



PRACTICE REPORT

The role of pharmacoeconomics in formulary decision making in different hospitals in Riyadh, Saudi Arabia

Mohammed S. Alsultan *

Pharmacoeconomic and Outcomes Research Unit, Department of Clinical Pharmacy, College of Pharmacy, King Saud University, P.O. Box 2487, Riyadh 11451, Saudi Arabia

Received 8 August 2010; accepted 25 September 2010
Available online 4 November 2010

KEYWORDS

Pharmacoeconomics;
Formulary decision;
Pharmacy and Therapeutics
committees;
Saudi Arabia

Abstract Objective: To assess the trend of using pharmacoeconomic information by Pharmacy and Therapeutics (P&T) committees when making formulary decisions.

Design: A cross-sectional study conducted in 2007, using structured survey questionnaires which were distributed to members of the P&T committees in 11 different hospitals in Riyadh, Saudi Arabia.

Results: A total of 100 survey questionnaires were sent to head of pharmacy departments of 11 different hospitals in Riyadh, Saudi Arabia. Out of these, 48 questionnaires were completed and returned. Of the total respondents participated in the study, 64.58% were medical doctors and 16.66% were pharmacists and 75% of the respondents said they have applied pharmacoeconomic evaluations in their decision making process. More than 80% of the respondents perceived that they had a fair knowledge of pharmacoeconomics. Approximately 80% of respondents expressed some degree of agreement that pharmacoeconomics should be applied as a decision making tool. The majority of decision-makers (95%) expressed the interest in attending workshops on pharmacoeconomics.

Conclusion: The study showed that pharmacoeconomics can play an important role in the P&T committee formulary decisions. However, more education to health care professionals and to hospital administrators should be conducted to facilitate the use of such a tool. Also, hospitals should recruit health care professionals with pharmacoeconomic expertise to manage limited health resources in the best way available.

© 2010 King Saud University. Production and hosting by Elsevier B.V. All rights reserved.

* Tel.: +966 50722277.
E-mail address: drsultan@ksu.edu.sa



1. Introduction

Health care providers are under pressure to control the rapid acceleration of health care costs. In the United States, expenditures on prescription drugs accounted for 9.4% of total health care costs in 2000, making medications the most influential driver of health care inflation (Shah et al., 2003; CMS, 2010). In Australia, Canada, Finland, Ireland, Sweden and the United States, spending on medicines has increased by more than 70% in real terms between 1990 and 2001.

Medicines now make up more than 10% of health spending in nearly all of these countries (OECD, 2003). The United States spent 16% of its national income (GDP) on health in 2007. Apart from the United States, even France, Switzerland and Germany spend the greatest proportion of national income on health, which allocated 11.0%, 10.8% and 10.4% of their GDP to health, respectively (OECD, 2009). In Saudi Arabia and other Arabian Gulf countries, budget allocations for medications and drug products have increased sharply over the recent years, with a greater percentage of health care costs devoted to medications. The available data revealed that Saudi Arabia spent an estimated 4% of its GDP on health care provision in 2007, which is low in comparison with most developed countries but similar to other Gulf Co-operation Council states (Saudi Market Profile, 2008). A study conducted in 2001 in Saudi Arabia reveals that the average household spent a mean of \$587.50 on health related matters, whereas the mean health expenses in other Gulf countries were \$342.50 ($P < 0.005$). The cost of total drug consumption by families in Saudi Arabia was calculated to be \$779,673, 913.00 (about 3.0 billion Saudi riyals [SR]). Data from the same study reveal that families in Saudi Arabia spend 16.3% more than families in other Gulf countries for medication (Abou-Auda, 2003).

