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Generic Drugs: Knowledge, Attitudes and Practices of Ministry of Health Physicians in Bahrain

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Abstract

Title

Generic Drugs: Knowledge, Attitudes and Practices of Ministry of Health Physicians in Bahrain.

Background

The use of generic substitution of branded medications has become a common practice world wide today. Many countries, including Bahrain, have introduced the use of generic drugs to control drug expenditure.

Objectives

The objectives of this study were to determine the knowledge, attitudes and practices related to generic drugs of ministry of health physicians in Bahrain.

Methods

A cross sectional study of 220 MOH physicians who worked in both primary and secondary health care services was conducted. A proportional stratified random sampling was used to represent the two health care levels. The selected physicians were requested to answer a self-administered, anonymous questionnaire. The questionnaire included items on socio-demographic and job-related characteristics and items on knowledge, attitudes and practices related to generic drugs.

Results

Out of 220 physicians, 147 responded, 46 (31%) from PHC and 101(69%) from SHC. About three-fourths of the PHC physicians were family physicians and the rest were general practitioners. Fifty seven percent of the participants were males and about half were in the age group 30-39 years. Thirty one percent of the respondents were consultants and 54% had 10 years or more of clinical experience.

The means of knowledge, attitudes and practices of MOH physicians were almost equal and diverted towards generic drugs. The attitudes and practices of the physicians toward generic drugs were strongly affected by their knowledge. The physicians were knowledgeable of the concept of generic drugs. The majority of physicians reported that the generic alternatives should never substitute the brand-named products for drugs with narrow therapeutic indices.

Conclusions

The MOH physicians in Bahrain are generally in favour of generic substitutions. However, they are not in favor of substituting brand-named drugs with generics for critical drugs with narrow therapeutic indices. Thus, the MOH can maintain and even expand its generic drug policy. However, this policy should be applied with caution on narrow therapeutic indices and critical drugs.

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List of Abbreviations

BD	Bahraini Dinar
BDF	Bahrain Defense Force
BMP	Bahrain Medicine Policy
CIO	Central Informatics Organization
EDL	Essential Drug List
EU	European Union
FDA	Food and Drug Administration
FP	Family Physician
GCC	Gulf Cooperation Council
GMP	Good Manufacturing Practice
GP	General Practitioner
KSA	Kingdom of Saudi Arabia
KOB	Kingdom of Bahrain
MOH	Ministry of Health
MSH	Management Sciences for Health
NCSS	Number Cruncher Statistical System
NTI	Narrow Therapeutic Index
PASS	Power Analysis and Sample Size
PBM	Pharmacy Benefit Management
PDCD	Pharmacy and Drug Control Directorate
PHC	Primary Health Care
rINN	Recommended International Non-propriety Name
SHC	Secondary Health Care
SMC	Salmaniya Medical Complex
SPSS	Statistical Product and Service Solutions
UK	United Kingdom
USA	United States of America
WHO	World Health Organization

Glossary

Bioavailability: is a measurement of the extent of a therapeutically active drug that reaches the systemic circulation and is available at the site of action (Shargel and Yu, 1999).

Bioequivalence: is a term in pharmacokinetics used to assess the expected in vivo biological equivalence of two proprietary preparations of a drug. If two products are said to be bioequivalent it means that they would be expected to be, for all intents and purposes, the same (Shargel and Yu, 1999).

Brand drugs: the brand name exclusively identifies the brand owner (Shargel and Yu, 1999).

Branded generics: Generic pharmaceutical products marketed under brand names (MSH, 1997).

Essential Drug List (EDL): This is the list of drugs that should be available in any healthcare setting to ensure providing proper medical and pharmaceutical services. To include a drug on the EDL, proper standard procedures should be followed and standard treatment guidelines should be used. The concept has been promoted by the WHO to ensure accessibility to treatment by all the public and to guarantee the use of safe and cost-effective drugs (BMP, 2008).

Formulary list: A list of drugs approved for use in a specific health care setting (MSH, 1997).

Generic name: The approved or nonproprietary name of a drug. It is generally the international nonproprietary name given by WHO (MSH, 1997).

Generic pharmaceutical products: products marketed by any producer under nonproprietary or approved names (MSH, 1997).

Generics: These are drug products that are also called multi-source pharmaceutical products. They are drugs that are pharmaceutically equivalent products, available from different manufacturers that are considered to be therapeutically equivalent. To ensure therapeutic equivalence, proper bioequivalence, pharmacodynamic, clinical and in-vitro studies are done and related tests are performed (BMP, 2008).

Pharmaceutical equivalents: Products that contain the same amount of the same active substance(s) in the same dosage form, meet the same or comparable standards, and are intended to be administered by the same route (MSH, 1997).

Rational Use of Drugs: This is being promoted by WHO and its member states to ensure proper use of safe, cost-effective,

and accessible drugs. It covers many basic principles such as ethical promotion of drugs, essential drug lists in the countries, accessibility of the public, introduction of generics, proper evaluated information to practitioners and the public and educational activities for the health professionals and the public (BMP, 2008).

Therapeutic equivalents: Pharmaceutically equivalent products whose effects with respect to both safety and efficacy are essentially the same, when administered in the same molar dose (MSH, 1997).

Therapeutic index (also known as therapeutic ratio), is a comparison of the amount of a therapeutic agent that causes the therapeutic effect to the amount that causes toxic effects (Shargel and Yu, 1999).

Chapter One

INTRODUCTION

1.1 Background

The use of less expensive generic substitution of branded medications that have lost patent protection has become a common practice world wide today. When a pharmaceutical company first markets a drug, it is usually under a patent protection that allows only the pharmaceutical company that developed the drug to sell it. New drugs are developed under the patent protection, which protects the investment in the drugs' development by giving the manufacturer company the sole right to sell them while the patent is in effect. According to the United States Food and Drug Administration (FDA), generic versions of the drug can be legally produced when the patent time expires (FDA, 2008).

1.1.1 Generic Drugs

Generic drugs are identical or bioequivalent to their brand-named counterparts in dosage form, safety, strength, route of administration, quality, performance characteristics and intended use. The generic drug must contain the same active ingredients as the original formulation, and it is considered bioequivalent to the brand-named counterpart with respect to pharmacodynamic and pharmacokinetic properties. The FDA criterion for bioequivalence of generic drugs is that they should not exceed ± 20% of the active ingredient level in the blood when compared with the brand drug (Mohler and Nolan, 2002).

Bioequivalence is defined as "the absence of a significant difference in the rate and extent to which the active ingredient or active moiety in pharmaceutical equivalents or pharmaceutical alternatives becomes available at the site of drug action when administered at the same molar dose under similar conditions in an appropriately designed study" (FDA, 2003). A product may also be considered bioequivalent to an innovator product if the difference in rate of absorption of the drug between the two products is intentional and there is no significant difference in the extent of absorption of the two products when they are administered in the same molar dose under similar experimental conditions (Welage, Kirking, Ascione, Gaither, 2001). On expiration of the originator product's patent term protection, other manufacturing companies may file submissions to regulatory authorities for approval to market generic versions of the originator medicine (King and Kanavos, 2002). Generic drugs may be marketed as under the recommended international non-propriety name (rINN) or as a branded generic name.

Although generic drugs are chemically identical to their branded counterparts, they are typically sold at substantially discounted prices. The principal reason for the relatively low price of generic medications is that manufacturing companies earn fewer revenues in creating the generic drugs. Generic manufacturers do not incur the cost of drug discovery and do not bear the burden of proving

the safety and efficacy of the drug through clinical trials since these trials have already been done by the brand-named company. Normally, health authorities in most countries are requesting the generic manufacturers to prove that their product is bioequivalent to the innovative drug in order to gain the regulatory approval. It has been estimated that the average cost incurred on drug companies for discovering and testing a new innovative drug may reach 800 million US dollars (DiMasi, 2003).

Generic prescribing is encouraged in many countries as one of the most effective tools in rational drug prescribing. The term "generic prescribing" describes the use in prescribing of a non-proprietary title for a pharmaceutical preparation. Generic prescribing allows any suitable drug, rather than a particular brand of drug, to be dispensed. This can lead to cost savings because cheaper alternatives may be prescribed. The pharmacist would dispense from a wider range of alternative preparations, rather than being limited to one which may not be stocked (Biga, Taboulet, Lapeyre-Mestre, 2005).

On the other hand, there are some drugs that have a narrow therapeutic index which makes the manufacturing of bioequivalent generic versions more complicated. A narrow therapeutic index refers to the "difference between the drug's effective amount in the body and the level at which the drug causes an undesirable or toxic effect" (PAMF,

2001). The narrow therapeutic index drug requires frequent blood testing to ensure that patients do not suffer consequences from sub-therapeutic or a toxic level of the drug (Reiffel, 2001).

1.1.2 Health Care Services in Bahrain

The Kingdom of Bahrain (KOB) is an archipelago of 33 small islands in the Arabian Gulf, midway between the Qatar peninsula and the Kingdom of Saudi Arabia (KSA). Bahrain island is the major island in the country with a land mass of 48 km. long and 16 km. wide. The Kingdom is connected to the KSA by a 23-km causeway, which was opened in November 1986.

In 2006, the estimated population of Bahrain was 742.562, of whom 62.0% were citizens and 38.0% non-citizens. The percentage of people under 15 years of age was 27.3% and the proportion of middle aged persons (15-64 years) was a little more than two-thirds of the total population (70.2%) and that of the elderly (aged 65 years and above) was 2.5% (CIO, 2006).

The health care system in the KOB is a partnership between both government and private sectors. The Ministry of Health (MOH) played a major role in providing, improving, regulating and sustaining quality health care services.

Government health care services in the KOB are provided mainly by the MOH and the Bahrain Defense Force (BDF) health services. The health care services in the MOH are offered in all the primary, secondary and tertiary care levels. The MOH services are distributed through out twenty two health centers, one psychiatric hospital, three maternity hospitals, and one geriatric hospital. The Salmaniya Medical Complex (SMC) is the main central governmental hospital in the country providing secondary and tertiary health care. In addition, there are several private clinics and hospitals in the country.

