) of the patients. Amoxicillin was the most common antibiotic dispensed to URTI patients, both at the hospitals (77.6%) and the pharmacies (50.4%). Almost all of the analgesic dispensed at the hospitals was paracetamol. At the pharmacies, other analgesics dispensed were ibuprofen and mefenamic acid. Many kinds of antihistamines were dispensed, both sedative and non-sedative antihistamines. Almost all of the decongestant dispensed at the hospitals was pseudoephedrine. The decongestants dispensed at the pharmacies were pseudoephedrine, phenylpropanolamine (PPA), and phenylephrine. Most of the cough suppressant dispensed was dextromethorphan. Codeine was dispensed to some of the URTI patients at both hospitals and pharmacies. Mucolytics dispensed were mainly bromhexine. Ammonium chloride, glyceryl guiacolate (GG), terpine hydrate, and glycerrhiza were also dispensed in some expectorant preparations.

Advice and referral

The percentages of patients who acknowledged that they had received advice were more for the pharmacies (66.5%) than for the hospitals (57.8%, $p = 0.009$). It was reported that three patients (0.6%) attending the pharmacies had been referred to a hospital. Among the URTI patients attending the hospitals, eight patients (1.5%) were admitted to the hospitals.

Table 2. Amount of medicines dispensed at the hospitals and the pharmacies.

	Hospitals		Pharmacies		t	P-value
	Min-Max	Mean ± SD	Min-Max	Mean ± SD		
Item of medicines						
Medicines dispensed	1 - 7	3.24 ± 0.97	1 - 5	2.58 ± 0.93	11.209	<0.001
Combined drugs	1 - 2	0.29 ± 0.46	1 - 3	0.78 ± 0.66	13.702	<0.001
Total number of medicines	1 - 9	3.58 ± 1.30	1 - 9	3.9 ± 1.86	3.421	0.001
Duration of treatment(days)						
Antibiotics	1.5 - 18.5	5.6 ± 2.1	0.7 - 8	2.9 ± 1.2	19.837	<0.001
Analgesics	1.5 - 12	3.8 ± 1.8	0.7 - 8	2.1 ± 0.8	17.015	<0.001
Antihistamines	1.5 - 30	6.8 ± 4.9	0.7 - 10	2.8 ± 1.4	3.330	<0.001
Decongestants	3 - 30	8.4 ± 5.9	0.7 - 8	2.5 ± 0.9	0.671	<0.001
Cough suppressants	1.6 - 15	5.2 ± 1.8	0.7 - 8	2.5 ± 0.9	0.117	<0.001
Mucolytics	3 - 15	6.8 ± 1.8	0.3 - 6.7	2.7 ± 0.9	9.240	<0.001
Expectorants	1.5 - 9.2	4.0 ± 1.5	0.3 - 8	2.7 ± 0.9	0.062	<0.001

Table 3. Therapeutic categories of the medicines dispensed at the hospitals and the pharmacies.

Group of medicines	Hospitals (n=536)		Pharmacies (n=516)		Total (n=1052)		Statistical analysis
	Freq.	%	Freq.	%	Freq.	%	
Antibiotics	462	**86.2**	348	**67.6**	810	77.1	X^2 = 43.7
Amoxicillin	416	77.6	260	50.4	676	64.3	df = 1
Cephalexin	20	3.7	22	4.3	42	4.0	p < 0.001
Erythromycin	9	1.7	6	1.2	15	1.4	
Cotrimoxazole	3	0.6	34	6.6	37	3.5	
Penicillin	1	0.2	5	1.0	6	0.6	
Tetracycline	-	-	4	0.8	4	0.4	
Others *	13	2.4	17	3.3	30	2.9	
Analgesics	439	**81.9**	275	53.3	714	67.9	X^2 = 98.7
Paracetamol	438	81.7	209	40.5	647	61.5	df = 1
Ibuprofen	1	0.2	55	10.7	56	5.3	p < 0.001
Mefenamic acid	-	-	11	2.1	11	1.1	
Antihistamines	190	35.4	305	59.1	495	47.1	X^2 = 59.1
Chlorpheniramine	58	10.8	112	21.7	170	16.2	df = 1
Tripolidine	59	11.0	98	19.0	157	14.9	P < 0.001
Diphenhydramine	62	11.6	8	1.6	70	6.7	
Brompheniramine	3	0.6	53	10.2	56	5.3	
Loratidine**	4	0.7	16	3.1	20	1.9	
Astemizole**	3	0.6	15	2.9	18	1.7	
Cetirizine**	1	0.2	3	0.6	4	0.4	
Decongestants	76	14.2	258	50.0	334	31.7	X^2 = 155.7
Pseudoephedrine	73	13.6	98	19.0	171	16.3	df = 1
PPA	1	0.2	98	19.0	99	9.4	p < 0.001
PPA+Phenylephrine	2	0.4	59	11.4	58	5.8	
Phenylephrine	-	-	3	0.6	3	0.3	
Cough suppressants	122	22.8	248	48.1	370	35.2	X^2 = 73.8
Dextromethorphan	102	19.1	211	40.9	313	29.8	df = 1
Codeine	20	3.7	37	7.2	57	5.4	p < 0.001
Mucolytics	157	29.3	113	21.9	270	25.7	X^2 = 7.5
Bromhexine	122	22.8	65	12.6	187	17.8	df = 1
Ambroxol	35	6.5	32	6.2	67	6.4	p <. 0001
Acetylcysteine	-	-	16	3.1	16	1.5	
Expectorants	123	22.9	174	33.7	297	28.2	X^2 = 15.0
Ammonium chloride	93	17.4	12	2.3	105	10.0	df = 1
Glyceryl guiacolate	9	1.7	88	17.0	97	9.2	P < 0.001
GG + Terpine hydrate	-	-	71	13.8	71	6.7	
Glycerrhiza	21	3.9	2	0.4	23	2.2	
Terpine hydrate	-	-	1	0.2	1	0.1	
Others	220	41.0	71	14.1	291	28.0	