The increase in expenditure of health care has prompted many governments, health insurance companies, and health providers throughout the world to adopt strategies to manage the high cost of medication, including formulary management and the use of pharmacoeconomics. Formulary management uses pharmacoeconomics as a means to reduce these costs by allowing efficient use of the available resources. Some studies suggested that decrease in drug expenditures and ultimately the overall cost savings can be achieved by using well-controlled formularies (Hazlet and Hu, 1992; Baluch et al., 1999; Green et al., 1989). Pharmacoeconomic data can support the inclusion or exclusion of a drug on or from the formulary and support practice guidelines that promote the most cost-effective use of medications. The formulary is a regularly revised collection of pharmaceuticals based on current clinical judgment and helps the medical staff of a given institution and experts in the diagnosis and treatment of disease (ASHP, 1995; AMCP, 1997). Various strategies can be used to incorporate pharmacoeconomics into formulary decision making. These include using published pharmacoeconomic studies, economic modeling techniques, and conducting local pharmacoeconomic research. The American Society of Health-System Pharmacists (ASHP) recommends the use of formulary management in hospital setting to manage the quality and costs of pharmaceuticals in order to optimize patient care by ensuring access to clinically appropriate, safe, and cost-effective medications (ASHP, 2008). The role of Pharmacy and Therapeutics (P&T) committees is to make sure deliverance of safe and effective drug therapy (Quinn and Barisano, 1999). A Medline search utilizing the keywords "pharmacoeconomics and Saudi Arabia" revealed that the use of pharmacoeconomics in formulary decisions has not been studied before in the country. Therefore, the objective of this study was to assess the trend of using pharmacoeconomic information by Pharmacy and Therapeutics committees when making formulary decisions in different hospitals in Riyadh, Saudi Arabia.

2. Methods

This was a cross-sectional study conducted in 2007. A structured survey questionnaire was developed and distributed to members of the P&T committees in 11 different hospitals in Riyadh, Saudi Arabia. Hospitals including ministry of health and general organization hospitals, university and academic hospitals, military hospitals, and private hospitals were selected to represent the different health care settings in Riyadh. The hospitals having 300 or more total qualified beds were included into the study. The survey questionnaire was developed using an earlier study (Odedina et al., 2002) and was pre-tested by ten pharmacists experienced in formulary decisions to check for face validity and the ease of administering such a survey. Some questions in the survey were modified after getting feedback from participants in the pilot study. After verifying the number of members in the P&T committee, a total of 100 surveys questionnaire, with a covering invitation letter to take part in the study, were sent to head of pharmacy departments in the participating organization. The questionnaire covered the following issues: (i) demographic information such as: education degree(s), age, years in the profession, years in the P&T committee, and the structure and number of the P&T committee members; (ii) rate the influence of physicians, pharmacists, and other members in the P&T committee decisions; (iii) rate the importance of different factors such as: drug efficacy, safety, acquisition cost, physicians demand, and other factors when making formulary decisions; (iv) if pharmacoeconomic evaluation has ever been used when making decisions and if the answer was yes, participants were asked to: (a) select the type of pharmacoeconomic studies used, (b) rate the usefulness of such studies, (c) the source of such studies, (d) rate the influence of such studies on the P&T committee decisions, (e) rate his/her knowledge in pharmacoeconomics; (v) if limited or no studies have been used members were asked to select from a list of potential reasons; (vi) rate his/her opinion on whether pharmacoeconomic evaluation should be a requirement when making formulary decisions; and finally (vii) would the member be interested in attending a workshop about pharmacoeconomics.

2.1. Data analysis

Responses to each question were coded individually, and data were analyzed using statistical software PASW 18 (SPSS Inc., Chicago, IL). Descriptive statistics was used for data analysis.

3. Results

A total of 100 survey questionnaires were sent to head of pharmacy departments of 11 different hospitals in Riyadh, Saudi Arabia. Out of the 100 questionnaires distributed, 48 questionnaires were completed and returned.

3.1. Demographic information

Of the 48 respondents participated in the study, 31 (64.58%) were medical doctors and 8 (16.66%) were pharmacists. The majority of respondents have more than 10–20 years of experience as health care professionals. Most of the participants (83%) had served on the P&T committee for less than 5 years. Members of the P&T committee in these hospitals consisted of

an average of 6 physicians (range, 4–8), an average of 3 pharmacists (range, 1–6 members), and a range of 1–3 members from other health professionals (Table 1). In response to the question regarding the influence of different professions on the P&T committee decisions, most of the respondents (75%) believed that physicians and pharmacists can manipulate equally the decisions of the P&T committee (Table 2).

