
Medicine utilisation and pricing in Malaysia: The findings of a household survey

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Abstract The objectives of this study were to identify the most commonly used medicines for mainly prevalent ailments and to compare retail sector prices (RSPs), public sector prices (PSPs) and international reference prices (IRPs). A convenient sampling method was employed to survey 33 households in a metropolitan city. Each family was followed once a week for eight weeks to observe their diseases and medication usage. The RSPs and PSPs for per unit doses and defined daily doses (DDDs) were compared with the IRPs. The most common ailments identified were cardiovascular and endocrine disorders followed by central nervous system and musculoskeletal disorders. Accordingly, the most common drugs used were for the treatment of the above ailments. Among 81 commonly used medicines, 63 were branded and 18 were generic. Of the 81 drugs, 26 were essential drugs. Angiotensin-converting enzyme (ACE) inhibitors, beta-blockers and calcium channel blockers were among the most commonly used medicines. The differential between the prices of branded medicines and IRPs were found to be remarkable. This study further revealed that the majority of patients also used traditional medicines and nutritional supplements alongside their modern medicines. Wide variations were observed in RSPs and IRPs, warranting critical evaluation, regulation and emphasis on the economic aspects of drug policy. Widespread use of branded medicines in the absence of a national health insurance programme can lead to high out-of-pocket expenditures. Concomitant use of traditional medicines and nutritional supplements may have drug interaction potential, invoking detailed investigation for relevance.

Keywords: *drug prices, drug utilisation, defined daily doses, international reference prices, drug policy, medicine price index*

INTRODUCTION

Medicine utility and pricing are major components of a national medicine policy. Morbidity and mortality, overall health

status of the population and the role of the pharmaceutical industry can all be evaluated by looking at a nation's medicine utilisation. There is no national

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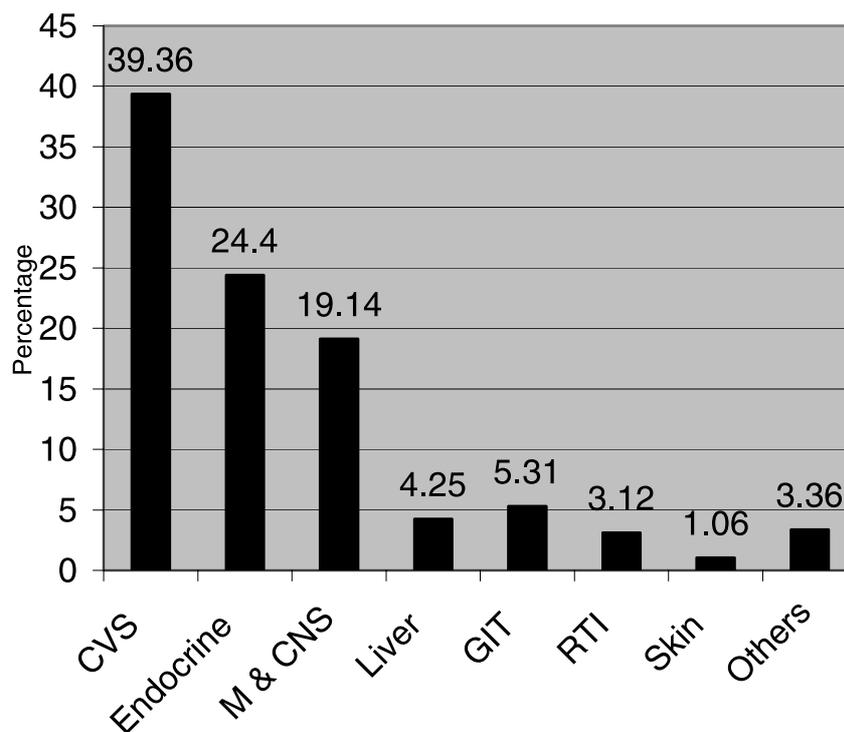


Figure 1: Percentage of commonly prevalent ailments in Malaysia
M, musculoskeletal; GIT, gastrointestinal; RTI, respiratory tract infections

health insurance (NHI) programme in place in Malaysia, although the public has access to free medical care through the public hospitals. The availability of medicines at negligible cost in public hospitals and clinics is a key success indicator of the Malaysian healthcare system. One of the authors' previous studies, however, showed that 79 per cent of patients obtained their medicines from places other than public sources, implying that a large number of consumers pay for medicines out of their own pocket.¹

Drug price regulation does not exist in Malaysia; market forces themselves are expected to stabilise drug prices.¹ The efficiency of autonomous regulation of market forces without the involvement of the government is questionable. Therefore, the authors decided to find out how much the public is paying for the drugs used for their common ailments. The objectives were to investigate the unit cost and daily

defined dose (DDD) cost of commonly used medicines and to compare them with the international reference prices (IRPs).

METHODOLOGY

Data collection

A household survey of drug utilisation in 33 families was carried out randomly in a metropolitan city and the results recorded in a previously developed logbook. The information noted included the illnesses, health status and medications used. Disease prognosis, medication progress and compliance were also followed once a week for the eight weeks of the study period.

