

Factors affecting the bargaining power of drug-purchasing groups in public hospitals in Thailand[®]

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Abstract:

Factors affecting the bargaining power of drug-purchasing groups in public hospitals in Thailand

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Songkla Med J 2005;23(2):93-98

Objective: To examine the effects of purchasing volume, purchasing group size, history of contracts, delivery rates, and drug types on the bargaining power of drug-purchasing groups in Thailand.

Design: A retrospective study

Materials and Methods: A bargaining model between drug-purchasing groups and sellers was estimated by using national databases, which included drug price information and hospital information for the year 2002. Diclofenac sodium, 75 milligrams/3 milliliters for injection; Cefazolin, 1 gram for injection; Chloramphenicol eye drop, 0.5%; Hyoscine-N-butylbromide, 10

[®]This manuscript was presented at the American Pharmacist Association (APhA) annual meeting, 2004 in Washington, USA

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milligrams; Colchicine, 0.6 milligram; Ceftriaxone, 1 gram for injection: were chosen to represent drugs for treating acute disease. Enalapril, 5 and 20 milligram; Nifedipine, 10 milligram; Gemfibrozil, 300 milligrams; Salbutamol oral inhaler, 200 doses: represented drugs for treating chronic disease in this study. Ordinary least-squares regression analysis was used for estimating coefficients in the bargaining model.

Results: Only purchasing volume and drug type were significantly associated with the bargaining power of drug-purchasing groups. When the purchasing volume increased, the bargaining power of the drug-purchasing group increased. Also, the bargaining power of the drug-purchasing group significantly increased when the drugs for chronic disease were purchased. The purchasing group size, the history of contract and the delivery rate were not statistically significant factors.

Conclusions: The most important factors affecting the bargaining power of drug-purchasing groups were the purchasing volume and drug type. An increase in the purchasing group size might not significantly increase the bargaining power of the drug-purchasing groups.

Key words: bargaining power, drug-purchasing group

บทคัดย่อ:

วัตถุประสงค์: เพื่อศึกษาผลของปริมาณยาที่สั่งซื้อ ขนาดของกลุ่มที่รวมกันเพื่อจัดซื้อ ประวัติการได้รับการคัดเลือกในปีที่ผ่านมา อัตราการขนส่งจากผู้จำหน่ายยาถึงผู้ซื้อ และชนิดของยา ต่ออำนาจการต่อรองราคาของกลุ่มที่รวมกันจัดซื้อยาในประเทศไทย

แบบวิจัย: การศึกษาแบบย้อนหลัง

วัสดุและวิธีการ: การหาแบบจำลองของการต่อรองระหว่างกลุ่มที่รวมกันจัดซื้อยากับผู้จำหน่ายยาโดยอาศัยฐานข้อมูลระดับประเทศของปี พ.ศ. 2545 ซึ่งประกอบด้วยข้อมูลราคาและโรงพยาบาล โดยเลือกยาชนิด Diclofenac sodium 75 มิลลิกรัมต่อ 3 มิลลิลิตร ยาชนิด Cefazolin 1 กรัม ยาหยอดตา Chloramphenicol 0.5 เปอร์เซ็นต์ ยา Hyoscin-N-butylbromide 10 มิลลิกรัม ยา Colchicine 0.6 มิลลิกรัม ยาชนิด Ceftriaxone 1 กรัม เป็นตัวแทนของยาที่ใช้รักษาโรคเฉียบพลัน และใช้ยา Enalapril 5 และ 20 มิลลิกรัม ยา Nifedipine 10 มิลลิกรัม ยา Gemfibrozil 300 มิลลิกรัม ยาสูดพ่น Salbutamol 200 ยูนิต เป็นตัวแทนของยาที่ใช้รักษาโรคเรื้อรังมาศึกษาและใช้การวิเคราะห์การถดถอย ordinary least-squares เพื่อหาสัมประสิทธิ์ในแบบจำลอง