3.2. Formulary decision-making criteria

The respondents were asked to rate the importance of drug efficacy, drug safety, acquisition cost and physician demand

for formulary decision making. The results are reported in Table 3. The top three criteria rated as “very or extremely important” for formulary decision-making were safety and efficacy (97.9%), the acquisition cost (56.25%) and physician demand (52.08%).

3.3. Use of pharmacoeconomics in formulary decision-making process

Respondents were asked to indicate whether they had applied pharmacoeconomic evaluations in the past for decision making process. Out of the 48 respondents, 36 (75%) of the respondents said they have done so; and of those respondents, 52.7% stated that they found pharmacoeconomic data to be influential; whereas 50.0% found these data helpful (Table 4).

3.4. Usefulness of types of pharmacoeconomic analysis in formulary assessments

One of the questions in the questionnaire required the respondents to indicate the type of pharmacoeconomic analysis which they would find useful in decision making. The most popular analysis type was a cost-effectiveness analysis (22.2%). This was followed by cost-benefit analysis (11.1%); however 47.2% of the respondents used more than one type of pharmacoeconomic analysis and 13.8% of the respondents were not sure about the use of the type of pharmacoeconomic analysis (Table 4).

3.5. Importance of data sources for formulary decision-making

Respondents were asked to indicate the data sources for pharmacoeconomic studies in formulary decision-making. About 50.0% of respondents were using more than one source of information for pharmacoeconomic studies. Among individual source, the published literatures in peer-reviewed journals were ranked the top of the list. In-house expertise and pharmaceutical company as a source of information were ranked the last and were not considered “very important” (Table 4).

3.6. Awareness of pharmacoeconomics

The respondents were requested to rate their understanding of pharmacoeconomic data, on a scale of “no knowledge”, “somewhat knowledgeable”, “knowledgeable”, “very knowledgeable”, and “extremely knowledgeable”. More than 80% of the respondents perceived that they had a fair knowledge of pharmacoeconomics and 8.3% indicated that they do not have knowledge of pharmacoeconomics” (Table 4).

Table 1 Summary of demographic information.

Variable		N = 48 (%)
Age (years)	25–40	22 (29.7)
	> 40–55	22 (29.7)
	> 55	3 (6.4)
Educational level	BS Pharmacy	5 (10.4)
	PharmD	3 (6.3)
	MD	25 (52.1)
	MS	6 (12.5)
	PhD	7 (14.6)
	Other	2 (4.2)
Years as health professional	< 10	9 (18.8)
	> 10–20	27 (56.3)
	> 20	12 (25)
Years in P&T committee	< 5	40 (83.3)
	> 5–10	4 (8.3)
	> 10	3 (6.3)
Number (ratio) of different professions in P&T committee	Physicians	4–8 physician
	Pharmacists	1–6 pharmacist
	Others	1–3 other professions

Table 2 Influence of different professions on the P&T committee decisions.

Level of influence	Profession		
	Physicians	Pharmacists	Others
Not influential	2	1	9
Somewhat influential	–	1	14
Influential	9	9	11
Very influential	19	21	4
Extremely influential	17	15	1

Table 3 Important criteria in formulary decision-making.

Factors	Rating criteria				
	Not important	Somewhat important	Important	Very important	Extremely important
Drug efficacy	–	–	1	19	28
Drug safety	–	–	1	18	29
Acquisition cost	–	6	15	21	6
Physician demand	–	4	19	24	1
Other factors	4	4	6	3	4

Table 4 Use of pharmacoeconomics in formulary decision-making process.