In 2006, the total number of outpatients and inpatients who visited the SMC was 484,362 and 48,377, respectively. The corresponding numbers for the Psychiatric Hospital were 38,242 and 1,195, respectively. In addition, a total of 3,049,682 visits were reported in primary health care (PHC) centers (MOH, 2007).

The number of registered physicians in Bahrain in 2006 was 2048, the majority (60%) of whom practiced in the government facilities, with an average number of physicians per 10,000 populations of 27.6. Of the MOH physicians, about one-third was working in the PHC (MOH, 2007). The health regulations in Bahrain allow the MOH physicians at the consultant level to practice in the private sector in addition to their original job.

The MOH provides free health care for the Bahraini and takes a nominal fee from the non-Bahraini population. The 2006 budget of the MOH was 118.0 million Bahraini Dinars (BD) which devoted approximately 7.5% of the total government expenditure. The MOH average annual expenditure per capita has increased from BD 83.0 in 1994 to BD 120.9 and BD 147.7 in 2004 and 2006, respectively. With the growing population and changes in the demographic pattern, the health care budget is coming under mounting strain as the Kingdom strives to maintain and improve its services (MOH, 2007).

1.1.3 Drug Registration in Bahrain

Bahrain and other Gulf Cooperation Council (GCC) countries had the lead in shifting to generic drugs whenever it's appropriate. The rules and regulations of drug procurements have been set to buy and use generic drugs.

The MOH is registering both original (innovators) and generic drugs under very clear and strict conditions. For a drug to be marketed in Bahrain, it must be registered and licensed. Furthermore, the manufacturer of the drug should be registered. Registration of manufacturers and drugs is done through local or central GCC registration system.

For a pharmaceutical company to be registered in Bahrain, it should be authorized to manufacture pharmaceuticals in the country of origin and must follow the World Health

Organization, Good Manufacturing Practice (WHO-GMP) guidelines. Moreover, its facilities should undergo frequent inspections by the health authorities. A Good Manufacturing Practice (GMP) certificate is required for every site which is involved in any part of the manufacturing procedure. In addition, bioavailability and bioequivalence studies from an independent scientific institute should be submitted for evaluation by the specialists in the Pharmacy and Drug Control Directorate (PDCD) in the MOH to ensure that it is conforming to the MOH regulatory requirements. An authenticated certificate, from the country of origin showing that the product submitted for registration in Bahrain is marketed in the country of origin with the same structure, composition and leaflets should be submitted as well (PDCD, 2007).

The registered drug product can be deleted from the approved drugs if it failed twice in the bio-availability studies. Re-registration can be done only if the reformulation of the product has taken place, and independent new bio-availability studies from a scientifically approved institute have been submitted (PDCD, 2007). To ensure quality, drugs submitted for registration and imported drugs are analyzed in the MOH drug quality assurance laboratory, where more than 3000 generic drugs have been analyzed for quality between 2001 and 2005 (MOH, 2006).

1.1.4 Drug Supply in the Ministry of Health

The MOH receives drug supplies through three purchasing channels; GCC annual tenders, local tenders, and local orders. All tenders and procurement requests are done on (rINN) only. Furthermore, brand-names are not accepted and only registered sources of supply are approved during the purchasing process. Only registered items are bought; with an exception for certain life saving products (BMP, 2008).

The MOH prepares a drug formulary using the non-proprietary names of drugs and the physicians are requested to prescribe from this formulary. The drug and therapeutic committees in primary and secondary health care (PHC and SHC) services are the responsible bodies for updating the content of the formulary. MOH drug formulary includes 1084 items and PHC drug list contains 548 drug items. The procurement of drugs is mainly done by tenders, and the selection criteria include among others, quality, registration status, patent status and cost with the concerned physicians being involved in the selection process (MOH, 2006).

The cost of consumed drugs in the MOH increased from BD 6.30 million in 2001 to 12.50 and 14.50 million in 2006 and 2007, respectively and is expected to exceed BD 15.00 million in 2008 (DMM, 2008). The percentage of drug-cost comprised 9.2% of the total health budget in 2004, and if the manpower budget is excluded, the percentage would

increase to 35.0%. The per capita expenditure on drugs rose from BD 10.30 ($ 27.40) in 2001 to BD 12.30 ($ 33.40) and BD 15.10 ($ 41.00) in 2004 and 2005, respectively (DMM, 2005).

1.2 Statement of the Problem

With the growing population and changes in the demographic pattern in Bahrain, the health care budget is coming under mounting strain as the Kingdom strives to maintain and improve its health care services. The expenditure on drugs in the MOH was growing over the past years putting the MOH under continuous pressure. Procurement of appropriate generic drugs was used by the MOH to maintain its expenditures and to contain the drug cost. There was a continuous debate on the quality and effectiveness of the used generic drugs among the MOH physicians. The convenience of MOH physicians on the appropriateness of the generic drugs is very essential to achieve the success in the MOH policy in using these drugs. The MOH physicians can play a significant role in stimulating the use of generic drugs and assure their patients on the appropriateness, quality and effectiveness of such drugs.

1.3 Aim of the Study

The aim of this study was to provide the MOH in Bahrain with baseline data on the knowledge, attitudes and practices of the Ministry's physicians towards generic drugs.

1.4 Research Questions

1. What are the knowledge, attitudes and practices of the MOH physicians in Bahrain with respect to generic drug prescribing?
2. How does the MOH physicians' knowledge of generic drugs affect their attitudes and prescribing practice?
3. Are there any differences between the PHC and SHC physicians with respect to knowledge, attitudes and practices towards generic drugs?

1.5 Objectives

1. Assess the knowledge of the MOH physicians on generic drugs.
2. Describe the attitudes of the MOH physicians towards the use of generic drugs.
3. Present the prescribing practice of generic drugs among the MOH physicians.
4. Determine the effect of knowledge and attitudes on the practice of generic drugs use among the MOH physicians.
5. Compare the PHC and SHC physicians with respect to knowledge, attitudes and practices of generic drugs use.

1.6 Hypotheses

Hypothesis 1: The practice of prescribing generic drugs by the MOH physicians in Bahrain is associated with their knowledge and attitudes towards these drugs.

Hypothesis 2: There are differences in the knowledge, attitudes and practice between the PHC and SHC physicians on generic drugs.

1.7 Study Rationale

To date, studies have not yet been conducted to assess the knowledge, attitudes and practice of the MOH physicians toward the use of generic alternatives in the KOB. This study will illustrate the reported magnitude of generic prescribing practice for better understanding of the MOH physicians' knowledge, attitudes and practice toward the use of generic drugs. The outcome of this study would possibly assist the MOH to improve its policy on generic drugs use. Drug expenditure consumes a significant part of the MOH budget. Using non generics incurs a costly burden on the MOH budget. Prudent substitution of expensive innovative products with more economic generic options, when appropriate, shall reduce health costs and drug expenditure.

Chapter Two

LITREATURE REVIEW

Pharmaceutical spending has been rising rapidly in recent years, and prescription medicines have quickly become a target in the struggle to contain health care costs. One increasingly attractive option to reduce costs is to encourage the utilization of generic drugs, which are typically sold at lower cost than their brand-name counterparts. The savings associated with policies that encourage the utilization of low-cost generic prescription drugs make them an obvious choice in the struggle to contain health care costs. However, challenges remain before this approach can be optimized.

Physicians can play a significant role in promoting generic drug use. Many studies revealed that physicians are neutral or sometime reasonably positive about the use of generics. With the increased attention given to generic bioequivalence standards, questions arise on the knowledge and attitudes of physicians over possible differences between brand-named and generic drugs, especially those with narrow therapeutic indices.

2.1 Economics of Generic Drugs

Generic drugs are one of the fastest growing sectors of the pharmaceutical industry. They have a key role to play in the efficient allocation of financial resources for pharmaceutical medicines. The pressure to control pharmaceutical expenditure and price competition among pharmaceutical companies is fuelling the development of generic drug

markets worldwide. The proportion of drug sales attributed to generic products will reach 10% through the first decade of the 21st century (Kirking, Ascione, Gaither, Welage, 2001).

The retail market of generic medicines in the European Union (EU) countries currently amounts to € 7 billions, 10% of the overall pharmaceutical market. It is higher than 40% in some EU countries like the United Kingdom (UK), Germany, the Netherlands, Poland and Denmark (Burgermeister, 2006). In 2007, the US-FDA approved the manufacturers' plans to market 682 new generics in the US (Healy, 2008). In the KSA, the local generic manufacturing plants contribute to 20% of the Saudi pharmaceuticals market (Al-Jazairi, Blhareth, Eqtefan, Al-Suwayeh, 2008). The Saudi pharmaceuticals market is considered the largest market in this part of the world reaching $2 billion annually (S-MPE, 2005).

To limit increases in health care spending, countries are constrained by the rise of pharmaceutical costs. In part, pharmaceutical costs are increasing as a result of changes in demographics and advances in medical technologies. In addition, the rise in pharmaceutical cost is due to new patented medicines that often replace cheaper ones (Brustall, 1997). Many countries have introduced the procurement of generic alternatives of drugs to contain the drug cost. Several of the world's industrialized countries

have in-placed policies encouraging the use of generic drugs, alongside policies that encourage innovation and use of newer therapies (King and Kanavos, 2002). The saving that results from the use of generic drugs can be used to purchase newer, more effective medicines. Furthermore, governments would find it easier to reimburse newer and more expensive medicines produced by companies if more savings could be made on pharmaceutical budgets (Burgermeister, 2006).

Generics deliver the dual benefit of quality therapy by providing economic benefits to the patient and to the payer. Thus, ensuring prescription healthcare remains affordable and accessible (Walker, 2006). In the US, generic drugs save consumers an estimated 8 to 10 billion US dollars annually at retail pharmacies, and even more billions are saved when hospitals use generic drugs (USFDA, 2008). Patients would be able to access safe, effective high quality medicines at 20%-80% lower prices than the branded originator medicines (Burgermeister, 2006). The potential saving from extended use of generic substitution for six indicator drugs reached 60% in Sweden (Andersson, 2005).