ผลการศึกษา: พบว่าปริมาณยาที่สั่งซื้อและชนิดของยามีความสัมพันธ์กับอำนาจการต่อรองราคาของกลุ่มที่รวมกันจัดซื้อยา โดยอำนาจการต่อรองราคาของกลุ่มที่รวมกันจัดซื้อยาจะเพิ่มขึ้นอย่างมีนัยสำคัญเมื่อปริมาณยาที่สั่งซื้อสูงขึ้นหรือ เมื่อยาที่สั่งซื้อเป็นยาใช้รักษาโรคเรื้อรัง ส่วนขนาดของกลุ่มที่รวมกันจัดซื้อยา ประวัติการได้รับการคัดเลือก และอัตราการขนส่งจากผู้จำหน่ายยาถึงผู้ซื้อ เป็นปัจจัยที่ไม่มีความสำคัญ

สรุป: ปัจจัยที่มีความสำคัญต่ออำนาจการต่อรองราคาของกลุ่มที่รวมกันจัดซื้อยา คือ ปริมาณยาที่สั่งซื้อ และชนิดของยา การเพิ่มขนาดของกลุ่มที่รวมกันเพื่อจัดซื้อไม่ทำให้อำนาจการต่อรองราคาของกลุ่มที่รวมกันจัดซื้อยาเพิ่มขึ้นอย่างมีนัยสำคัญ

คำสำคัญ: อำนาจการต่อรองราคา, กลุ่มที่รวมกันจัดซื้อยา

Introduction

In 2000, the Ministry of Public Health, Thailand, launched a new health campaign encouraging "Good Health at Low Cost" strategies. Its objective was to reduce patients' out-of-pocket expenses and also to decrease public hospitals'

expenditure. One of the strategies was drug product selection. All public hospitals in each province of Thailand formed a drug-purchasing group, instead of buying drugs independently. Each purchasing group identified high volume and expensive products, and then purchased wholesale by bid pricing. In

2002, the Ministry of Public Health reported that the new campaign had saved approximately US \$8 million from group purchasing. Interestingly, different prices for the same product were found across the purchasing groups. After the savings were reported, the Ministry of Public Health proposed an increase in purchasing group size. Instead of province based, the new purchasing group would be region based, which contained nearby provinces. Neither advantages nor disadvantages were examined. Therefore, it could either increase the savings or create problems such as in distribution and services.

Even though some studies reported factors affecting drug bid pricing, there was no similar study conducted in Thailand.^{1,2} Thailand has a different economic profile and healthcare system from other countries. The Thai government needs more information regarding drug-purchasing groups and which is a relatively new campaign. Therefore, the objective of this study is to examine the effects of purchasing volume, purchasing group size, the history of contract, geographic location, and drug types on the bargaining power of drug-purchasing groups in Thailand.

Materials and methods

Theoretical model

A bargaining model was adapted to examine factors affecting the bargaining power of drug purchasing groups.³

$$P_N - P_L = (\alpha + \beta F) * (P_H - P_L)$$

Where:

- P_H is the highest price the drug-purchasing group would be willing to pay for the product
- P_L is the lowest price the seller would be willing to accept
- P_N is the agreed price or final bid purchasing price
- F is factors affecting bargaining power

The $P_H - P_L$ is the possible gain from bargaining to be shared between the drug-purchasing group and the seller; and the $P_N - P_L$ is the proportion of the potential gain for the seller. Therefore, the $\alpha + \beta F$ is the parameterized bargaining power of the seller. If the β is negative, the F will be negatively correlated to the

bargaining power of the seller and vice versa. Intuitively, it can be seen that any particular F that is negatively correlated to the bargaining power of the seller will be positively correlated to the bargaining power of the drug-purchasing group.

Definitions of variables

The highest price the drug purchasing group would be willing to pay for the product (P_H) was defined by the maximum allowable cost of each product that all public hospitals could possibly buy, the reference price. The bid purchasing price was used as the agreed price between the drug purchasing group and the seller (P_N), while the lowest price the seller would be willing to accept (P_L) was identified as the lowest observed bid purchasing price for the given product. These unit prices were calculated as baht per tablet or baht per milliliter.