Variable	N (%)
Ever use pharmacoeconomic data	
Yes	36 (75)
No	12 (25)
Type of study used	
Cost effectiveness	8 (22.2)
Cost benefit	4 (11.1)
More than one	17 (47.2)
Not sure	5 (13.8)
Usefulness of studies	
Not helpful	1 (2.7)
Somewhat helpful	1 (2.7)
Helpful	18 (50.0)
Very helpful	11 (30.5)
Extremely helpful	3 (8.3)
Source of studies	
Published literature	11 (30.5)
Pharmaceutical company	2 (5.5)
In house expertise	2 (5.5)
More than one source	18 (50.0)
Pharmacoeconomic influence	
Not influential	–
Somewhat influential	8 (22.2)
Influential	19 (52.7)
Very influential	8 (22.2)
Extremely influential	1 (2.7)
Pharmacoeconomic knowledge	
No knowledge	3 (8.3)
Somewhat knowledgeable	11 (30.5)
Knowledgeable	19 (52.7)
Very knowledgeable	2 (5.5)
Extremely knowledgeable	1 (2.7)

3.7. Barriers to use pharmacoeconomic information for formulary decision-making and future expectations

The respondents in this study have indicated the reason for the limited use of pharmacoeconomic data to more than one

Table 5 Barriers to use pharmacoeconomics for formulary decision-making and future expectation.

Variable	N (%)
<i>Reason of no or limited use of pharmacoeconomics</i>	
Lack of expertise	8 (22.2)
Lack of resources	6 (16.6)
Not required	2 (5.5)
More than one factor	16 (44.4)
Other factors	4 (11.1)
<i>Should pharmacoeconomics be required like the rest of the world</i>	
Disagree	6 (12.5)
Not sure	1 (2.1)
Agree	21 (43.7)
Strongly agree	20 (41.7)
<i>Interested in attending a pharmacoeconomic educational workshop</i>	
Yes	46 (95.8)
No	2 (4.2)

factor (44.4%) including: lack of expertise (22.2%), lack of resources (16.6%), and that pharmacoeconomic data are not required (5.5%) in the formulary management process. It has been expressed to some degree of agreement by almost 80% of respondents that pharmacoeconomics should be applied as a decision making tool like in the rest of the world. Almost all the decision-makers (95%) expressed the interest in attending workshops on pharmacoeconomics (Table 5).

4. Discussion

To our knowledge, this study is the first of its kind in the Kingdom of Saudi Arabia that examines the use of pharmacoeconomic data and techniques in formulary decision making. This study had shown that safety and efficacy were the most important criteria for formulary decision-making followed by acquisition cost and physician demand criteria. Traditionally, the most formulary decisions were made on the basis of relative clinical efficacy, safety, drug interactions, pharmacokinetics, pharmacology, and drug acquisition costs with little consideration for the overall health-systems costs (Odedina et al., 2002). In another study it was also revealed that drug safety and drug efficacy appeared to have a great influence on the P&T committee decision making process (Hans et al., 2003). In a different study in which the role of pharmacoeconomics in drug benefit decision-making was investigated, a result similar to our study was observed as product efficacy and safety were rated highest among the considered data in the drug benefit decision making process (Motheral et al., 2000). Two thirds of the respondents in our study stated that they have applied pharmacoeconomic evaluations in their decision making process. Out of those who have applied pharmacoeconomics in their decision making, more than half of the respondents stated that they found pharmacoeconomic data to be influential and helpful. Cost-effectiveness analysis was the more preferred type of pharmacoeconomic analysis in use by the respondents in the study. Cost-benefit analysis was the next most useful type of analysis. This finding was similar to earlier studies which indicated that cost-effectiveness analysis is one of the fundamental principles of pharmacoeconomics, and also the most commonly used and conducted type of pharmacoeconomic analysis (Harris, 2001). In our study about 50.0% of respondents were using more than one source of information for pharmacoeconomic studies. However, among individual source, the published literature was ranked the top of the list. In all studies on the subject of pharmacoeconomics and drug benefit decision-making, peer-reviewed literature was the preferred source of data used by decision-makers. Peer-reviewed literature is rated very highly for its validity and quality (Lyles et al., 1997). More than 80% of the respondents in our study assumed that they had a fair knowledge of pharmacoeconomics; however, they have indicated the reason for the limited use of pharmacoeconomic data to lack of expertise and lack of resources when making formulary decisions. Others studies had also identified that the ability of drug benefit decision-makers to understand and interpret pharmacoeconomic data is inadequate, and has resulted in the limited use of these data for making decisions (Mullins and Wang, 2002; Suh et al., 2002). Now it is the obligation of time for decision-makers to truly understand pharmacoeconomics in order to make appropriate decisions for selecting drugs during formulary