2.2 Generic Prescribing

Generic prescribing is becoming a common practice worldwide. It has risen from just half of total prescriptions in the US in the mid-nineties (Brustall, 1997) to 64% of all prescriptions filled in the US each year and is expected to

rise steeply over the next few years (King and Kanavos, 2002). It reached 38%, 25% and 17% in the UK, Northern Ireland and Ireland, respectively (McGettigan, 1997). In other countries like Australia, generics accounted for about 20% of all prescriptions filled in 2001 (Lofgren, 2004).

Using the generic names in writing the prescriptions was encouraged by many health authorities in different countries and the same was supported by the World Health Organization (WHO). WHO declared generic prescribing as one of the most important prescribing indicators in detecting the efficiency of good prescribing practice (WHO 1993). In South Africa, 21% of prescribed drugs were generics (Karim, 1996). The prescribing of drugs by generic name in PHC was higher in Bahrain (14.3%) as reported by Naseeb and Nasser (2005) and 13.2% as reported by Alkhaja, Al-Ansari and Sequeira (2005) than in Jordan (5.1%) (Otoom, Batieha, Hadidi, Al-Saudi, 2002).

Since the late 1970's the substitution of generic drugs for brand-named drugs became a relatively common practice among physicians. The British government had put commendable efforts promoting the use of generic drugs. Generic prescribing rates by general practitioners (GPs) are much higher in the UK than several countries (Ashworth, Golding, Majeed, 2004). Efforts in other EU countries are being made to increase the rates of generic prescribing often as part of efforts to improve the quality and efficacy of

prescribing. In Belgium, to promote the use of generic drugs, the government introduced a reference pricing (RP) scheme in 2001. The market share held by generic drugs tripled following the implementation of the RP scheme from 2.1% to 6.1% (Simoens, De Bruyn, Bogaert, 2005).

2.3 Perception of Generic Drugs

Physicians and pharmacists can play a significant role in promoting generic drug use. Most physicians and pharmacists have come to rely on the FDA rating of bioequivalence to determine which products are acceptable substitutes (Friedman, Jaffe, Steinhardt, 1987). Pharmacists in general supported the use of generic drugs. The most important factors according to them in selecting a product are quality, price and supplier consistency (Duane, Caroline, Frank, Lynda, 2001). Seventy-two percent of the patients accepted generic medication when pharmacists recommended them and 75.8% of patients agreed to have generic medications when a physician suggested them (Caroline, Duane, Kirking, Frank, Lynda, 2001). Physicians have an essential role to play in convincing their patients to use generic drugs. Physicians, especially GPs, are in an ideal position to inform their patients adequately about the equivalence of brand-named and generic drugs and promote generic drug use (Himmel, 2005 and Rataboli and Garg, 2005).

Physicians are neutral to modestly positive about the use of generics (Kirking, Ascione, Gaither, Welage, 2001). Forty-three percent of the physicians supported generic drug use and were considered as pro-generics (Banahan and Kolassa, 1997). By the late 1980's, 62.5% of family physicians in the US said "they had enough confidence in prescribing generic drugs in their practice, but only 26.9% actually prescribed mostly generics" (Barrett, 2005).

With the increased attention given to generic bioequivalence standards, questions arise on the awareness and attitudes of prescribing physicians over potential differences between brand-named and generic drugs, especially those with narrow therapeutic index. This is true in areas of prescribing where equivalence is critical such as with anticonvulsants and anticoagulants (Jobst and Holmes, 2004). Physicians were found to have neutral attitudes with respect to generic substitution and moderately high concerns about substitution of drugs with low therapeutic index such as warfarin, carbamazepine and phenytoin (Banahan and Kolassa, 1997). A similar result was obtained in 2005 in the study performed on brand and generic warfarin, where a special concern over the therapeutic equivalence of the branded product and generics was common among the physicians (Pereira, Holbrook, Dolovich, 2005).

The Primary care groups (PCGs) in the UK have used prescribing incentive schemes to improve the quality and cost of prescribing. The most frequently monitored prescribing indicator was generic prescribing used by 88% of the PCGs (Ashworth, Golding, Majeed, 2002 and Ashworth, Lea, Gray, 2003 and Ashworth, Lea, Gray, 2004). British GPs believe that cost of drugs should be taken into consideration when prescribing. The cost was secondary to clinical effectiveness and safety as an important factor in the prescribing decisions (Prosser and Walley, 2005). Moreover, two-thirds of Slovenian GPs consider the cost of generic drugs when they prescribe drugs to their patients (Kersnik and Peklar, 2006).

On the other hand, GPs do not refuse the use of generic drugs but are very concerned about the risks of their adverse effects outcomes in patients. The majority (88·9%) of GPs in Slovene perceived generics to have the same effectiveness as brand drugs and one quarter of them would prescribe more generics if additional clinical trials on the safety of these drugs were to be presented (Kersnik and Peklar, 2006). Lower levels of acceptance of generic prescribing amongst GPs when compared with pharmacists and the general public were reported in France (Biga, Taboulet, Lapeyre-Mestre, 2005). In another study in France, expanding the use of generic drugs was not significant, where only 55% of GPs considered generic drugs to be as safe and effective as original drugs and 59% rarely

or never prescribed generics (Lagarce, Lusson-Brisset, Bruhat, Diquet, Lainé-Cessac, 2005). Nearly one in five physicians in the US believed that generic drugs are less safe than brand-named medications, and more than one in four believed that generic medications will cause more side effects than the originals (John, 2006).

Generic substitution has become a common practice since the 1970s in the US. It is a practice advocated principally for economic reasons by health authorities, health care professionals, and policy makers (Al-Jazairi, Blhareth, Eqtefan, Al-Suwayeh, 2008). In a survey done by the US health plan, the U.S physicians reported that they would never hesitate to replace brand-named drugs with generic drugs whenever they feel that it can be more beneficial. The results of a survey revealed that 8 out of 10 physicians supported the view that generic drugs can replace brand-named drugs in a number of cases. Seventeen percent of the physicians agreed that such substitutions were appropriate in all cases, and only 5 % said that they never prescribed generic drugs in place of branded drugs (Fine Generics, 2008).

A study on GPs in Germany concluded that switching from brand-named drugs to generics was reasonable and desirable for economic reasons. In this study, two-thirds of the GPs stated that brands and generics were therapeutically equivalent. Many of these GPs prescribed

generic drugs in more than half of the instances. However, fewer doctors did so, if they had doubts on the therapeutic equivalence of generic drugs. Furthermore, nearly 8% of the GPs reported that generics were less effective and 10% observed new adverse effects when they switched to generics. Moreover, the German GPs estimated that 10% of their patients severely rejected generic drugs (Simmenroth-Nayda, Hummers-Pradier, Ledig, Jansen, Niebling, Bjerre, Kochen, Himmel, 2006). One quarter of the physicians in the US stated that they do not believe generic medications to be chemically identical to their branded counterparts and more than 8% said they were unsure, despite the FDA regulations that require generic versions of the drug be bioequivalent to the brand medication (John, 2006).

The vastness of the generic world and the fear of adverse events are somewhat confusing for both patients and health professionals. It is important that a patient receiving treatment for a chronic disease be given the same generic drug each time (Lagarce, Lusson-Brisset, Bruhat, Diquet, Lainé-Cessac, 2005).

Physicians also suffer from the pressure of patients, health insurance companies and health authorities for prescribing generic drugs. Comparing generics and brand-named drugs, physicians admit that patients frequently pressure them for generics' prescribing (23%) rather than for brand-named drugs (8%). Two–thirds of the physicians frequently feel

pressured by health care plans or insurance companies to prescribe generics. About 84% of physicians said pharmacy benefit management (PBM) also creates pressure on them to prescribe generic drugs while 70% said a PBM has encouraged them to switch to generics (Fine Generics, 2008).

Chapter Three

METHODOLOGY

3.1 Study Design

A cross-sectional study was used to assess the knowledge, identify the attitudes and describe prescribing practice of the MOH physicians with respect to the use of generic drugs.

3.2 Study Population

All the MOH physicians who worked in both PHC and SHC levels during the period of the data collection (from July to August 2007) were included in the study.

3.3 Exclusion Criteria

Any physician whose job did not require prescribing was excluded from the study (e.g. radiologists, pathologists and public health physicians).

3.4 Sampling

3.4.1 Sampling Frame

The latest lists of physicians who worked at the MOH PHC and SHC during the year 2007 obtained from the offices of heads of medical services and used as a sampling frame. A total of 939 physicians were listed, 286 of whom were in primary care and 653 in secondary care.

3.4.2 Sampling Method

A proportional stratified random sample was used to determine the number of physicians needed in this study.