Price comparisons

For price comparisons, drug prices were sought from private community retailers and the public sector and then compared, in terms of per unit and DDD costs, with

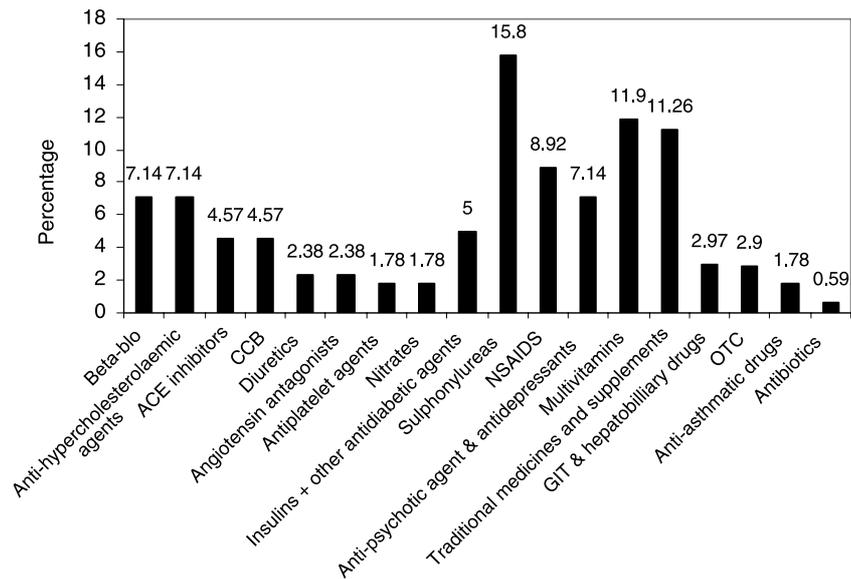


Figure 2: Percentage of commonly used drugs
 Beta-blo, beta-blockers; ACE, angiotensin-converting enzyme; NSAIDs, non-steroidal anti-inflammatory drugs; GIT, gastrointestinal; OTC, over-the-counter

each other and with IRPs. The prices are reported in Ringgit Malaysia (RM: US\$1 = 3.8200 RM). The DDDs and IRPs were obtained from the International Drug Price Indicator Guide and Anatomical Therapeutic Classification (ATC) Index.^{2,3} The IRPs are the medians of recent procurement or tender prices offered by not-for-profit suppliers to developing countries for multisource products.²

The retail sector prices (RSPs) were the median prices of 20 retail pharmacy outlets. The price comparisons of public sector, private sector and IRPs have been reported as percentages and the DDD prices as RM. Generic brands have been indicated as 'G' in parenthesis, where applicable.

RESULTS

Cardiovascular disorders were among the most prevalent ailments (39.28 per cent) in Malaysia; these can be further subdivided into hypertension (24.40 per cent), hypercholesterolaemia (9.57 per cent) and

coronary artery diseases (5.31 per cent). The other common diseases were endocrine disorders (24.46 per cent), musculoskeletal and central nervous system ailments (9.57 per cent each), liver disorders (4.25 per cent) and gastric problems (5.31 per cent). Respiratory tract infections (3.12 per cent) and skin infections (1.06 per cent) were less prevalent (Figure 1).

Accordingly, 32.10 per cent of all drugs used were used to treat cardiovascular problems. The usage of beta-blockers (7.14 per cent) and antihypercholesterolaemic drugs (7.14 per cent) was high, followed by angiotensin-converting enzyme (ACE) inhibitors and calcium channel blockers (4.76 per cent each). The usage of diuretics was 2.38 per cent, angiotensin antagonists was 2.38 per cent and anti-platelet drugs and nitrates were 1.78 per cent each. The second most widely used class of drugs was anti-diabetics (20.80 per cent), including high usage of sulphonylureas (15.80 per cent). Other commonly used classes included the

Table I: The number of generics available in community pharmacies in Malaysia for a specific drug and its brand premium (the drugs in bold have not observed in the current study but are included for comparison)

Serial No	Drugs	Generics in the market	Number of generics	Unit price of innovator brand (RM)	Unit price of the lowest-price generic equivalent (RM)	Brand premium (%)
1	Allopurinol 100 mg tab	Allopurinol (Pharmaniaga) Allopurinol (YSP Industries) APO-Allopurinol (Apotex) Upha Allopurinol (Upha) Zyloric (GSK)	4	Zyloric (0-965)	Upha Allopurinol (0-3000)	221
2	Amitriptyline 25 mg tab	APO-Amitriptyline (Apotex) Endep (Alphapharm/MSD) Tripta (Atlantic Lab) Tryptanol (MSD)	3	Tryptanol (0-400)	APO-Amitriptyline (0-0300)	1,233
3	Atenolol 50 mg tab	APO-Atenolol (Apotex) Atenolol Pharmaniaga (Pharmaniaga) Normaten (Xepa-Soul Pattinson) Ternolol (Hovid) Urosin (YSP) Vascoten (Komedic) Tenormin (AstraZeneca)	6	Tenormin (1-420)	Normaten (0-4286)	231
4	Diazepam 5 mg tab	APO-Diazepam (Apotex) Diapine (Atlantic Lab) Diapo (Upha) Valium (Roche)	3	Valium (0-050)	APO-Diazepam (0-0300)	40
5	Enalapril 10 mg tab	Invoril (Ranbaxy) Zynace (Xepa-Soul Pattinson) Renitec(MSD)	2	Renitec (1-520)	Invoril (0-9900)	53-5
6	Furosemide 40 mg tab	Dirine (Atlantic Lab) Furosemide Pharmaniaga (Pharmaniaga) Furmide (Upha) Rasitol (YSP Industries) Lasix (Aventis)	5	Lasix (0-300)	Furmide (0-1500)	100
7	Glibenclamide 5 mg tab	Debtan (YSP Industries) Dibelet (Atlantic Lab) Gliben (Medispec) Claben (Pharmaniaga) Glibenclamide Pharmaniaga (Pharmaniaga) Glibesyn (Komedic) Glimide (Upha) Daonil (Aventis)	7	Daonil (0-600)	Claben (0-0100)	5,900
8	Ibuprofen 200 mg tab	Ibufen (Upha) Ibuprofen Pharmaniaga (Pharmaniaga) Ibuprofen (YSP Industries) Perofen (JDH Pharma) Rupan (Komedic) Brugesic (Raza) Nurofen (Boots)	6	Nurofen (0-333)	Ibufen (0-2500)	32
9	Isosorbide dinitrate 10 mg tab	APO-ISDN (Apotex) Upha Isordil (Upha) Isosorbide dinitrate (Hovid) Isordil (Wyeth)	3	Isordil (0-300)	Isosorbide dinitrate (Hovid) (0-1000)	200