The factors affecting bargaining power (F) included purchasing volume, purchasing group size, the history of contract, geographic location, and the drug type. Products of total purchased unit of each product in year 2000 and their reference prices were used to identify the purchasing volume, while the total number of hospital beds in each purchasing group was used as a proxy for the purchasing group size. The history of contract reflects whether or not the seller was chosen in a previous year, therefore it was a binary variable. The geographic location was defined by using the delivery rate from the capital of Thailand, Bangkok. The delivery rate, which was transportation rate, was based on the distance from Bangkok because almost all pharmaceutical manufacturers are located either in Bangkok or in its vicinity. Finally, the drug type referred to whether the drug product was used for chronic or acute disease and it was a binary variable.

Data collection

This study used retrospective analysis of two national databases: drug price information and hospital information of the drug-purchasing groups. These were used to examine factors affecting the bargaining power of the drug-purchasing groups. The databases were established by the Ministry of Public Health, Thailand, for administrative purposes in 2000. The drug price information database was composed of two types of drug price

lists: reference prices and bid purchasing prices for various drug products. The reference price list was set at a maximum allowable cost for each product which all public hospitals could possibly buy or were permitted to buy, while the bid purchasing price list was composed of bid prices agreed upon between a purchasing group and a manufacturer for each particular product. The bid purchasing price varied across the purchasing groups. The reference price list was composed of a generic name, a package size, and a unit price; while the bid purchasing price list contained a generic name, a trade name, a package size, a manufacturer, the volume of purchased product, the purchasing time, and the bid purchasing price for each particular product from each purchasing group. The hospital database contained the number of beds of each hospital in the individual purchasing group, which was defined as all public hospitals in each province.

The drug product list contained approximately 1,000 items. It would be laborious to include all drug products in the study. Therefore, only products with a high purchased volume were selected. Diclofenac sodium, 75 milligrams/3 milliliters for injection; Cefazolin, 1 gram for injection; Chloramphenicol eye drop, 0.5%; Hyoscin-N-butylbromide, 10 milligrams; Colchicine, 0.6 milligrams; Ceftriaxone, 1 gram for injection: represented drugs used for treating acute disease. Enalapril, 5 and 20 milligrams; Nifedipine, 10 milligrams; Gemfibrozil, 300 milligrams; Salbutamol oral inhaler, 200 doses: represented drugs used for treating chronic disease. Only data from the fiscal year 2002 were used in this study because they were more complete. Since there were several purchasing time periods during the study year, only data from the first trimester of the fiscal year 2002, which included the majority of data, was included in this study. All data are available at the Ministry of Public Health website (<http://www.moph.go.th>). Finally, the data were composed of 405 items and they were downloaded and combined with Microsoft Excel XP format to make a working file. Before analyzing the data, the price and volume data were authenticated by comparing with raw data obtained from four provinces resulting in a high level of data accuracy.

Data analysis

The bargaining power of the sellers for each product was calculated by using the bargaining model. The mean and

standard deviation of the variables were calculated for descriptive analysis. Ordinary least-squares regression analysis was used to estimate regression coefficients in the bargaining model. Since the distribution of bargaining power was skewed and its residuals were not normally distributed, the bargaining power was transformed to logarithmic form before estimating the coefficients. Multicollinearity also was examined and no evidence was found.

Results

Table 1 shows the mean and standard deviation for all variables. The bargaining power was approximately 20 percent. This implies that the difference between the agreed price or the final bid purchasing price and the lowest price the seller would be willing to accept was one fifth of the difference between the highest price the drug-purchasing group would be willing to pay and the lowest price the seller would be willing to accept. The results suggest that on average, a purchasing group yielded a discount from the highest price they would be willing to pay.