** amoksiclav, roxithromycin, augmentin, rovamycin, midecamycin, and lincocin.

** non-sedative antihistamine.

Outcomes

The 388 patient follow-up questionnaires were returned. Their health status after treatment was not different. The mean health status after treatment in URTI patients attending the hospital was 3.75, and those at the pharmacies was 3.77 (p = 0.769). The health status change (after-before) in URTI patients attending the hospitals was greater than for the URTI patients attending the pharmacies (mean = 0.66 and 0.30, respectively, p = 0.001).

Clinical outcomes were assessed using four levels; completely resolved, partially resolved, no change or worse. The majority of patients (55.6%) considered that their symptoms were completely resolved, 41.0% had symptoms that were partially resolved and 3.4% had symptoms that were not changed. Almost all of the outcomes of treatments reported by the URTI patients attending the hospitals (96.8%) and attending the pharmacies (96.4%) were that they felt better (partially resolved plus completely resolved). This was not statistically different (p = 0.170) as shown in Table 4.

In order to examine the relationship between patient's characteristics (independent variables) and the outcomes (dependent variables), multivariate analysis was used. All variables were tested and controlled by each other, as shown in Table 5. In the multivariate logistic regression model, the age, gender, education, occupation, income, past medical history, duration of illness, previous medication, and health status were adjusted. Clinical outcome was categorized into completely resolved and not completely resolved. The variables indicated, all else being equal, that the clinical outcomes of the URTI patients who attended the hospitals and those who attended the pharmacies were not different (p = 0.846).

The humanistic outcomes, in terms of patient satisfaction before and after treatment, are shown in Table 6. Before treatment: the patients were more satisfied with the pharmacies than the hospitals in the aspects of convenience, time and general satisfaction but the payment satisfaction was greater in the hospitals than in the pharmacies. After treatment, reported by post cards, the patients were more satisfied with the pharmacies than the hospitals in the aspects of advice, time and convenience but the payment satisfaction was greater for the hospitals than for the pharmacies. The satisfaction in terms of confidence when compared between the physicians and the pharmacists showed no difference.

Table 4. Clinical outcomes of treatments of URTI patients attending the hospitals and the pharmacies.

Clinical outcome of treatment	Hospitals (n=220)		Pharmacies (n=168)		Total (n=388)		Statistical analysis
	No.	%	No.	%			
Completely resolved	114	51.8	102	60.7	216	55.6	X^2=3.54
Partially resolved	99	45.0	60	35.7	159	41.0	df = 2
No change	7	3.2	6	3.6	13	3.4	p = 0.170
Worse	-	0.0	-	0.0	-	0.0	

Table 5. Regression coefficients of patient's variables and the clinical outcomes.