Table 1: Continued

Serial No	Drugs	Generics in the market	Number of generics	Unit price of innovator brand (RM)	Unit price of the lowest-price generic equivalent (RM)	Brand premium (%)
10	Lovastatin 20 mg tab	Lestric (Ranbaxy) Lostatin (Dr Reddy's Lab) Lovastatin (YSP Industries) Medostatin (Komedic) APO-Lovastatin (Apotex) Mevacor (MSD)	5	Mevacor (1.050)	Lestric (1.5000)	-30
11	Metformin 500 mg tab	Diabemet (YSP Industries) Diabetmin (Hovid) Metformin-Medochemie (Komedic) Metformin Pharmaniaga (Pharmaniaga) Glucophage (Merck)	4	Glucophage (1.250)	Diabetmin (0.1500)	733
12	Propranolol 40 mg tab	Propranolol (Pharmaniaga) Propranolol (Pharm Malaysia) Inderal (AstraZeneca)	2	Inderal (1.267)	Propranolol (Pharm Malaysia) (0.1200)	955
13	Ranitidine 150 mg tab	APO-Ranitidine (Apotex) Histac (Ranbaxy) Hyzan (Xepa-Soul Pattinson) Ranitidine Pharmaniaga (Pharmaniaga) Vesyca (YSP Industries) X'TAC (Upha) Zantac (GSK)	6	Zantac (2.300)	Histac (1.0000)	130

RM, Ringgit Malaysia.

non-steroidal anti-inflammatory drugs (NSAIDs; 8.92 per cent), and anti-psychotic agents and antidepressants (7.14 per cent). Widespread use of multivitamins (11.90 per cent) and traditional medicines and supplements (11.26 per cent) was also recorded. Classes of medicines found in the lowest usage categories were those drugs used for gastrointestinal and hepato-biliary problems (2.97 per cent), over-the-counter drugs (2.90 per cent), anti-asthmatic drugs (1.78 per cent) and antibiotics (0.59 per cent) (Figure 2).

Among 81 drugs used, 63 (77 per cent) were branded, while 13 (16 per cent) were of generic origin (Table 1). Out of these 81 drugs, 26 (32 per cent) were essential medicines.⁴ Traditional and supplementary drugs were also found to be used (Table 2).⁸

Table 2: Traditional/supplementary medicines used concomitantly with the surveyed drugs

Supplements	Traditional medicine
Calcium supplements	Ginkgo Biloba
Vitamins A, B, C, E	Omega fish oil
Pharmaton	Garlic pills
Appeton Multivitamins	Cod liver oil
Natural B Complex	Spirulina
Neurobion Forte B-Complex	Hepatofalk
Folic acid	Lecithin
Green Field Vitamin C	Evening primrose oil
Neuquinon (Co-Enzyme Q-10)	Garlic nutrition
Natopherol vitamin E 250 IU	Garlic

Public versus private sector prices

As can be seen in Table 3, public sector prices were found to be lower than private sector prices. Wide variations were observed between both sectors for 50 drugs. The private community pharmacy prices were found to be higher than the

Table 3: Percentage comparison of international reference prices (IRPs) and private and public sector prices of drugs in Ringgit Malaysia (RM)