Two independent variables, the history of contract and the drug type, were categorical. Almost 60 percent of the selected sellers were not from the previous year's contract. The number of studied drugs included for chronic and acute diseases was almost equal. The average purchasing volume and its standard deviation were relatively high. The average purchasing group size was approximately 900 beds for each province and the average delivery rate was 1.29 Baht per kilogram.

Table 2 shows the ordinary least-squares regression estimates across all products. A negative estimated regression coefficient means that the particular factor is positively related to the bargaining power of the drug-purchasing group. Only purchasing volume and drug type were significantly associated with the bargaining power between the drug-purchasing groups and the sellers. When the purchasing volume increased, the bargaining power of the drug-purchasing group increased. Also, the bargaining power of the drug-purchasing group significantly increased when drugs for chronic disease were purchased. Even though an increase in the purchasing group size and a decrease

in the delivery rate increased the bargaining power of the drug-purchasing group, they were not statistically significant factors. Similarly, the bargaining power of the drug-purchasing group increased when the particular product was selected from the previous purchase. However, it was not a statistically significant factor.

Table 1 Descriptive statistics (N=405)

	Mean + Standard Deviation
Bargaining power	.19+.21
Purchasing volume (Baht)	188,127.92+475,384.76
Purchasing group size (beds)	902.95+449.49
History of contract (0 = not chosen, 1 = chosen in previous year)	.59+.49
Delivery rate (Baht per kilogram)	1.29+.23
Drug Type (0= drug for chronic disease, 1 = drug for acute disease)	.51+.49

Table 2 Ordinary least-squares regression coefficients (LN of bargaining power)

	Unstandardized		Standardized
	coefficients	Standard Error	coefficients
Constant	-2.48	.33*	-
Purchasing volume (x10 ⁶ Baht)	-.09	.01*	-.36
Purchasing group size (x 10 ³ beds)	-.10	.12	-.86
History of contract (0 = not chosen, 1= chosen in previous year)	-.16	.11	-.07
Delivery rate (Baht per kilogram)	.20	.23	.04
Drug Type (0= drug for chronic disease, 1 = drug for acute disease)	.59	.11*	.25

* p<.01, R² = .20

Discussion

Intuitively, purchasing volume was a major determinant for bargaining power. The lower prices or lower bargaining power of the sellers were compensated by the higher volume. This was the reason the government proposed to increase the purchasing volume. The result also was consistent with a previous study by Raetz, Milewski, and Massoud.² However, this was not the only factor that significantly influenced the bargaining power of the drug-purchasing group. Drug-purchasing groups had higher bargaining power when they negotiated with the sellers for chronic disease drugs. One reason was that the drugs for chronic disease were used for a longer period of time than were the drugs for acute disease. The sellers would allow lower bid prices because they expected brand loyalty in the long run.

The result, which was inconsistent with the previous studies^{1,2}, was that purchasing group size as represented by the number of beds was not significantly correlated with bargaining power. The history of contract and delivery rate also were not significant factors. Basically, purchasing groups considered the purchasing contract annually. The results confirmed that the previous contract did not affect the bargaining power between drug-purchasing groups and sellers. For the delivery rate, one reason could be that the drug products were not bulky and did not require extensive transportation between sellers and purchasing groups. Therefore, the scenario was not seriously considered during bargaining sessions. This result was consistent with a previous study by May, Daniel, and Herrick.¹

There were some limitations to this study. The study used only secondary data, which was collected for administrative purposes. Moreover, only a limited number of independent variables were used. Various factors, such as other benefits that the sellers provide to the hospitals, should be included in future study. However, potential factors, according to previous studies, had already been included. Also, generalizability was limited because only some products were studied. They might not be representative of all products.

Conclusions

For policy considerations, an increase in the purchasing group size might not increase the bargaining power of the drug-purchasing group. It also might be difficult to manage distribution or services from the sellers. The results demonstrated that the bargaining power of the drug-purchasing group had a significant relationship with purchasing volume and drug type. The drug-purchasing groups can increase their bargaining power when they negotiate for either higher volume or chronic disease drugs.

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