Variable	Sig.	Exp (B)
Age (15 yrs+)	0.9902	1.0002
Gender (Female, Male)	0.1102	0.5583
Education	0.9327	
- Primary school	0.7955	1.1659
- Secondary school	0.8122	0.8338
- Post-secondary school	0.7579	0.8647
- Graduate*		
Occupation	0.2218	
- Government official/ Business	0.2359	2.2692
- Others	0.3767	0.6879
- Employee*		
Income (baht)	0.1057	
< 6,000	0.0608	4.3236
6,000 – 9,999	0.8325	1.1687
> 10,000*		
Past medical history	0.6289	1.2107
Illness duration	0.1040	1.1097
Previous medication	0.3951	0.7191
Prior health status	0.2000	
- Not very well	0.3389	0.2789
- Okay	0.2856	0.2450
- Very well	0.1013	0.1050
- Great	0.1862	0.0874
- Very bad*		
Place visited	0.8463	
- Pharmacies (a)	0.6530	1.3230
- Pharmacies (b)	0.9421	0.9651
- Hospitals*		

(a) 3 pharmacies having pharmacists with extra training.
(b) 7 pharmacies having pharmacists with no extra training.
* Reference group.

The mean patient satisfaction for the payment of the hospital group was higher than that for the pharmacies group, probably because about 60% of them did not have to pay personally and a further 20% could claim reimbursement. In the hospitals, 87 patients (16.4%) made full payment, 79 patients (14.8%) had health insurance, 37 patients (7.0%) such as government officials paid but could claim reimbursement, 12 patients (2.3%) who did not have enough money made part or co-payment, and in the case of 317 patients (59.6%) no payment was required because they were either poor, children, senior or some other form of privileged citizens. The patients attending the pharmacies had to pay for all the medicines themselves.

Medical Costs

The cost of medicines dispensed in hospitals (average 106 baht) was double ($p < 0.001$) that of the medicines supplied in the pharmacies as shown in Table 7. In some cases patients who attended the hospitals had to pay a consultation fee, which was on average 32 baht.

DISCUSSION

It was shown that characteristics of URTI patients that attended the hospitals and the pharmacies were different. Almost all of the single formula medicines were in the essential drug lists of hospital formularies. There was a greater variety of medicines supplied in pharmacies because of the large number of commercial preparations in the market place. Antibiotics were greatly over prescribed in the hospitals. In the pharmacies over prescribing also occurred, but to a less extent, and the patients did not receive a full course. Over prescribing of antibiotics and inappropriate duration of treatment could cause anti-microbial resistance to develop and waste money. Amoxicillin was the most common antibiotic prescribed by both physicians and pharmacists. The medicines supplied in pharmacies were largely combination preparations that consisted of analgesics, antihistamines, decongestants, and cough suppressants. Duplication of therapy sometimes occurred without providing any advantage, for example, of increasing compliance. Codeine was supplied in both the hospitals and pharmacies. This should be discontinued because of the addictive properties of codeine (Fry and Sandler, 1993).

The duration of medicines dispensed in the hospitals was normally for one week but in the pharmacies it was normally only for 2-3 days. At the hospitals, the average duration of antibiotic therapy dispensed was 5.6 days, while it was only for 2.3 days in pharmacies. This is similar to the study of Thamlikitkul (1988), who found that antibiotics were dispensed for less than two days in 71% of drug stores.

Table 7. Cost of medicines dispensed for URTI patients at the hospitals and the pharmacies.

Cost (baht)	Hospitals		Pharmacies		t	P-value
	Min-Max	Mean ± SD	Min-Max	Mean ± SD		
Cost of medicines	10-970	106.53 ± 82.29	5-130	47.23 ± 23.79	15.781	<0.001
Consultation cost	20-220	32.21 ± 21.96	-	-	33.897	<0.001
Total	10-970	138.80 ± 85.52	5-130	47.23 ± 23.79	23.601	<0.001

The self-limiting nature of the symptoms would indicate that most of the URTI patients would report that their symptoms were resolved. Multivariate logistic regression analysis was conducted to confirm that the clinical outcomes of the patients were not different, in the situation of equal variables. The humanistic outcomes in terms of patient satisfaction were different. The patients were more satisfied with the pharmacies than the hospitals in the aspects of convenience, time, and advice. The costs of medicines dispensed in the hospitals were higher than those dispensed in the pharmacies because of the larger number of antibiotics. Antibiotics were the highest costing category of medicines used and thus when used inappropriately represented a large waste of resources. Rational guidelines for antibiotic prescribing need to be developed, and steps taken to see that they are followed. Monitoring of the appropriate use of medicines and feedback for improving treatment is very important to achieve a good health status for the population and for the proper use of resources.

Up to date URTI standard guidelines should be implemented aggressively. All health service providers should complete a recognized training course with follow up evaluation to improve appropriate and effective use of medicines for URTIs. Training programs on the rational use of drugs should be implemented in all schools of medicine and pharmacy. And appropriate continuing education programs for practitioners should be conducted.