Generic name, strength, dosage form	Brand name(s)	Difference between		
		IRP – public	IRP – private	Public – private
Atenolol 50 mg tab	Tenormin		3,957.0	
Atenolol 50 mg tab	Renotol (G)	240.00	1,123.0	260.00
Metoprolol 100 mg tab	Betaloc			952.00
Betaxolol 20 mg tab	Kerlone			1,134.00
Labetalol 100 mg tab	Tolbetol (G)			-5.00
Propranolol 40 mg	(G)	63.68	952.0	
Propranolol 40 mg tab	Inderal		6,215.0	
Enalapril 10 mg tab	Renitec	209.00	1,106.0	284.00
Lisinopril 10 mg tab	Zestril		345.0	
Perindopril 4 mg tab	Coversyl			352.00
Losartan 50 mg tab	Cozaar	14.70	14.7	
Valsartan 80 mg tab	Diovan			122.00
Hydrochlorothiazide 25 mg tab	(G)		2,261.0	
Amlodipine 5 mg tab	Norvasc	2100.00	5,227.0	161.00
Nifedipine 30 mg tab	Adalat	-91.00		
Nifedipine 10 mg cap	Stada	-28.00	1,447.0	2,066.00
Diltiazem 30 mg tab	Herbessor			525.00
Acetylsalicylic acid 500 mg tab	Aspirin (G)		2,018.0	
Ticlopidine 250 mg tab	Ticlid			771.00
Aspirin, glycine 100 mg tab	Cardiprin			30.00
Isosorbide dinitrate 10 mg tab	Isordil	-70.20	257.0	1,100.00
Isosorbide dinitrate 60 mg tab	Imdur			44.40
Furosemide 40 mg tab	Furmid (G)	-12.50	719.0	837.50
Furosemide 40 mg tab	Lasix		1,438.0	
Trimetazidine 20 mg tab	Valsteral			423.00
Gemfibrozil 300 mg cap	Brozil (G)			7.14
Atorvastatin 10 mg tab	Lipitor			85.40
Simvastatin 20 mg tab	Zocor			21.20
Lovastatin 20 mg tab	Mevacor		179.0	
Lovastatin 20 mg tab	Lestric	-51.30	298.0	719.00
Rosiglitazone 4 mg tab	Avandia			33.30
Gliclazide 80 mg tab	Diamicron			733.00
Glibenclamide 5 mg tab	Claben (G)	-42.30	-35.8	11.11
Glibenclamide 5 mg tab	Daonil		3,746.0	
Metformin 500 mg tab	Diabetmin (G)	-49.20	123.0	341.00
Metformin retard 850 mg tab	Glucophage retard		195.0	
Carbimazole 5 mg tab	Camazol (G)	-42.90	73.9	525.00
Thyroxine 0.1 mg tab	Oroxine (G)			471.00
Flunarizine 5 mg cap	Sibelium			261.00
Pizotifen 0.5 mg tab	Sandomigran			51.50
Mefenamic acid 500 mg tab	Pontalon (G)			2,172.00
Mefenamic acid 500 mg tab	Ponstan			3,218.00
Meloxicam 7.5 mg tab	Mobic			130.00
Naproxen 550 mg tab	(G)			566.00
Naproxen 275 mg tab	(G)			536.00
Ibuprofen 200 mg tab	Brugesic (G)	9.75	1,912.0	1,733.00
Ketoprofen 100 mg cap	Oruvail			290.00
Allopurinol 100 mg tab	Zyloric	93.32	1,595.0	777.00
Colchicine 0.5 mg tab	Goutnil (G)	-66.66	-34.5	200.00
Rofecoxib 12.5 mg tab	Vioxx			8.10
Alendronate 70 mg tab	Fosamax			128.00
Diazepam 5 mg tab	Valium	185.00	257.0	
Alprazolam 1.0 mg tab	Xanax			83.30
Amitriptyline 25 mg tab	APO-amitriptyline 25 (G)	27.50	3.4	-18.90
Fluoxetine 20 mg cap	Prozac			122.00
Ranitidine 150 mg tab	Zantac		2,308.0	

Table 3: Continued

Generic name, strength, dosage form	Brand name(s)	Difference between		
		IRP – public	IRP – private	Public – private
Ranitidine 150 mg tab	Histac (G)	199.00	947.0	249.00
Mebeverine 135 mg tab	Duspatalin			-49.40
Theophylline 250 mg tab	Neulin SR	-16.60	212.5	275.00
Terbutaline 2.5 mg tab	Bricanyl			1,452.00
Cloxacillin 250 mg cap	(G)			984.00
Metoclopramide 10 mg tab	(G)			1,557.00

G, generic.

public prices, with a maximum of 3,218 per cent higher for a ponstan 500 mg tablet and a minimum of 7.14 per cent higher for gemfibrozil (Brozil [G]) 300 mg capsule.

The private sector prices of three drugs — ponstan 500 mg tablet, nifedipine (Stada) 10 mg capsule and mefenamic acid (pontalon [G]) 500 mg tablet — were observed to be more than 2,000 per cent higher than those in the public sector. The prices for five drugs — kerlone 20 mg tablet, isordil 10 mg tablet, ibuprofen (Brugesic [G]) 200 mg tablet, bricanyl 2.5 mg tablet and metoclopramide 10 mg tablet — were noted to be 1,000 per cent or more higher in the private sector. Eleven drug prices were more than 500 per cent higher in the private sector when compared with the public sector prices (Table 3).

Public and private sector prices versus IRPs

When public sector prices were compared with the respective IRPs, the prices of some of drugs were found to be higher, from a maximum of 2,100 per cent for amlodipine (Norvasc) 5 mg tablet to a minimum of 9.75 per cent for ibuprofen (Brugesic [G]) 200 mg tablet. As shown in Table 3, the prices of ten drugs were found to be lower than their respective IRPs; from a maximum for nifedipine (Adalat) 30 mg tablet (-91 per cent) to a

minimum for frusemide (Furmid [G]) 40 mg tab (-12.5 per cent).

The community (private) prices were noted to be higher than IRPs, the highest difference being for propranolol (Inderal) 4 mg tablet (6,215 per cent) and the lowest difference for amitriptyline 5 mg tablet (3.40 per cent). Prices of colchicine 0.5 mg tablet and glibenclamide (Claben [G]) 5 mg tab were found to be 34.50 per cent and 35.80 per cent lower, respectively, than their respective IRPs (Table 3).

DDD prices

The private sector DDD price for Inderal 40 mg tablet was much higher (5.0680 RM) than its IRP-DDD price (0.0760 RM). The Tenormin 50 mg tablet price for the private sector was 2.1300 RM, compared with its IRP-DDD price of 0.0525 RM. Norvasc 5 mg tablet was found to have a public DDD price of 1.1210 RM, a private DDD price of 2.9330 RM and an IRP-DDD price of 0.0550 RM.

The public DDD price of Zyloric 100 mg tablet — 0.4400/DDD — was less than its private DDD price of 3.8580 RM and IRP-DDD price of 0.2276 RM. The public DDD price of ibuprofen (Brugesic [G]) 200 mg tablet (0.1080/DDD RM) deviated from the 1.9800 RM private DDD price and the 0.0984 RM IRP DDD price (Tables 4–8).