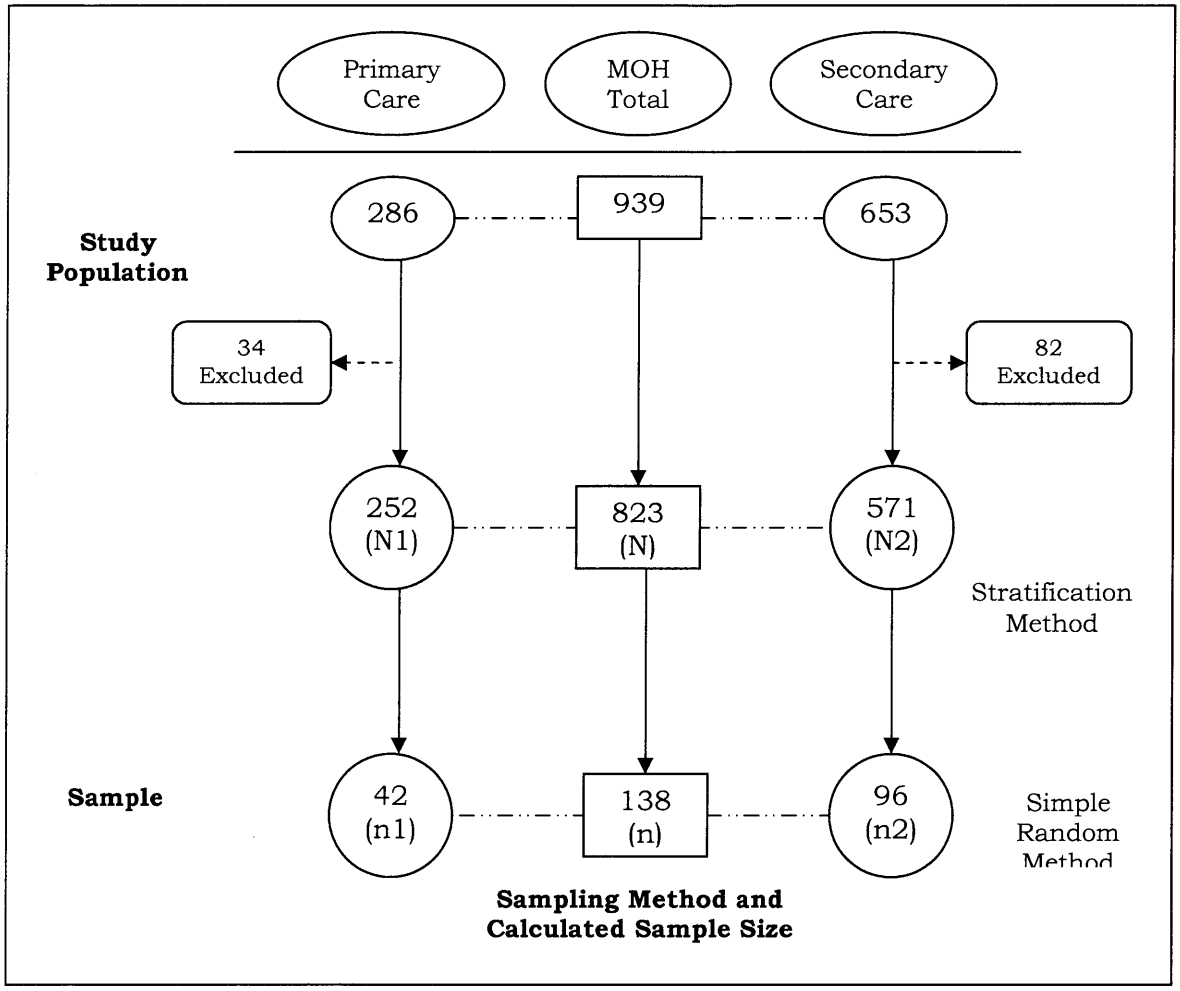
3.4.3 Sample Size

After excluding physicians who do not prescribe, the total number (N) of included physicians was 823. The lists of PHC (N1) and SHC (N2) physicians were 252 and 571 physicians, respectively. The number of excluded physicians was 116, 34 of whom were from PHC and 82 from SHC, respectively (Figure 1).

With the assumption that the MOH physicians would have neutral opinions on the use of generic drugs, and the estimated baseline proportion of 0.50, confidence interval (CI) of 99% and 0.10 precision (d), a sample size (n) of 138 from a population (N) of 823 was calculated using the Power Analysis and Sample Size (PASS) which is part of the Number Cruncher Statistical System (NCSS).

The minimum sample size (138) was calculated to fulfill the stated assumptions. The calculated sample size was stratified proportionally to comprise 42 physicians from PHC (n1) and 96 from SHC (n2). (Figure 1)

Figure 1: Sampling Method and Calculated Sample Size



The calculation of sample size was done with the help of an expert biostatistician.

After those not eligible were excluded, a serial number was given to each physician (from 1 to 252 in primary care list and from 1 to 571 in secondary care list). The computer software was used to randomly choose 80 numbers from the 252 for PHC and 150 numbers from the 571 for SHC. The purpose of having extra numbers was to replace those who would not be willing to participate, or would be out of the country, or not

respond and thus attain the targeted minimum sample size. A total of 220 questionnaires were distributed, 75 and 145 on PHC and SHC physicians, respectively.

3.5 Instrument

The selected physicians were requested to answer a self-administered, anonymous questionnaire. The questionnaire was written in the English language as all physicians are knowledgeable of the language. The questionnaire used in this study was based on those used in other studies performed in Canada and the US (Banahan and Kolatta, 1997 and Pereira, Holbrook and Dolorich 2005).

The questionnaire included items on socio-demographic and job related characteristics, knowledge of generic drugs, attitudes toward the use of generic drugs and the experience of the use of generic drugs in their practice in the MOH.

The practice setting was classified into two health care levels, primary and secondary. The PHC physicians were classified into family physicians (FP) and GPs while the SHC physicians were classified according to their departments. Based on the MOH categorization for the professional levels of physicians, all the physicians were further classified into four professional levels; consultants, chief residents, senior residents and junior residents. The respondents were grouped into four age groups; 20-29 years, 30-39 years, 40-49 years and 50 years and above. The years of experience

were grouped into four groups; less than one year, 1-4 years, 5-9 years and 10 years or more.

The items in the questionnaire were structured to address the three components: knowledge, attitudes and practices of the MOH physicians regarding the use of generic drugs in Bahrain (Appendix 1).

The questionnaire included a series of close-ended questions and a five point Likert scale statements. On the five point of agreement scale, 1 = "strongly disagree", 2 = "disagree", 3 = "neither agree nor disagree", 4 = "agree" and 5 = "strongly agree".

3.6 Pilot Study

The pilot study was done on 15 physicians, 5 from PHC and 10 from SHC. The purpose of this pilot study was to test the instrument for its reliability, validity and feasibility. A slight change in wording of five questions was made and the questionnaire was re-piloted on 10 physicians, 4 from primary and 6 from secondary health care to check the consistency and reliability. The overall reliability was 0.7 using the Cronbach's alpha test. The piloted participants were not included in the study.

3.7 Data Collection

The questionnaires (220) were distributed and collected in the period starting 10th July to 25th Aug 2007. Seventy five

questionnaires were distributed to PHC physicians and 145 to the SHC physicians.

The distribution and collection of the questionnaires was done through one or more of the following people:

- The researcher.
- The chief pharmacists of both PHC and SHC.
- The head or the secretary of the departments in the SHC.
- Heads of the health centers.

3.8 Ethical Considerations

The Academic Committee of the Master in Health Policy and Population Studies Program approved the research protocol. The following ethical considerations were made prior to data collection:

- Covering letter addressed to the participants briefing them on the purpose of the study, assuring the confidentiality and contact details of the researcher for any clarification (Appendix II).
- A permission letter was sought from the Research Technical Advisory Committee at the MOH (Appendix III).

3.9 Data Entry and Analysis

The researcher coded the responses to questions and entered the collected data using the Statistical Product and Service Solutions (SPSS) version 15.0.

The items were regrouped into three main categories to summarize the main components of the questions. Questions 8,9,10,11,13,14 and 15 were grouped as "knowledge". Questions 12,16,17,18,19,28 and 35 regrouped as "attitudes" and 20 to 27 and 29 to 34 as "practice".

Further, to measure the level of agreement and disagreement of the participants on different statements on knowledge, attitudes and practice items, agree and strongly agree responses were regrouped under "agree" and disagree and strongly disagree responses under "disagree".

Categorical variables were presented and tabulated as frequencies and quantitative variables were presented and tabulated in means and standard deviations (SD).

The following tests were used to analyze the results;

- *t*-test: was used to test the difference between the means at quantitative variables for categorical variables with two groups.
- Pearson's Chi-Square test: was used to test the association among the qualitative variables and to compare proportions.

A comparison with P values less than 0.05 was considered statistically significant.

Chapter Four

RESULTS

Table 4.1 presents the characteristics of the study sample including the setting, gender, age group, specialty, professional level, and work experience of the physicians. Fifty seven percent of the participants were males and 43% females. Around half of them were in the age group 30-39 years and one-fourth in the 40-49 years age group. The younger physicians (20-29 years) and older (50 years and above) age groups were 16% and 14%, respectively.

Approximately one third (31%) of the physicians were consultants, 23% chief residents, 38% senior residents and 8% junior residents. Over half (54%) of the physicians had been working as medical doctors for 10 years or more and 4% for less than one year (Table 4.1).

The majority (61%) of the SHC physicians was males and females (54%) in the PHC. Half of the SHC physicians were 30-39 years old compared to around 40% of those in the PHC. Moreover, more than one-quarter of the physicians were fifty years or older in PHC compared to 9% in SHC (Table 4.1).

Fifty two percent of PHC physicians were consultants compared to 22% in SHC. PHC physicians who had 10 years or more work experience as medical doctors were almost double those in SHC (78% and 42%, respectively) (Table 4.1).

Table 4.1: Sociodemographic Characteristics of the Physicians

Characteristic	Category	Primary Care (n=46)		Secondary Care (n=101)		Total (n=147)	
		N	%	N	%	N	%
Gender	Male	21	46	62	61	83	56
	Female	25	54	39	39	64	44
Age Group	20-29 years	0	0	23	23	23	16
	30-39 years	18	39	51	50	69	47
	40-49 years	16	35	18	18	34	23
	≥ 50 years	12	26	9	9	21	14
Professional Level	Consultant	24	52	22	22	46	31
	Chief Resident	10	22	24	24	34	23
	Senior Resident	12	26	33	32	55	38
	Junior Resident	0	0	12	12	12	8
Work Experience	< 1 year	0	0	6	6	6	4
	1-4 years	2	5	28	28	30	20
	5-9 years	8	17	24	24	32	22
	≥ 10 years	36	78	43	42	79	54

Table 4.2 shows the distribution of the SHC physicians by department. Twenty five percent of SHC physicians were from the medicine department followed by surgery (10%) and psychiatry (10%).

Table 4.2: Secondary Care Physicians by Department

Department	N (101)
Accident & Emergency	9
Medicine	25
Surgery	10
ENT	8
Ophthalmology	7
Neurology	2
Gynecology & Obstetrics	4
Psychiatry	10
Hematology & Oncology	4
Dermatology	3
Nephrology	2
Orthopedic	8
Pediatric	9

4.2 Agreement of MOH Physicians to Knowledge, Attitudes and Practice Statements

4.2.1 Knowledge Statements

Two-thirds (66%) of the physicians knew the correct definition of generic drugs as stated in the questionnaire. A similar percentage (65%) of physicians knew the definition of bioequivalence and the majority of physicians (60%) knew the term "narrow therapeutic index drugs" (Table 4.3).