Limitations of the study

This study had several limitations. It was based on a sample from only one province in northeast Thailand, which has approximately one million people. The data collected in the hospitals were only from one general hospital and one community hospital. The data collections from pharmacies were only from those pharmacies having pharmacists present and did not include non-pharmacist drugstores.

Collecting detailed information associated with service delivery was a time-consuming and demanding task. The decision by patients to either self-manage or to consult health care professionals may be influenced by a number of factors including the recommendation of relatives or friends, past experience or availability of health care services (Segall, 1990). In this study, the patients decided by themselves whether to visit hospitals or pharmacies. It would be anticipated that they would be inclined to be satisfied with the service they received from their selected service.

Only 36.9% of patients responded to the patient satisfaction questionnaire, which although typical of studies using questionnaires, was seen as a weakness to the study. It could be argued that only the patients satisfied with the service responded to the questionnaire. For this reason an additional study was undertaken which ensured a 100% patient response rate (Osiri and Richards, 2001). Twelve volunteer real patients with acute URTI symptoms visited and assessed treatment from all of the same twelve treatment facilities used in the current study (144 individual consultations). The patients were not known to the pharmacists or physicians nor did the pharmacists or physicians know that the study was taking place. This obviated any Hawthorne effect (Mays, 1994), which might result from the practitioners knowing that they were being observed/assessed. It also eliminates possible false pictures being presented by simulated patients acting out scenarios as have been used in previous assessments of pharmacy practice (Lamsam and Kropff, 1998). The results provided confirmation of the main findings of this present study.

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Entire issue of journal

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Book in a series

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Book not in a series

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Part of a book

Upatham, E.S., Koura, M.S. , Ahmed, M.D., and Awad, A.H. 1980. Focal control of *Schistosoma haematobium*-transmitting snails, *Bulinus (Ph.) abyssinicus*, using controlled release tri-n-butyltin fluoride and copper sulphate, pp. 449-459. *In* R. Baker (ed.). *Controlled Release of Bioactive Materials*, Academic Press, New York.

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O'Connor, L.M. 2001. Spawning success of sea lamprey, *Petromyzon marinus*. M.Sc. thesis. University of Guelph, Guelph, Ontario, Canada.

Translation

Koike, A. and Ogura, R. 1977. Selectivity of meshes and entrances of shrimp and crab traps. *Journal of Tokyo University Fishery* 64: 1-11 (translated from Japanese by Canadian Translation of Fishery Aquatic Science 4955, 1983).

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Journal article

Bekerian, D.A. 1993. In search of the typical eyewitness. *AmericanPsychologist* 48:574-576.

Borman, W.C., Hanson, M.A., Oppler, S.H., Pulakos, E.D., and White, L.A. 1993. Role of early supervisory experience in supervisor performance. *Journal of Applied Psychology* 78:443-449.

Magazine article

Posner, M.I. (1993, October 29). Seeing the mind. *Science* 262:673-674.

Entire issue of a journal

Barlow, D.H. (ed.). 1991. Diagnoses, dimensions, and DSM-IV: The science of classification (Special issue). *Journal of Abnormal Psychology* 100 (3).

Book

Mitchell, T.R. and Larson, J.R., Jr. 1987. *People in Organizations: An Introduction to Organizational Behavior* (3rd ed.). McGraw-Hill, New York.

Gibbs, J.T. and Huang, L.N. (eds.) 1991. *Children of Color: Psychological Interventions with Minority Youth.* Jossey-Bass, San Francisco.

Article or chapter in edited book

Bjork, R.A. 1989. Retrieval inhibition as an adaptive mechanism in human memory, pp. 309-330. *In* H.L. Roediger and F.I. Craik (eds.), *Varieties of Memory and Consciousness*, Erlbaum, New Jersey.

C. Quotation

She stated "The 'placebo effect'..... disappeared when behaviors were studied in this manner" (Miele, 1993, p.276), but she did not clarify which behaviors were studied.

Miele (1993) found that "the 'placebo effect,' which had been verified in previous studies, disappeared when [only the first group's] behaviors were studied in this manner" (p. 276).

Miele (1993) found the following: The "placebo effect," which had been verified in previous studies, disappeared when behaviors were studied in this manner. Furthermore, the behaviors *were never exhibited again* (italics added), even when real [*sic*] drugs were administered. Earlier studies (e.g., Abdullah, 1984; Fox, 1979) were clearly premature in attributing the results to a placebo effect (p. 276).