Table 4: Comparison of international reference prices (IRPs) and public and private sector prices of drugs for the treatment of endocrine disorders

Drugs	Brand name(s)	Dosage	Defined daily dose (DDD)	Cost (RM)					
				IRP		Public		Private	
				Per unit dose	Per DDD	Per unit dose	Per DDD	Per unit dose	Per DDD
Diabetes–Thiazolidinediones									
Rosiglitazone	Avandia	4 mg tab	6 mg			5.5100	8.265	7.350	11.025
Diabetes–Sulphonylureas									
Gliclazide	Diamicron	80 mg tab	160 mg			0.1200	0.240	1.000	2.000
Glibenclamide	Claben (G)	5 mg tab	10 mg	0.0187	0.0374	0.0090	0.018	0.010	0.020
Glibenclamide	Daonil	5 mg tab	10 mg	0.0187	0.0374			0.600	
Glipizide	Melizide	5 mg tab	10 mg					0.413	0.826
Glipizide	Minidiab	5 mg tab	10 mg					0.983	1.966
Diabetes–Biguanides									
Metformin	Diabetmin	500 mg tab	2,000 mg	0.067	0.268	0.0340	0.136	0.150	0.600
Metformin	Glucophage	500 mg tab	2,000 mg	0.067	0.268			1.250	5.000
Metformin retard	Glucophage retard	850 mg tab	2,000 mg	0.169	0.3976			0.500	1.176
Thyroid disorders									
Carbimazole	Camazol (G)	5 mg tab	15 mg	0.069	0.207	0.0400	0.120	0.250	0.750
Thyroxine	Oroxine	0.1 mg tab				0.0700		0.400	

RM, Ringgit Malaysia; G, generic.

The private sector DDD prices of Cozaar 50 mg tablet, 4.1300/DDD, was found to be equal to its public sector DDD price but was higher (3.6000 RM) than its IRP-DDD price. The IRP-DDD price for lestric 20 mg tablet was 0.5640 RM, the public DDD price was 0.2740 RM and the private sector DDD price was 2.2500 RM. The private DDD price of Zantac 150 mg tablet was 4.6000 RM, compared with the IRP-DDD price of 0.1930 RM.

DISCUSSION

General

In this survey, the 39.36 per cent prevalence of cardiovascular disease was higher than the 15–25 per cent value reported by the World Health Organization (WHO) in Malaysia. Similarly, the incidence of diabetes mellitus (24.40 per cent) found in this study was far more than the 7.70 per cent reported by WHO.⁵ The variation between the WHO-reported incidences and the current

findings may be due to the small sample size in the current study or use of an urban population only. Further data would be required to substantiate these findings.

Another peculiar finding of the study was the utilisation of herbal products or nutritional supplements by the majority of the respondents. Herbal product–drug and nutritional supplement–drug interactions have been reported and thus may have relevance for therapeutic outcomes. The possible interactions among the above are likely to remain unnoticed or unreported, warranting further investigations.

Price comparisons

Detailed information on medicine pricing is scarce in Malaysia, justifying the present study. Drug prices in the private sector were noted to be remarkably higher than those in the public sector and IRPs, with few exceptions. Differences between the IRP and private sector prices were noted to up to be 6,215 per cent (Inderal 40 mg tab). The differences between public sector

Table 5: Comparison of international reference prices (IRPs) and public and private sector prices of drugs for the treatment of cardiovascular disorders

Drug	Brand name(s)	Strength	Defined daily dose (DDD)	Cost (RM)					
				IRP		Public		Private	
				Per unit dose	Per DDD	Per unit dose	Per DDD	Per unit dose	Per DDD
Beta-blockers									
Atenolol	Ternormin	50 mg tab	75 mg	0.0350	0.0525			1.4200	2.1300
Atenolol	Renotol (G)	50 mg tab	75 mg	0.0350	0.0525	0.1190	0.1785	0.4285	0.6427
Labetalol	Trandate	100 mg tab	600 mg			0.2100	1.2600		
Labetalol	Tolbetol (G)	100 mg tab	600 mg			0.2106	1.2636	0.2000	1.2000
Metoprolol	Betaloc	100 mg tab	150 mg			0.1331	0.19965	1.4000	2.1000
Betaxolol	Kerlone	20 mg tab	20 mg			0.1330	0.1333	1.6420	1.6420
Propranolol	Propranolol (G)	40 mg tab	160 mg			0.0070	0.0280	0.2000	0.8000
Propranolol	Inderal	40 mg tab	160 mg	0.0190	0.0760			1.2670	5.1040
Carvedilol	Coreg	25 mg tab	37.5 mg					2.8000	4.2000
Carvedilol	Trandate	25 mg tab	37.5 mg			2.1500	3.2250	2.8000	4.2000
Angiotensin-converting enzyme inhibitors									
Enalapril	Renitec	10 mg tab	10 mg	0.1260	0.1260	0.3900	0.3900	1.5200	1.5200
Lisinopril	Zestril	10 mg tab	10 mg	0.4560	0.4560			2.0300	2.0300
Perindopril	Coversyl	4 mg tab	4 mg			0.5750	0.5750	2.6300	2.6300
Angiotensin-receptor blockers									
Losartan	Cozaar	50 mg tab	50 mg	3.6000	3.6000	4.1300	4.1300	4.1300	4.1300
Valsartan	Diovan	80 mg tab	80 mg			1.7625	1.7625	3.9280	3.9280
Diuretics									
Hydrochlorothiazide	(G)	25 mg tab	25 mg	0.0130	0.0496			0.3070	0.3070
Indapamide	Dapa	2.5 mg tab	2.5 mg					1.6660	1.6660
Calcium-channel blockers									
Amlodipine	Norvasc	5 mg tab	5 mg	0.0550	0.0550	1.1210	1.1210	2.9330	2.9333
Nifedipine	Adalat	30 mg tab	30 mg	1.2650	1.2650			3.2300	3.2300
Nifedipine	Stada	10 mg cap	30 mg	0.0420	0.1260	0.0300	0.0900	0.6500	1.9500
Diltiazem	Herbesser	30 mg tab	240 mg			0.0560	0.4470	0.3500	2.7990
Antiplatelet agents									
Ticlopidine	Ticlid	250 mg tab	500 mg			0.4360	0.8720	3.8000	7.6000
Aspirin, glycine	Cardiprin	100 mg tab				0.2383		0.3000	
Vasodilators									
Isosorbide dinitrate	Isordil	10 mg tab	60mg	0.0840	0.5040	0.0250	0.1500	0.3000	
Isosorbide-5-mononitrate	Imdur	60 mg tab				1.2220		1.7650	
Diuretics									
Furosemide	Furmid (G)	40 mg tab	40 mg	0.0183	0.0183	0.0160	0.0160	0.1500	0.1500
Furosemide	Lasix	40 mg tab	40 mg	0.0183	0.0183			0.3000	0.3000
Fibrates									
Gemfibrozil	Lopid	300 mg cap	1,200 mg					1.2430	4.9720
Gemfibrozil	Brozil (G)	300 mg cap	1,200 mg			0.1860	0.7440	0.6000	2.4000
Statins									
Atorvastatin	Lipitor	10 mg tab	10 mg			1.9200	1.9200	3.5600	3.5600
Lovastatin	Mevacor	20 mg tab	30 mg	0.3763	0.5640			1.0500	1.5750
Lovastatin	Lestric	20 mg tab	30 mg	0.3760	0.5640	0.1830	0.2740	1.5000	2.2500
Simvastatin	Zocor	20 mg tab				3.3000		4.0000	
Simvastatin	Covastin (G)	20 mg tab						1.6660	
Anti-anginal agents									
Trimetazidine	Vasteral	20 mg tab	40 mg			0.2100	0.4200	1.10000	2.200
Drugs to treat obesity									
Benfluorex	Medi axial	150 mg tab						1.0330	