Table 4.3: Agreement on the Knowledge Statements

Statement	Agree N (%)	Neither Agree nor Disagree N (%)	Disagree N (%)
Generic drugs definition	97 (66)	25 (17)	25 (17)
Allowed variation in bioavailability	48 (33)	77 (52)	22 (15)
Bioequivalence definition	95 (65)	33 (22)	19 (13)
Familiar with MOH bioequivalence specific requirements	40 (27)	44 (30)	63 (43)
Interchangeable use of brand and generic drugs	59 (40)	39 (27)	49 (33)
No therapeutic difference between brand and generic drugs	42 (29)	31 (21)	74 (50)
Narrow therapeutic index (NTI) drugs definition	88 (60)	19 (13)	40 (27)

Half of the participating physicians (52%) neither agreed nor disagreed in recognizing the allowed variation in bioavailability for generic drug versus the original branded one, and 43% were not familiar with the specific requirements of the MOH on bioequivalence. Forty percent

of the physicians agreed that all products rated by the health authorities as generic bioequivalent can be used interchangeably with brand product, and half disagreed with the statement "no real therapeutic difference between most brand products and their generic equivalents" (Table 4.3).

4.2.2 Attitudes Statements

The majority of the MOH physicians (59%) were neutral toward the appropriateness of bioequivalence regulations stated by the health authorities in Bahrain for generic drugs (Table 4.4).

Table 4.4: Agreement on the Attitudes Statements

Statement	Agree N (%)	Neither Agree nor Disagree N (%)	Disagree N (%)
Appropriateness of bioequivalence regulations	37 (23)	87 (59)	26 (18)
Appropriateness of NTI Drugs bioequivalence regulations	53 (36)	79 (54)	13 (10)
Never substitute brand with generic NTI drugs	83 (57)	39 (26)	25 (17)
Willingness to support generic substitutions for brand drugs	71 (48)	22 (15)	54 (37)
MOH physicians aren't in favor of the use of generic drugs	71 (48)	25 (17)	51 (35)
Feeling more comfortable in prescribing brand drugs	82 (56)	20 (13)	45 (31)
Patients should have the option to choose between brands and generics with a type of co-payment measure	77 (52)	29 (20)	41 (28)

The majority of physicians (60%) knew the term "narrow therapeutic index drugs", however over half (54%) were neutral in their evaluation to the appropriateness of bioequivalence regulations set by the health authorities in Bahrain for such drugs. Fifty seven percent agreed that the generic equivalents of these drugs should never be substituted for brand-named products (Table 4.4).

The percentage of physicians (48%) who supported the generic drug substitutions were similar to those who were not in favor of the use of generic drugs (Table 4.4).

Over half (56%) of the physicians felt more comfortable in prescribing brand-named products rather than generic drugs and 52% were in favor to give the patients an option to choose between the brand-named products and other generic alternatives with a type of co-payment measure (Table 4.4).

4.2.3 Practices Statements

While forty one percent of the physicians stated that the MOH is enforcing the use of generic drugs, 64% strictly adhered to the regulations of the MOH drug list. Moreover, fifty seven percent of the physicians prescribed medications other than their first drug of choice as a result of the MOH drug list adherence (Table 4.5).

Although, only 39% of physicians agreed that therapeutic failure was a common result when switching from brand to generic drugs, 68% were ready to prescribe brand-named drugs if they felt that the available generic drugs were inappropriate. Furthermore, almost half (49%) had some difficulties in managing new patients with generic drugs and 44% had faced difficulties in managing patients with generic drugs after being managed quite easily with brand-named drugs (Table 4.5).

Although, there were no major differences between those who agreed and those who disagreed on the possible difficulties in managing patients on generic drugs who were managed quite easily on brand drugs, almost half (48%) said they wouldn't feel comfortable in substituting generic for brand drugs in patients who had been stabilized on brand-named drugs (Table 4.5).

While 42% of the physicians said that their patients were frequently asking them to prescribe brand-named products, only 12% said they were getting the same request for generic drugs. Fifty seven percent of the physicians reported that their patients accepted the use of generic drugs when recommended by them (Table 4.5).

Only 27% of the physicians reported that they had noticed some generics with better therapeutic effect than brand-

named products, and 33% agreed that some generics had better patient compliance (Table 4.5).

Table 4.5: Agreement on the Practices Statements

Statement	Agree N (%)	Neither Agree nor Disagree N (%)	Disagree N (%)
Therapeutic failure is common result from switching to generics	58 (39)	32 (22)	57 (39)
MOH enforcing the use of generics	60 (41)	49 (33)	38 (26)
Adhering to prescribe from MOH drug list	94 (64)	24 (16)	29 (20)
MOH drug list restricts me to prescribe medications other than my first choice	84 (57)	23 (16)	40 (27)
Brand prescribing if available generics are inappropriate	100 (68)	12 (8)	35 (24)
Difficulties in managing new patients on generic drugs	46 (31)	30 (20)	71 (49)
Difficulties in managing patients on generic drugs after being managed with brand drugs	59 (40)	24 (16)	68 (44)
Not feeling comfortable for substituting generic for brand drugs in stabilized patients	70 (48)	32 (22)	45 (30)
My patients frequently ask me to write brands	62 (42)	24 (16)	61 (42)
My patients accept the use of generics if I recommend them	84 (57)	34 (23)	29 (20)
My patients frequently ask me to write generics	18 (12)	23 (16)	106 (72)
Some generics have better therapeutic effect than brands	40 (27)	28 (19)	79 (54)
Some generics show better patients compliance than brands	49 (33)	31 (21)	67 (46)
MOH encourage the use of generics to reduce the cost	95 (65)	25 (17)	27 (18)

While, two-thirds (65%) of the physicians believed that the MOH was encouraging the use of generic alternatives to reduce the cost of drugs (Table 4.5) 52% were in favor to give their patients an option to choose between the brand-

named products and other generic alternatives with a type of co-payment measure (Table 4.4).

4.3 Overall Knowledge, Attitudes and Practices of MOH Physicians

In general, the means of knowledge (3.22 ± 0.582), attitudes (3.26 ± 0.484) and practice (3.13 ± 0.420) of MOH physicians were almost equal towards generic drugs. The highest standard deviation and range were found in the knowledge (Table 4.6).

Table 4.6: Mean, Standard Deviation and Range of Knowledge, Attitudes and Practices of MOH Physicians

Group	Mean	Standard Deviation	Range
Knowledge	3.22	0.582	3.3 (1.6-4.9)
Attitudes	3.26	0.484	2.0 (2.3-4.3)
Practices	3.13	0.420	2.0 (2.2-4.2)

The means and standard deviations for the knowledge, attitudes and practice by gender, setting and primary care specialty are illustrated in table 4.7. There were no statistically significant differences between any independent variables and practices of MOH physicians regarding the use of generic drugs.

Table 4.7: Knowledge, Attitudes and Practices of MOH physicians by gender, setting, primary care specialty and years of experience

Outcome Variable	Independent Variable	Category	N	Mean	Standard Deviation	P Value
Knowledge	Gender	Male	83	3.30	0.582	0.076
		Female	64	3.12	0.572	
	Setting	Primary Care	46	3.38	0.434	0.011
		Secondary Care	101	3.15	0.627	
	Primary Care Specialty	Family Physician	33	3.43	0.411	0.198
		General Practitioner	13	3.25	0.477	
	Years of Experience	< 10 years	68	3.21	0.557	0.846
		≥ 10 years	79	3.23	0.607	
Attitudes	Gender	Male	83	3.18	0.495	0.018
		Female	64	3.37	0.452	
	Setting	Primary Care	46	3.29	0.491	0.581
		Secondary Care	101	3.25	0.483	
	Primary Care Specialty	Family Physician	33	3.39	0.428	0.069
		General Practitioner	13	3.05	0.570	
	Years of Experience	< 10 years	68	3.33	0.411	0.104
		≥ 10 years	79	3.20	0.535	
Practices	Gender	Male	83	3.10	0.437	0.401
		Female	64	3.16	0.399	
	Setting	Primary Care	46	3.21	0.426	0.106
		Secondary Care	101	3.09	0.414	
	Primary Care Specialty	Family Physician	33	3.28	0.433	0. 074
		General Practitioner	13	3.03	0.364	
	Years of Experience	< 10 years	68	3.17	0.330	0.223
		≥ 10 years	79	3.09	0.484	

While there were no statistically significant differences found by primary care specialty for knowledge, attitudes and practices, it was very significant for attitudes between the male and female physicians (*P = 0.018*). Furthermore, the results showed statistically significant differences between the PHC and SHC physicians in term of knowledge (*P = 0.011*) (Table 4.7).

The association was very strong between knowledge and attitudes *(P < 0.001)* and the correlation coefficient was *0.358* and between the attitudes and practices *(P < 0.001)* and correlation coefficient was *0.457* when applying the Pearson correlation test (Table 4.8).

Table 4.8: Association between Knowledge and Attitudes and Practices of the MOH physicians

Groups	Correlation Coefficients	P Value
Knowledge - Attitudes	0.358	< 0.001
Attitudes - Practices	0.457	< 0.001

Chapter Five

DISCUSSION

The cost of drugs consumed in the MOH has doubled in the last five years, while more than BD 14 million was spent on drugs in 2007, constituting about 10% of the total MOH budget (MOH, 2008). The average number of drugs per encounter in primary health care was 2.6 and the percentage of drugs written by generic names was just 14.3% as reported in a study on the rational prescribing (Naseeb and Nasser, 2005). Generic prescribing is recognized as a good prescribing practice and is encouraged from the educational and cost effective point of view (WHO, 1993). Moreover, prescribing drugs by generic names and encouraging pharmacists to dispense prescriptions with generic medicines are frequently suggested means for lowering the cost of health care (Karim, 1996 and King, Kanavos, 2002).

The physicians in this study were generally in favor of generic drugs, where the overall agreement levels on statements concerning knowledge, attitudes and practices were skewed towards positive perceptions and supported the use of generic drugs. A similar finding was reported by Barrett (2005), as more than 62.5% of the US physicians supported the use of generic substitutions in most cases.