decision making process. Almost 80% of the respondents in our study have expressed some degree of agreement that pharmacoeconomics should be applied as a tool in formulary decision making process like the rest of the world. This is raising the issue of the need for special guidelines on how to conduct and use pharmacoeconomics in Saudi Arabia similar to other countries. Decision-makers worldwide have been looking more frequently at pharmacoeconomics as a basis for cost-effective treatment (Bentkover and Corey, 2002; Kozma et al., 1993; Arenas et al., 2005). The applications of pharmacoeconomics in many countries are used by decision makers when making formulary, reimbursing decisions, and/or support pricing decisions about new medications. Countries that have made the use of such application a requirement and have their own guidelines for that include Australia, Canada, United Kingdom, New Zealand, Sweden, and many other European countries (Eddama and Coast, 2008, 2009; Vuornkoski et al., 2008; Williams and Bryan, 2007; Armstrong et al., 2008; Tordoff et al., 2006). Pharmacoeconomic guidelines provide guidance on the appropriate concepts to consider or use when conducting pharmacoeconomic evaluations (Jacobs et al., 1995). The successful management of a drug formulary is frequently dependent on the reliability of the criteria and evidence used to make decisions regarding the inclusion or exclusion of drugs from formularies. Almost all the decision-makers in our study expressed the interest in attending workshops on pharmacoeconomics. This finding was similar to earlier report in which decision-makers in the United States also expressed the need for seminars, symposia and workshops on pharmacoeconomics. It has been suggested that pharmaceutical companies should assist by collaborating to provide educational programmes, so that decision-makers would more effectively use pharmacoeconomic information (Bentkover and Corey, 2002).

5. Conclusion

Our study showed that pharmacoeconomics can play an important role in the P&T committee formulary decisions. However, more education to health care professionals and to hospital administrators should be conducted to facilitate the use of such a tool. Also, hospitals should recruit health care professionals with pharmacoeconomics expertise to help and manage limited health resources in the best way available.