RM, Ringgit Malaysia; G, generic.

Table 6: Comparison of international reference prices (IRPs) and public and private sector prices of drugs for the treatment of migraine, musculoskeletal disorders and gout

	Brand name(s)	Dosage	Defined daily dose (DDD)	Cost (RM)					
				IRP		Public		Private	
				Per unit dose	Per DDD	Per unit dose	Per DDD	Per unit dose	Per DDD
Drugs for migraine and cerebrovascular disorders									
Flunarizine	Sibelium	5 mg cap	10 mg			0-360	0-720	1-300	2-600
Co-dergocrine mesylate	Hydergine	1 mg tab						1-340	
Pizotifen	Sandomigran	0-5 mg tab	1-5 mg			1-450	4-350	0-703	2-110
Non-steroidal anti-inflammatoary drugs									
Acetylsalicylic acid	Aspirin (G)	500 mg	3 gm	0-0118	0-0708			0-250	1-500
Piroxicam	Feldene	10 mg cap	20 mg					1-065	2-130
Piroxicam	Roxim (G)	20 mg tab	20 mg					0-800	0-800
Mefenamic acid	Ponstan	500 mg tab	1,000 mg			0-022	0-044	0-730	1-460
Mefenamic acid	Pontalon (G)	500 mg tab	1,000 mg			0-022	0-044	0-500	1-000
Meloxicam	Mobic	7-5 mg tab	15 mg			0-693	1-386	1-600	3-200
Naproxen	(G)	550 mg tab				0-240		1-600	
Naproxen	(G)	275 mg tab				0-110		0-700	
Ibuprofen	Brugesic (G)	200 mg tab	1,200 mg	0-0164	0-0984	0-018	0-108	0-330	1-980
Ketoprofen	Oruvail	100 mg cap	150 mg			0-520	0-780	2-030	3-045
Xanthine oxidase inhibitors									
Allopurinol	Zyloric	100 mg tab	400 mg	0-0569	0-2276	0-110	0-440	0-965	3-858
Colchicine	Goutnil (G)	0-5 mg tab	1-0 mg	0-3361	0-6722	0-110	0-220	0-330	0-660
Cyclo-oxygenase-2 inhibitors									
Rofecoxib	Vioxx	12-5 mg tab	25 mg			1-850	3-700	2-000	4-000
Biphosphonates									
Alendronate	Fosamax 70	70 mg tab				25-190		57-500	
Others									
Glucosamin sulphate	Viartil-S	314 mg cap						0-900	

RM, Ringgit Malaysia; G, generic.

Table 7: Comparison of international reference prices (IRPs) and public and private sector prices of drugs for the treatment of central nervous system disorders

Drugs	Brand	Dosage	Defined daily dose (DDD)	Cost (RM)					
				IRP		Public		Private	
				Per unit dose	Per DDD	Per unit dose	Per DDD	Per unit dose	Per DDD
Diazepam	Valium	5 mg tab	10 mg	0-014	0-0208	0-040		0-050	
Alprazolam	Xanax	1 mg tab	1 mg			0-840	0-840	1-547	1-547
Olanzapine	Zyprexa	5 mg tab	10 mg			14-710	29-420		
Citalopram	Cipram	20 mg tab	20 mg					4-640	4-640
Amitriptyline	APO-Amitriptyline 25 (G)	25 mg tab	75 mg	0-029	0-0870	0-037	0-111	0-030	0-090
Fluoxetine	Prozac	20 mg cap	20 mg			3-500	3-500	7-800	7-800
Quetiapine	Seroquel	100 mg tab	400 mg			4-607	18-420		
Dothiepin	Prothiaden	25 mg cap	75 mg					0-240	1-200

RM, Ringgit Malaysia; G, generic.

prices and IRPs varied up to maximum of 2,100 per cent higher in the former (Norvasc 5 mg tab), which ought not to

be the case, owing to the fact that the public sector works on a non-profit basis.