Lack of knowledge concerning generic drugs could have a negative impact on the future of generic prescribing (Birkett, 2003). In order to improve the prescribing behavior of physicians and given the evidence supporting the benefits of

generic medicines, a survey in the US concluded that physicians need to be educated about generics (Walker, 2006). The high proportion of physicians (66%) found to be knowledgeable of generics in this study and the strong association between their knowledge, attitudes and practice on the use of such drugs is consistent but lower than that reported by Barrett (2005), where 86% of the US physicians were knowledgeable and supported the use of generic drugs. The differences in health care system and population structure in the two countries could probably have contributed to the variation.

Physicians' responses regarding the local requirements and regulations of bioequivalence were mostly neutral as only 23% felt that such regulations were appropriate. However, when asked about the appropriateness of the bioequivalence requirements needed for the generic substitutes of narrow therapeutic index drug, the proportion increased to 36%. This percentage is higher than that reported in Canada, where only 26.5% of the physicians felt that the bioequivalence regulations for narrow therapeutic index substitutes were appropriate (Pereira, Holbrook, Dolovich, 2005). These results show the significance of the need to disseminate adequate information about bioequivalence to all health care professionals and particularly educating physicians on the needs and requirements of appropriate generic substitutes (Armstrong, Reyburn, Jones, 1996). The concern over bioequivalence of generic medicines was one of

the main reasons given by physicians who opposed the use of generic drugs in a qualitative study done on Australian PHC physicians (Hassali, Kong, Stewart, 2006).

Almost half of the physicians in Bahrain and two-thirds of the Canadian and American physicians generally supported generic substitutions for brand-products. Four out of ten physicians reported that they were using generic and brand drugs inter-changeably in this study, similar to what has been reported in Canada and the USA (Barrett, 2005 and Pereira, Holbrook, Dolovich, 2005).

Drugs with narrow therapeutic indices should never be substituted or routinely used inter-changeably with brands (Sherri, 2003). Although pharmacists and physicians consider most generic drugs acceptable clinical alternatives to the original branded pharmaceutical agents, concern has been expressed for some generic alternatives, especially those with narrow therapeutic indices (Banahan and Kolassa, 1997). A similar concern was reported by this study. Even with their support to the use of generic drugs, physicians were against the substitution of narrow therapeutic index brand products with generics, as 57% reported that generic equivalents of narrow therapeutic index drugs should never be substituted for brand-products. This proportion is lower than that of the US (75%) but slightly higher than Canada (43.6%) (Barrett, 2005 and Pereira, Holbrook, Dolovich, 2005). As an example of drugs

with narrow therapeutic index, patients on warfarin should adhere to one product. Moreover, additional monitoring should occur in the days and weeks after substitution of one warfarin product for another to allow timely detection of significant changes in anticoagulation response (Sherri, 2003).

Fear of therapeutic failure is one of the possible reasons of uncertainty of prescribing the generics by physicians. Thirty nine percent of the physicians in this study believed that therapeutic failure is a frequent result of the use of generics. The percentage was slightly higher than that of US physicians (36%), but much higher than that (6.3%) of Canadian physicians (Barrett, 2005 and Pereira, Holbrook, Dolovich, 2005). This is most likely because of the wide use of generic drugs in these countries and the influence of insurance companies (Barrett, 2005).

Generic substitution is a practice advocated by health authorities, healthcare professionals, and policy makers principally for economic reasons (Al-Jazairi, Belhreth, Eqtefan, Al-Suwayeh, 2008). Health authorities, insurance companies and health care payers are normally forcing physicians to prescribe from previously agreed drug lists. This is principally to control the spending on drugs and to contain the health care cost. Although 64% of the physicians in Bahrain strictly adhered to the policy of the MOH in prescribing from the specified MOH drug formulary,

more than half (57%) reported that this formulary restricts them from writing their first choice drug. Forty one percent of the physicians in Bahrain agreed that the MOH was forcing them to use the generics in their medical practice, which was half of what reported in the US where 84% of physicians said they were forced by health care plans to prescribe generic substitutes to reduce the cost of treatment (Barrett, 2005).

The cost was the main reason mentioned by two-thirds of the Bahraini physicians behind the encouragement of the MOH to promote the use of generic drugs. The cost of consumed drugs in the MOH increased from BD 6.3 million in 2001 to 12.5 and 14.5 million in 2006 and 2007, respectively and is expected to exceed BD 15.0 million in 2008 (DMM, 2008). The escalation of drug expenditure in the MOH is chiefly due to the introduction of new patented drugs, where more than 30 new patented drugs were added to the MOH drug formulary in the previous three years and the increase in drug demand due to continuous rise in the population and health seeking behavior. The price difference between generics and brand-named products was found to be the main reason for three-fourths of physicians in the US to prescribing generic substitutions (Barrett, 2005). In 2002, the Italian MOH saved around €25 million as a result of introducing generic drugs (Borgherini, 2003). The reduction of governments' drug expenditure by up to 48% in some EU countries has resulted from replacement of the ten most

frequently used branded original medicines with generic products (Burgermeister, 2006).

Patients may become more satisfied with specific brands especially if they use them for a long time. They adhere to brands that they are familiar with or appear to be cheaper and have equivalent effects (Rataboli, 2005). In this study, only 12% of physicians reported that they were asked by their patients to write generic drugs, whereas 61% of the US physicians reported that they were frequently requested by their patients to write the generic substitutes (Barrett, 2005). This difference is due to the difference in health care systems in the two countries. In Bahrain, drugs are dispensed by the MOH to patients without any cost. Thus, the patients do not have the option to choose between the brands and generics like in the US. Furthermore, the responsibility of the third party insurance system in the health care plan in the US, where co-payment measures are applied on original brand drugs does not exist in Bahrain.

Fifty six percent of the physicians in this study felt more comfortable in prescribing brand drugs than generics, and about one-third faced some difficulties in managing new patients on generic drugs. This percentage is higher than that reported by Pereira (2005) on the anticoagulant drug, warfarin, where 44% of the hematologists in Canada felt more comfortable in prescribing original brands and only

9.5% had faced difficulties in managing new anticoagulant patients on generic warfarin.

In this study, around half of physicians were against substituting brand with generic drugs if the patients had been stabilized on the brand product. Similar percentages were reported in Canada but for specified specialties, where 48% of cardiologists and 44% of FPs reported to be uncomfortable to substitute the generic anticoagulant "warfarin" in patients being stabilized on the brand product (Pereira, Holbrook, Dolovich, 2005).

In this study, 57% of the physicians agreed that their patients accepted the use of generic drugs when they recommend them. This finding is quite close to the finding reported in the US by Barrett (2005) in his study on the attitudes and practice of physicians regarding the use of generic drugs, in which 61% reported that "their patients accepted the use of generic substitution if they recommend them". This considerable finding supports the potential important role the physicians have in educating and convincing their patients on generics. Patient education on the benefit of using appropriate generic drugs by their physicians was seen as an efficient manner in improving the utilization of generic medicines. In an Australian study that looked at drug information seeking behaviors among consumers, medical practitioners were more frequently the main source of prescription medication information. The

majority of Australian physicians (69%) were able to convince their patients when they recommended generic substitutions as an appropriate choice (Newby, Hill, Barker, 2001).

Half of the physicians (52%) in this study were in favor of giving their patients the option to choose between the brand-named products and other generic alternatives with a type of co-payment measure. By giving the patients the right to choose between different drug brands, the more rational use of drug are expected. Chronic diseased patients generally prefer to continue their treatment with a well known familiar brand of drugs which they were comfortable with. One of the reasons for opposing the use of generic drugs by some physicians is the patient's confusion resulting from the use of different generics from different manufacturers (Hassali, Kong, Stewart, 2006).

The results of this study showed significant differences between the PHC and SHC physicians in term of knowledge and revealed that PHC physicians were more knowledgeable on generic drugs than SHC physicians. This is probably referred to wide in-service training program taken by FPs who formed 72% of participated PHC physicians. High professional level and the longer work experience could probably contribute to the higher level of knowledge of PHC physicians, where 52% of whom were consultants and 78% had ten years or more work experience. On the other hand,

there were no significant differences between the PHC and SHC physicians in terms of attitudes and practices. This could be due to the fact that the same MOH policy on generic drugs is applied in both settings.

This study also showed that female physicians found to have better attitudes than male physicians. This is mostly due to presence of majority (54%) of female physicians in more knowledgeable PHC physicians. The association between knowledge and attitudes was strongly verified in this study *($P < 0.001$)* (Table 4.8). Thus, the existence of continuous education program to improve the knowledge on generic drugs will positively change the attitudes and practices of physicians towards these drugs.

Chapter Six

Conclusion and Limitations

6.1 Conclusion

This study evaluated the knowledge, attitudes and practice of the MOH physicians in Bahrain towards generic drugs. The MOH physicians in both PHC and SHC services were generally in favour of using generic substitutions when they are available and appropriate for their patients and when the drugs were approved by the health authority. However, they are not in favour of the replacement of brand named drugs with generics for critical drugs having narrow therapeutic indices. The MOH physicians also support to offer patients the option to choose between brand-products and generic alternatives with a compensation or partial payment measure.

6.2 Limitations

- The study population consisted of the MOH physicians only, thus generalization of the study results on all physicians practicing in the KOB cannot be made, especially with the differences in the health care systems practiced in several clinics and hospitals.

- The period of data collection was during the summer, where considerable proportions of physicians were usually on leave, which could have led to selection bias.

- The results of this study can not be generalized with other studies due to the differences in the health care systems.

Chapter Seven

Policy Implications and Recommendations

7.1 Policy Implications

- The MOH can expand its policy for the use of generic drugs in both primary and secondary health care services. However, this policy should be applied with caution on narrow therapeutic indices and critical drugs.
- The MOH should give the choice to their patients to choose between the brand-named products and other generic alternatives, even with a kind of co-payment measure.