References

- Abou-Auda, H., 2003. An economic assessment of the extent of medication use and wastage among families in Saudi Arabia and Arabia gulf countries. *Clin. Ther.* 25, 1276–1292.
- Academy of Managed Care Pharmacy (AMCP), 1997. Position Statement on Formularies. Academy of Managed Care Pharmacy, Alexandria, VA.
- American Society of Health-System Pharmacists (ASHP), 1995. Statement on the formulary system. In: Hicks, W.E. (Ed.), *Practice Standard of ASHP*. American Society of Health-System Pharmacists, Bethesda, MD.
- American Society of Health-System Pharmacists (ASHP), 2008. Statement on the pharmacy and therapeutics committee and the formulary system. *Am. J. Hosp. Pharm.* 65, 2384–2386.
- Arenas, R., Tosti, A., Hay, R., Haneke, E., 2005. Pharmacoeconomics – an aid to better decision-making. *JEADV* 19, 34–39.
- Armstrong, K., Mitton, C., Carleton, B., Shoveller, J., 2008. Drug formulary decision-making in two regional health authorities in British Columbia, Canada. *Health Policy* 88, 308–316.
- Baluch, W., Gardner, J., Krauss, R., Scholes, D., 1999. Therapeutic interchange of conjugated and esterified estrogens in a managed care organization. *Am. J. Health Syst. Pharm.* 56, 537–542.
- Bentkover, J., Corey, R., 2002. Effective utilization of pharmacoeconomics for decision makers. *Dis. Manage. Health Outcomes* 10, 75–80.
- Centers for Medicare and Medicaid Services (CMS), 2010. Health accounts. <<http://www.cms.gov/statistics/nhe/>> (accessed on 08.06.2010).
- Eddama, O., Coast, J., 2009. Use of economic evaluation in local health care decision-making in England: a qualitative investigation. *Health Policy* 89, 261–270.
- Eddama, O., Coast, J., 2008. A systematic review of the use of economic evaluation in local decision-making. *Health Policy* 86, 129–141.
- Green, E., Chrymko, M., Rozek, S., Kitrenos, J., 1989. Clinical considerations and costs associated with formulary conversion from tobramycin to gentamicin. *Am. J. Hosp. Pharm.* 46, 714–719.
- Hans, M., Marie, C., Magali, M., Marie, C., 2003. A qualitative approach to the use of economic data in the selection of medicines for hospital formularies: a French survey. *Pharm. World Sci.* 25, 269–275.
- Harris, A., 2001. Using economic evidence in reimbursement decisions for health technologies: experience of 4 countries. *Expert Rev. Pharmacoeconom. Outcomes Res.* 1, 7–12.
- Hazlet, T., Hu, T., 1992. Association between formulary strategies and hospital drug expenditures. *Am. J. Hosp. Pharm.* 49, 2207–2210.
- Jacobs, P., Bachynsky, J., Baladi, J., 1995. A comparative review of pharmacoeconomic guidelines. *Pharmacoeconomics* 8, 182–189.
- Kozma, C., Reeder, C., Schulz, R., 1993. Economic, clinical, and humanistic outcomes: a planning model for pharmacoeconomic research. *Clin. Ther.* 15, 1121–1132.
- Lyles, A., Luce, B., Rentz, A., 1997. Managed care pharmacy, socioeconomic assessments and drug adoption decisions. *Soc. Sci. Med.* 45, 511–521.
- Motheral, B., Grizzle, A., Armstrong, E., Cox, E., Fairman, K., 2000. Role of pharmacoeconomics in drug benefit decision-making: results of a survey. *Formulary* 35, 412–442.
- Mullins, C., Wang, J., 2002. Pharmacy benefit management: enhancing the applicability of pharmacoeconomics for optimal decision-making. *Pharmacoeconomics* 20, 9–21.
- Odedina, F., Sullivan, J., Nash, R., Clemmons, C., 2002. Use of pharmacoeconomic data in making hospital formulary decisions. *Am. J. Health Syst. Pharm.* 59, 1441–1444.
- Organization for Economic Co-Operation and Development (OECD) Health Data, 2003. Online. <http://www.oecd.org/document/39/0,2340,en_2649_201185_2789735_1_1_1_1,1,00.html> (accessed on 13.05.2010).
- Organization for Economic Co-Operation and Development (OECD) Health Data, 2009. Online. <http://www.oecd.org/document/16/0,3343,en_2649_34631_2085200_1_1_1_1,00.html> (accessed 13.05.2010).
- Quinn, C., Barisano, A., 1999. Understanding, creating, and working with formulary systems. *Am. J. Manage. Care* 5, 1311–1317.
- Saudi Arabia, 2008. Healthcare and pharmaceuticals forecast (market profile). <<http://www.zawya.com/printstory.cfm?storyid=EIU20081101211439546&l=00000080828>> (accessed on 28.08.2008).
- Shah, N., Hoffman, J., Vermeulen, L., Hunkler, R., Hontz, K., 2003. Projecting future drug expenditures 2003. *Am. J. Health Syst. Pharm.* 60, 137–149.

- Suh, D., Okpara, I., Agnese, W., Toscani, M., 2002. Application of pharmacoeconomics to formulary decision making in managed care organizations. *Am. J. Manage. Care* 8, 161–169.
- Tordoff, J., Murphy, J., Norris, P., Reith, D., 2006. Use of centrally developed pharmacoeconomic assessments for local formulary decisions. *Am. J. Health Syst. Pharm.* 63, 1613–1618.
- Vuornkoski, L., Toivianen, H., Hemminki, E., 2008. Decision-making in priority setting for medicines—a review of empirical studies. *Health Policy* 86, 1–9.
- Williams, I., Bryan, S., 2007. Cost-effectiveness analysis and formulary decision making in England: findings from research. *Soc. Sci. Med.* 65, 2116–2129.