Table 8: Comparison of international reference prices (IRPs) and public and private sector prices of drugs for the treatment of gastric ulcers and respiratory disorders

Drugs	Brand name(s)	Dosage	Defined daily dose (DDD)	Cost (RM)					
				IRP		Public		Private	
				Per unit dose	Per DDD	Per unit dose	Per DDD	Per unit dose	Per DDD
Ranitidine	Zantac	150 mg tab	300 mg	0.0955	0.1910			2.300	4.600
Ranitidine	Histac (G)	150 mg tab	300 mg	0.0955	0.1910	0.2860	0.5720	1.000	2.000
Mebeverine	Duspatalin	135 mg tab	405 mg			1.9200		0.970	2.910
Domperidone	Motilium	10 mg tab	30 mg					0.777	2.330
Theophylline	Nuelin SR	250 mg tab	400 mg	0.1287	0.2059	0.1200	0.1920	0.450	0.720
Terbutaline	Bricanyl	2.5 mg tab	15 mg			0.0161	0.0966	0.250	1.500
Cloxacillin	(G)	250 mg	2000 mg			0.0856	0.6848	0.500	4.000
Metoclopramide	(G)	10 mg	30 mg			0.0181	0.0543	0.300	0.900
Diethanolamine glucuronate,	Jetepar	150 mg+				0.4169			
Betaine glucuronate,		30 mg+							
nicotinamide ascorbate		20 mg cap							

RM, Ringgit Malaysia; G, generic.

Obviously, earning profit is the fundamental aim of any business, and the pharmaceutical business is no exception. The findings of this study revealed remarkably higher prices, however, even for off-patent drugs, indicating higher profit margins. The price of Tenormin 50 mg tablet, an off-patent drug, was found to be 3,957 per cent higher in the private sector compared with its IRP. The price of one of its generics (Renotol) was also found to be 1,123 per cent higher. The price of Lasix 40 mg tab was found to be 1,438 per cent higher in the private sector compared with its IRP; however, other off-patent medicines, such as colchicines, glibenclamide and a generic version of lovastatin were cheaper. The community prices of the off-patent drugs Zyloric 100 mg tablet and ibuprofen (Brugesic [G]) 200 mg tablet were noted to be 1,595 per cent and 1,912 per cent higher, respectively, in the retail sector (Table 3).

In this study, the costs of some off-patent medicines were found to be higher in the public sector. This could be due to the fact that there is a non-competitive environment in the public sector. In the Malaysian public sector, the drug

distribution system was privatised in 1994, and the privatised concessionaire selects the drugs independently. Before privatisation, the drug distribution system provided a superb model of cost containment and ensured that drugs were supplied at lower prices, keeping overall drug expenditures low.⁶ After privatisation, there were reports of a price hike and a preliminary study showed a 3.3-fold increase in drug prices.⁶ A previous investigation into the effect of privatisation on the prices of anti-infective agents depicted an increasing trend over the years, disproportionate to the rate of inflation.⁷

The data presented in Table 1 enable an assessment of the level of generics competition with regard to the number of generic drugs on the market. This table depicts the percentage difference between innovator brands and their lowest-price generic equivalents (brand premium) in the community retail pharmacy. It was concluded that the availability of generics on the market does not always reduce prices. The brand premium of atenolol is 231 per cent, indicating an apparent success of price reduction, but it is still higher than the IRP. By contrast, ibuprofen 200 mg tablet has five generic

versions available, with a brand premium of only 33.2 per cent, showing that generic availability does not always reduce the price remarkably. In the case of lovastatin, which has five generic versions, the price of the innovator brand is lower than its generic equivalent.

This controversy over generic entry to the market and price reduction is further supported by several other studies. Studies in the USA have shown that the entry of generic drugs to the market does not affect the prices of branded drugs.^{8–10} Another study, from Canada, has also shown that brand name companies do not compete on price with generics companies, regardless of who makes the generic product, how long the generics competition has been present and whether or not prices are subject to a government-imposed freeze.¹¹ It was noted that when there were four or more generics competitors listed in the Ontario formulary, prices for branded products were higher than when there were one to three generics. One US study, however, found an association between the number of generics competitors and subsequent declines over time in the rate of the rise of branded prices.¹²

The DDD, a technical unit of measurement, is an assumed average maintenance dose per day for a drug used for its main indications. The DDD system serves as a tool for drug utilisation research in order to improve the quality of drug use and provides price information.¹³ The prices of DDDs have been found to be high for the angiotensin antagonist losartan, calcium channel blockers (amlodipine and nifedipine), ACE inhibitors (enalapril and lisinopril) and beta-blockers (atenolol and propranolol) (see Tables 4–8 for detailed results).

Malaysia follows an open market economy model, whereby pure market forces are expected to determine prices and favour price control. Nevertheless, price control in a free market economy

has not been supported by the prevailing price situation, which instead is regarded as being tantalisingly high in international terms (Creese, A. [2003]), personal communication). This indicates that there are other factors, not only the free market, influencing pricing.¹⁴ The market works well for society when there is price competition, comprehensive and accurate information, an adequate supply of drugs and when consumers are able to make informed choices.¹⁵ Leaving the financing and supply of drugs entirely to the market economy may also fail to achieve public health objectives.¹⁶

There could be other factors having an impact on pricing. In Malaysia, a manufacturer can fix the prices of its products independently. At the same time, distributors, wholesalers and retailers may sell a product at their own prices. It is not mandatory to inform the pharmaceutical regulatory authority of any price fixation or increase, as the government has absolutely no control over the pricing of pharmaceuticals. Wholesalers and retailers usually increase their prices twice a year.