7.2 Recommendations

- Strict MOH regulations and a thorough evaluation of generic applications should exist to give the users confidence on the effectiveness and safety of generic drugs.
- Dissemination of information on bioequivalence and other generic-related issues to the MOH physicians would facilitate in better understanding on generic drugs.
- Encourage prescribing with the international non-proprietary name (INN) could help in enhancing the use of unbranded generics.
- Physicians are in the best position to educate and convince their patients on the usefulness and appropriateness of the use of generic drugs, thus the ministry can use them as an efficient tool to

educate the public on appropriateness of the use of such drugs.

- Education of medical students (future doctors) on generic prescribing issues and introducing it in the curricula of medical school would help to increase generic medicine use and prescribing in the future.
- The need to focus on the concept of generic prescribing in the training programs conducted for the new physicians.
- Education of medical students and doctors to critically evaluate the information provided by drug companies.

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APPENDICES

Appendix I

INSTRUMENT TOOL
"Questionnaire"

Arabian Gulf University



جامعة الخليج العـربـي

College of Medicine and Medical Sciences

Master in Health Policy and Population Studies

GENERIC DRUGS

Knowledge, Attitudes and Practices of Ministry of Health Physicians in Bahrain

Questionnaire

Serial Number .....

Mohamed Nasser

July 2007

Q1. What is your practice setting?

□ Primary care □ Secondary care

Q2. If you are in primary care, are you?

□ Family Physician □ General Practitioner

Q3. If you are in secondary care, please mention your department. .....

Q4. What is your position in your department?

□ Consultant □ Chief Resident □ Senior Resident □ Resident

Q5. Gender

□ Male □ Female

Q6. How old are you?

□ 20-29 years □ 30-39 years □ 40-49 years □ 50 years and above

Q7. How many years of practice experience do you have?

□ Less than one year □ 1-4 years □ 5-9 years □ 10 years and above

For the following statements, (from Q8 to Q35), a five points scale of 1 to 5 will be used for each statement. Circle the most appropriate point you think it's reflecting your opinion. Where

1: Strongly Disagree	2: Disagree	3: Neither Agree Nor Disagree
4: Agree	5: Strongly Agree	

Q8. Generic drugs are defined as those drugs with identical dosage form, safety, strength, route of administration, quality and intended use to their brand-named counterparts. 1 2 3 4 5

Q9.	Generally, the allowed variation in bioavailability for generically equivalent products is about 20%.	1	2	3	4	5
Q10.	Bioequivalence is defined as the absence of a significant difference in the rate and extent to which the active ingredient in pharmaceutical alternatives becomes available at the site of drug action when administered at the same molar dose and under similar conditions.	1	2	3	4	5
Q11.	I am familiar with the specific bioequivalence requirements that apply to generic drugs in ministry of health, Bahrain.	1	2	3	4	5
Q12.	Bioequivalence regulations set by health authority in Bahrain are appropriate for all generic drugs.	1	2	3	4	5
Q13.	All products rated by health authorities in Bahrain as generic bioequivalent can be used interchangeably with the brand product.	1	2	3	4	5
Q14.	There is no real therapeutic difference between most brand-named products and their generic equivalents.	1	2	3	4	5
Q15.	Narrow therapeutic index drugs (such as warfarin) are those drugs with a little difference between therapeutic and toxic doses.	1	2	3	4	5
Q16.	Bioequivalence regulations set by health authority in Bahrain are appropriate for drugs with a narrow therapeutic index.	1	2	3	4	5

Q17.	Generic equivalents of narrow therapeutic index drugs should never be substituted for brand-named products.	1	2	3	4	5
Q18.	I willingly support generic substitutions for brand-named products in general.	1	2	3	4	5
Q19.	In general, physicians aren't in favor of the use of generic drugs in ministry of health.	1	2	3	4	5
Q20.	Therapeutic failure is a common result from switching to generic drugs in general.	1	2	3	4	5
Q21.	Ministry of health is enforcing the use of generic drugs.	1	2	3	4	5
Q22.	I am strictly adhering to the regulations of ministry of health in prescribing from ministry of health drug list.	1	2	3	4	5
Q23.	Ministry of health drug list restricts me to prescribe medications other than my first choice.	1	2	3	4	5
Q24.	I am prescribing brand-named products to be obtained from private pharmacies, if I feel that the available generic products are inappropriate.	1	2	3	4	5
Q25.	I am more comfortable prescribing brand-named products than generic drugs to my patients.	1	2	3	4	5
Q26.	I have had difficulties managing new patients on generic drugs.	1	2	3	4	5

Q27.	I have had difficulties managing patients on generic drugs, who were managed quite easily on brand-named drugs.	1	2	3	4	5
Q28.	I would not feel comfortable substituting generic drugs for brand-named drugs in a patient who had been stabilized on brand-named drugs.	1	2	3	4	5
Q29.	My patients frequently ask me to write brand-named drugs.	1	2	3	4	5
Q30.	My patients accept the use of generic drugs when I recommend them.	1	2	3	4	5
Q31.	My patients frequently ask me to write generic drugs.	1	2	3	4	5
Q32.	In my practice, I have noticed that some generic alternatives have better therapeutic effect than brand-named products.	1	2	3	4	5
Q33.	In my practice, some generic alternatives show better patient compliance than brand-named products.	1	2	3	4	5
Q34.	Ministry of health is encouraging the use of generic alternatives to reduce the cost of drugs.	1	2	3	4	5
Q35.	Patients should have the option to choose between the brand-named products and other generic alternatives with a type of co-payment measure.	1	2	3	4	5

Thank you for your contribution to this study

Appendix II

Consent Letters

Dear Doctor

I am conducting research on "Generic Drugs.. Knowledge, Attitudes and Practices of Ministry of Health Physicians in Bahrain" as a part from my thesis in Master in Health Policy and Population Studies in College of Medicines in Arabian Gulf University.

The purpose of this study is to understand the knowledge, attitudes and practice of ministry of health physicians towards the use of generic drugs.

As a medical doctor in ministry of health, you are randomly selected to answer the attached questionnaire. I assure you that this questionnaire is anonymous and the answers will be treated confidentially and for the purpose of the study only.

Kindly please, spare few minutes from your valuable time to fill this questionnaire and insert it in the attached envelop and send it to the Chief Pharmacist Office.

If you want to know more about this research project, please contact me at (17258668 – 39611617).

Mohamed Nasser
Ag. Director Pharmacy and Drug Control
Ministry of Health

Dear Doctor

I am conducting research on "Generic Drugs.. Knowledge, Attitudes and Practice of Ministry of Health Physicians in Bahrain" as a part from my thesis in Master in Health Policy and Population Studies in College of Medicines in Arabian Gulf University.

The purpose of this study is to understand the knowledge, attitudes and practices of ministry of health physicians towards the use of generic drugs.

As a medical doctor in ministry of health, you are randomly selected to answer the attached questionnaire. I assure you that this questionnaire is anonymous and the answers will be treated confidentially and for the purpose of the study only.

Kindly please, spare few minutes from your valuable time to fill this questionnaire and return it to the department's secretary or send it to the Chief Pharmacist Office.

If you want to know more about this research project, please contact me at (17258668 – 39611617).

Mohamed Nasser
Ag. Director Pharmacy and Drug Control
Ministry of Health

Appendix III

MOH Health Research Committee Approval

KINGDOM OF BAHRAIN
Ministry of Health
Office of Assistant
Undersecretary for Training
& Planning

مملكة البحريـــــن
وزارة الصحـــــــة
مكتب الوكيل المساعد للتدريب
والتخطيط

No: FA/LA/ 493 /2007
Date: 10/5/2007

Mr. Mohamed A. Nasser
Ag. Director of Pharmacy & Drug Control
Ministry of Health

Dear Mr. Nasser,

The Research Technical Support Team discussed in its' last meeting on Wednesday 9th, 2007 your research proposal titled **"Generic Drugs: knowledge, attitudes and practices of Ministry of Health Physicians in Bahrain".**

We would like to inform you that the committee has approved it because there were neither technical nor ethical issues that hinder the conduction of this research.

Yours sincerely,

Dr. Fawzi Abdulla Amin
Assistant Undersecretary for Training & Planning
Head, Health Research Technical Support Committee Meeting

CC:
- US. Chairman, Health Research Committee.
- Team file.

Appendix IV

Detailed Results

Detailed Results

Response to Questionnaire

No.	Question / Statement	Level	Frequency	Percent
Q1	What is your practice setting?	Primary Care	46	31
		Secondary Care	101	69
Q2	If you are in primary care, are you?	Family Physician	33	72
		General Practitioner	13	28
Q3	If you are in secondary care, please mention your department	A & E	9	9
		Medical	25	24
		Surgical	10	10
		ENT	8	8
		Eye	7	7
		Neuro	2	2
		Gyn & Obst	4	4
		Psychiatric	10	10
		Hemat & Oncol	4	4
		Derm	3	3
		Neph	2	2
		Ortho	8	8
		Ped	9	9
Q4	What is your position in your department?	Consultant	46	31
		Chief Resident	34	23
		Senior Resident	55	37
		Resident	12	8
Q5	Gender	Male	83	56
		Female	64	44
Q6	How old are you?	20 - 29 years	23	16
		30 - 39 years	69	47
		40 - 49 years	34	23
		50 years and above	21	14
Q7	How many years of practice experience do you have?	Less than 1 year	6	4
		1 - 4 years	30	20
		5 - 9 years	32	22
		10 years and above	79	54
Q8	Generic drugs are defined as those drugs with identical dosage form, safety, strength, route of administration, quality and intended use to their brand-named counterparts.	Strongly Disagree	14	10
		Disagree	11	7
		Neither Agree nor Disagree	25	17
		Agree	62	42
		Strongly Agree	35	24

No.	Question / Statement	Level	Frequency	Percent
Q9	Generally, the allowed variation in bioavailability for generically equivalent products is about 20%.	Strongly Disagree	5	3
		Disagree	17	12
		Neither Agree nor Disagree	77	52
		Agree	41	28
		Strongly Agree	7	5
Q10	Bioequivalence is defined as the absence of a significant difference in the rate and extent to which the active ingredient in pharmaceutical alternatives becomes available at the site of drug action when administered at the same molar dose and under similar conditions.	Strongly Disagree	0	0
		Disagree	19	13
		Neither Agree nor Disagree	33	22
		Agree	68	46
		Strongly Agree	27	18
Q11	I am familiar with the specific bioequivalence requirements that apply to generic drugs in ministry of health, Bahrain.	Strongly Disagree	19	13
		Disagree	44	30
		Neither Agree nor Disagree	44	30
		Agree	31	21
		Strongly Agree	9	6
Q12	Bioequivalence regulations set by health authority in Bahrain are appropriate for all generic drugs.	Strongly Disagree	8	5
		Disagree	18	12
		Neither Agree nor Disagree	87	59
		Agree	28	19
		Strongly Agree	6	4
Q13	All products rated by health authorities in Bahrain as generic bioequivalent can be used interchangeably with the brand product.	Strongly Disagree	14	10
		Disagree	35	24
		Neither Agree nor Disagree	39	27
		Agree	45	31
		Strongly Agree	14	10
Q14	There is no real therapeutic difference between most brand-named products and their generic equivalents.	Strongly Disagree	19	13
		Disagree	55	37
		Neither Agree nor Disagree	31	21
		Agree	32	22
		Strongly Agree	10	7
Q15	Narrow therapeutic index drugs (such as warfarin) are those drugs with a little difference between therapeutic and toxic doses.	Strongly Disagree	10	7
		Disagree	30	20
		Neither Agree nor Disagree	19	13
		Agree	53	36
		Strongly Agree	35	24
Q16	Bioequivalence regulations set by health authority in Bahrain are appropriate for drugs with a narrow therapeutic index.	Strongly Disagree	5	3
		Disagree	10	7
		Neither Agree nor Disagree	79	54
		Agree	46	31
		Strongly Agree	7	5

No.	Question / Statement	Level	Frequency	Percent
Q17	Generic equivalents of narrow therapeutic index drugs should never be substituted for brand-named products.	Strongly Disagree	7	5
		Disagree	18	12
		Neither Agree nor Disagree	39	27
		Agree	42	29
		Strongly Agree	41	28
Q18	I willingly support generic substitutions for brand-named products in general.	Strongly Disagree	23	16
		Disagree	31	21
		Neither Agree nor Disagree	22	15
		Agree	45	31
		Strongly Agree	26	18
Q19	In general, physicians aren't in favor of the use of generic drugs in ministry of health.	Strongly Disagree	14	10
		Disagree	37	25
		Neither Agree nor Disagree	25	17
		Agree	41	28
		Strongly Agree	30	20
Q20	Therapeutic failure is a common result from switching to generic drugs in general.	Strongly Disagree	20	14
		Disagree	37	25
		Neither Agree nor Disagree	32	22
		Agree	46	31
		Strongly Agree	12	8
Q21	Ministry of health is enforcing the use of generic drugs.	Strongly Disagree	5	3
		Disagree	33	22
		Neither Agree nor Disagree	49	33
		Agree	35	24
		Strongly Agree	25	17
Q22	I am strictly adhering to the regulations of ministry of health in prescribing from ministry of health drug list.	Strongly Disagree	5	3
		Disagree	24	16
		Neither Agree nor Disagree	24	16
		Agree	70	48
		Strongly Agree	24	16
Q23	Ministry of health drug list restricts me to prescribe medications other than my first choice.	Strongly Disagree	8	5
		Disagree	32	22
		Neither Agree nor Disagree	23	16
		Agree	45	31
		Strongly Agree	39	27
Q24	I am prescribing brand-named products to be obtained from private pharmacies, if I feel that the available generic products are inappropriate.	Strongly Disagree	12	8
		Disagree	23	16
		Neither Agree nor Disagree	12	8
		Agree	57	39
		Strongly Agree	43	29

No.	Question / Statement	Level	Frequency	Percent
Q25	I am more comfortable prescribing brand-named products than generic drugs to my patients.	Strongly Disagree	14	10
		Disagree	31	21
		Neither Agree nor Disagree	20	14
		Agree	41	28
		Strongly Agree	41	28
Q26	I have had difficulties managing new patients on generic drugs.	Strongly Disagree	18	12
		Disagree	53	36
		Neither Agree nor Disagree	30	20
		Agree	32	22
		Strongly Agree	14	10
Q27	I have had difficulties managing patients on generic drugs, who were managed quite easily on brand-named drugs.	Strongly Disagree	17	12
		Disagree	47	32
		Neither Agree nor Disagree	24	16
		Agree	43	29
		Strongly Agree	16	11
Q28	I would not feel comfortable substituting generic drugs for brand-named drugs in a patient who had been stabilized on brand-named drugs.	Strongly Disagree	14	10
		Disagree	31	21
		Neither Agree nor Disagree	32	22
		Agree	49	33
		Strongly Agree	21	14
Q29	My patients frequently ask me to write brand-named drugs.	Strongly Disagree	16	11
		Disagree	45	31
		Neither Agree nor Disagree	24	16
		Agree	42	29
		Strongly Agree	20	14
Q30	My patients accept the use of generic drugs when I recommend them.	Strongly Disagree	9	6
		Disagree	20	14
		Neither Agree nor Disagree	34	23
		Agree	73	50
		Strongly Agree	11	7
Q31	My patients frequently ask me to write generic drugs.	Strongly Disagree	36	24
		Disagree	70	48
		Neither Agree nor Disagree	23	16
		Agree	15	10
		Strongly Agree	3	2
Q32	In my practice, I have noticed that some generic alternatives have better therapeutic effect than brand-named products.	Strongly Disagree	27	18
		Disagree	52	35
		Neither Agree nor Disagree	28	19
		Agree	31	21
		Strongly Agree	9	6

No.	Question / Statement	Level	Frequency	Percent
Q33	In my practice, some generic alternatives show better patient compliance than brand-named products.	Strongly Disagree	18	12
		Disagree	49	33
		Neither Agree nor Disagree	31	21
		Agree	45	31
		Strongly Agree	4	3
Q34	Ministry of health is encouraging the use of generic alternatives to reduce the cost of drugs.	Strongly Disagree	13	9
		Disagree	14	10
		Neither Agree nor Disagree	25	17
		Agree	45	31
		Strongly Agree	50	34
Q35	Patients should have the option to choose between the brand-named products and other generic alternatives with a type of co-payment measure.	Strongly Disagree	18	12
		Disagree	23	16
		Neither Agree nor Disagree	29	20
		Agree	48	33
		Strongly Agree	29	20

خلاصة البحث

الأدوية المماثلة: معرفة وتوجهات
وممارسة أطباء وزارة الصحة في البحرين

خلفية الدراسة

استخدام البدائل المماثلة (الجنيسة) للأدوية الأصلية التي انتهت فترة الحماية الممنوحة لها أصبح اليوم تقليداً معروفاً على المستوى العالمي. فالعديد من البلدان، ومن ضمنهم البحرين لجأت لاستخدام الأدوية المماثلة للحد من الصرف على الأدوية.

الأهداف

تهدف هذه الدراسة إلى تحديد معرفة، وتوجهات، وممارسة أطباء وزارة الصحة في البحرين للأدوية المماثلة.

طريقة البحث

تمت هذه الدراسة المقطعية على عينة من ٢٢٠ طبيباً من الذين يعملون في خدمات الرعاية الصحية الأولية والثانوية. وقد استخدمت تقنية العينات العشوائية الطبقية والنسبية لتمثيل مستويي الرعاية الصحية. وطلب من الأطباء الذين تم اختيارهم الإجابة ذاتياً على استبيان من غير الحاجة للتعريف بشخصياتهم. وتضمن الاستبيان أسئلة تتعلق بالشأن الديموغرافي والاجتماعي والعملي للشخص المجيب، كما يتضمن أسئلة تتعلق بمعرفة الأدوية المماثلة، والتوجه لاستعمالها، وكذلك التجربة العملية لاستخدام مثل هذه الأدوية في وزارة الصحة.

النتائج

أجاب ١٤٧ من بين الـ ٢٢٠ طبيباً الذين تم اختيارهم. ٤٦ طبيباً (٣١%) من الرعاية الصحية الأولية، و١٠١ (٦٩%) من الرعاية الصحية الثانوية. حوالي ثلاثة أرباع من

أطباء الرعاية الصحية الأولية كانوا أطباء عائلة، والبقية ممارسون عامون. سبعة وخمسون بالمائة من المشاركين من الذكور، وما يقرب من النصف من الفئة العمرية (٣٠-٣٩ سنة). واحد وثلاثون بالمائة من المستجيبين كانوا من الاستشاريين، و٥٤% لديهم ١٠ سنوات أو أكثر من الخبرة العملية.

متوسط المعرفة، والتوجهات، والممارسة لأطباء وزارة الصحة كانت متساوية تقريباً، وهي تميل نحو تأييد استخدام الأدوية المماثلة. وكشفت الدراسة بأن أطباء وزارة الصحة على معرفة بمفهوم الأدوية المماثلة، وأن معرفة الأطباء بالأدوية المماثلة أثرت بقوة على توجههم وممارستهم لاستخدام هذه الأدوية. كما أن الغالبية أقرت بأنه لا ينبغي استبدال الأدوية الأصلية من الأدوية ذات النطاق العلاجي الضيق بأدوية مماثلة.

الخاتمة

بشكل عام، يؤيد أطباء وزارة الصحة في البحرين إستعمال البدائل المماثلة، إلا أنهم ليسوا من مؤيدي استعمال البدائل المماثلة لبعض الأدوية الحرجة أو تلك التي لها نطاق علاجي ضيق. وهكذا، فإن وزارة الصحة يمكن أن تبقي، بل وتوسّع سياستها بإستعمال الأدوية المماثلة، مع التأكيد بأن يراعى الحذر في تطبيق هذه السياسة على بعض الأدوية الحرجة، أو تلك التي لها نطاق علاجي ضيق.

جامعة الخليج العربي

كلية الطب والعلوم الطبية



برنامج السياسات الصحية
والدراسات السكانية

الأدوية المماثلة: معرفة وتوجهات وممارسة أطباء وزارة الصحة في البحرين

رسالة مقدمة كجزء من متطلبات الحصول على درجة الماجستير في
السياسات الصحية والدراسات السكانية

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