In a recent study employing the WHO/HAI (Health Action International) methodology, the authors found unavailability of certain innovator brands at government hospitals and in the dispensing doctor sector, but there was availability at private hospitals and university hospitals, implying that innovator brands are being sold. Although their selling volumes may be small, they are generating more profit. The availability of innovator brand lovastatin 20 mg (Mevacor) only in private hospitals restricts its market share, however, this still creates large profits due to high prices; hence, lovastatin makes higher profits than its generic versions.¹⁷

Community retail pharmacies and private hospitals are using patented medicines as a marker of quality, which may help to explain why generic medicines are not competing. The local

private hospitals are reluctant to use generic drugs, hence the government is the largest consumer of generic drugs in the country.¹⁸

Certain generic drugs were found to be more expensive than their branded versions in some community pharmacies, an indication of the absolutely free market. In this study, it was found that the price of the innovator brand of lovastatin was lower than its generic version (Table 1). Likewise, in a recent WHO/HAI study, the price of the innovator brand of co-trimoxazole suspension was noted to be lower than its generic versions in some retail pharmacies.¹⁷

Other factors influencing pricing could include the monopolistic position of drug companies and patent protection in Malaysia, whereby pharmaceutical patents are for both the product and the process.¹⁹ Drugs that still have patent status in Malaysia, with no generic available include amlodipine, fluoxetine, atorvastatin and trimetazidine.

The cost of medicines plays an important role in the health budget planning of a country and therefore requires regulation. In this context, most of the Organisation for Economic Co-operation and Development countries, including Norway, Sweden, the UK, New Zealand and Spain, have mechanisms to control the prices of medicines by one means or another. In Australia, the Pharmaceutical Benefits Pricing Authority controls drug prices. The Patented Medicines Pricing Review Board of Canada sets the maximum introductory price for medications and the limit for price rises thereafter, according to the rate of inflation.²⁰

The developing countries have also recognised the benefits of price regulation. In Brazil, the Databank of Health Purchases updates and monitors the prices of medicines.²⁰ Korea has introduced reference pricing to set a price ceiling on

drugs of similar efficacy. The Korean price re-evaluation system also aims to curb drug prices by establishing mandatory reviews of product prices, carried out every three years.²¹ In India, The National Pharmaceutical Pricing Authority fixes and revises prices.²⁰

Escalating drug prices have also been an issue of great concern to healthcare providers, consumers, patients and members of the public in Malaysia. In the quest to protect public health, the Malaysian Ministry of Health is always mindful of this responsibility and continues to work hand in hand with the pharmaceutical industry towards ensuring the quality, efficacy, safety, accessibility and availability of healthcare products.²² One of the structural indicators of the draft National Medicine Policy (NMP) also related to affordability and pricing policy is whether or not the drug prices are regulated in the private sector. According to the draft NMP, a rational pricing structure should be developed to ensure, fair, affordable and stable prices.²³

Twenty-six out of 81 medicines were found to be on Malaysia's National Essential Drug List. Seventy-seven per cent of the drugs surveyed were branded, indicating wide prescription and use of innovator drugs in this country. Although the public sector has offered almost free healthcare services to the public, many of the innovator brands may be unavailable, and the majority of people have to use the private sector. The average monthly income of an unskilled worker in Malaysia is approximately 500 RM (16.5 RM/day). Thus, high prices may put some medications out of the reach of some of the Malaysian population, contrary to the efforts of governments to ensure the accessibility of appropriate healthcare. Therefore, government involvement in pharmaceutical pricing practices can be justified as a means of ensuring appropriate

access to pharmaceuticals, irrespective of whether medications are funded via a public or a private payment mechanism.²⁴

The foregoing discussion has indicated the need for price regulation, although the national pharmaceutical industry holds the view that any such price control may hamper innovative research. The Pharmaceutical Association of Malaysia (PhAMA), representative of the Malaysian pharmaceutical industry, considers that, with free pricing and due to competition, Malaysia continues to enjoy some of the lowest prices in the region. According to PhAMA, the adoption of a fixed pricing strategy for drugs would have prevented the emergence of such competition and, therefore, led to the continued increases in drug prices; it also states that a free drug pricing strategy would actually reduce prices over time.²⁵

The above arguments are not, however, supported by the facts. Large-scale innovative research is not being carried out by the local pharmaceutical industry, so it is unreasonable to view price regulation as a hurdle to research. PhAMA itself states that Phase I clinical trials are generally carried out at international centres overseas, but that Phase II, III and IV trials may be conducted in Malaysia.²⁵ This indicates that the Malaysian pharmaceutical industry is only involved in the later stages of clinical research and not in Phase I innovative research. Furthermore, in the Asia-Pacific region, only four countries (India, China, South Korea and Australia) have innovative capabilities.²⁶

Medicine prices and the therapeutic cost index are proposed as a starting point for the formulation of price regulation mechanisms. The therapeutic cost index calculates the average increase in drug cost per DDD.²⁷ The drug price index will help to observe price increases or decreases on a yearly basis, so that rational price increases can be adjusted to match the annual inflation rate.

CONCLUSION

Wide variations were observed in private sector prices versus IRPs. This, coupled with the higher prices of some off-patent medicines, indicates that market forces alone are currently unlikely to act as drug price controlling mechanisms.

Price deregulation conflicts with the economic aspect of drug policy objectives — that is, access to the public. Therefore, the authors propose the adoption of a drug price index and therapeutic cost index for monitoring and regulating drug prices.

The study further suggests the need for investigations into possible herbal product–drug and nutritional supplement–drug interactions.

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