Perception and attitude of physicians toward local generic medicines in Saudi Arabia: A questionnaire-based study

Huda O. Salhia a,b, Anna Ali a, Naser L. Rezk c,d, Ashraf El Metwally a,e,*

a School of Public Health, King Saud bin AbdulAziz University for Health Sciences, Riyadh, Saudi Arabia
b Alghadeer Primary Healthcare Centre, Primary Healthcare Sector and Healthcare Affairs, MOH, Riyadh, Saudi Arabia
c School of Applied Medical Sciences, Taibah University, Madina, Saudi Arabia
d Andor Laboratories, Durham, NC, USA
e Epidemiology Group, Institute of Applied Health Sciences, University of Aberdeen, UK

Received 7 November 2014; accepted 6 January 2015
Available online 16 January 2015

KEYWORDS
Local generic medicine; Physician; Knowledge; Opinion; Attitude; Market share; Saudi Arabia

Abstract Objectives: The current study aimed to explore the knowledge, perception, and attitude of physicians toward generic medicines in Saudi Arabia.

Background: The local market of generic medicine share in Saudi Arabia is low compared to global and regional statistics. The reason for this low market share and the role of physicians has not previously been investigated. The purpose of this study was to assess health practitioner level of perceived knowledge, opinions and attitudes about local generic medication, and identify factors that influence infrequency of generic prescriptions.

Methods: A random sample of 231 physicians was recruited from two hospitals in Riyadh (one government one private) and 178 (77%) responded. Information on the physicians’ perceived knowledge, opinions and attitude toward local generic medication was extracted, analyzed and interpreted. Factors that influence infrequent prescription of local generic drugs were identified.

Results: Among the 178 participants in the physicians’ survey, 76% and 47% reported that they are knowledgeable about the terms “generic” and “bioequivalence” respectively, while 44% reported that they are able to explain bioequivalence to their patients. Approximately 52% of physicians reported that local generics should be substituted for brands if suitable for the case,
and 21.9% reported that they believe SFDA approved local generics are therapeutically equivalent to their brands. Clinical effectiveness was reported by 71.9% of physicians as the most influential factor effecting prescription of brand over local generic medication. The three independent significant predictors for infrequent prescription of local generics among physicians: Government sector employment (OR = 3.74, [95%CI 1.50–9.43]), consultant level (OR = 3.94, [95%CI 1.50–10.31]) and low level of knowledge about local generics (OR = 4.11, [95%CI 1.56–10.84]).

Conclusion: The low market share of local generics medicines attributed to low prescription rates is significantly more among senior-level physicians working in governmental hospitals. Low level of knowledge about generic drugs among physicians was the strongest predictive factor for low prescription. Future bigger studies are needed to confirm these results.

© 2015 Production and hosting by Elsevier B.V. on behalf of King Saud University. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

The total healthcare budget in Saudi Arabia for 2012 was SAR 86 billion (Gamble, 2011), while the total drug consumption was between SAR 13 and 14 billion. Of this total, 84% was estimated to be primarily imported brand names and only 16% was local generics (Al Shaikh and Chahine, 2011). According to the SFDA, a generic drug product is a pharmaceutical product that is interchangeable with an innovator branded product, and is manufactured and marketed without a license from the innovator company after expiry of the drug’s patent and other exclusivity rights. When generic drug products become available they drive down prices of both the innovator drug and its corresponding generics (Bioequivalence Requirements Guidelines, 2005). The Saudi population is expected to reach 30 million in 2015 (Al Shaikh and Chahine, 2011). These demographics have driven overall pharmaceutical expenditure to increase by around 10% from 2010 to 2012 (http://www.pressbox.co.uk/detailed/Business/Generics_to_Scale_High_in_Saudi_Arabian_Pharmaceutical_Market_664609.html, 2011) and is expected to continue putting pressure on the Saudi economy in the future.

Globally, local generics account for more than 65% of the pharmaceutical market share (Shrank et al., 2009; Al Shaikh and Chahine, 2011). In the USA alone, $ 9 billion (11% of total prescription costs) were saved during the period from 1997 to 2000 through the use of generic drugs (Fischer and Avorn, 2003; Haas et al., 2005). In 2009, 66% of prescriptions in the USA were for generic drugs that contributed to only 13% of total prescription expenditure (Shrank et al., 2009). With over $100 billion worth of innovator drugs losing their patent protection between 2010 and 2014, it is essential for countries to develop their generic drug manufacturing capabilities to take advantage of this new market (http://www.reportlinker.com/cf02261/Generic-Drug.html, 2012). According to the WHO the 2009 total global annual cost of health services was over US$4 trillion, of which US$750 billion was the total expenditure on pharmaceuticals (WHO, 2009). According to IMS Health market prognosis, the total global pharmaceutical expenditure was estimated to grow by 4–5% in 2010 and 5–7% in 2011 to reach US$ 880 billion (www.abni.org.uk, Moon, 2005). These projections are consistent with the EFPIA statistics which have global pharmaceutical sales in 2011 at US$ 856 billion (www.efpia.eu, Chidambaram, 2011; Market Analysis, 2012).

A study conducted in the USA in 2005 (Barrett, 2005) showed that 78% of physicians support generic substitution in most cases, with 17% said they would prescribe generic drugs in all cases when they are available. Only 5% pf doctors indicated they did not support generic substitution. Ninety percent percent of physicians surveyed believed they were knowledgeable enough about generic bioequivalence to instruct informed substitution of generics for brands. Sixty-nine percent indicated that therapeutic index influenced their decision to prescribe a brand over a generic, while 75% thought that certain drugs that have a narrow therapeutic index should never be substituted for generics (Barrett, 2005).

A similar study was conducted in Riyadh, Saudi Arabia from May to September 2007 (Alghasham, 2009). Overall 79% of physicians said they supported generic substitution in most cases, while 16% supported it in all cases where a generic is available and only 5% objected to its use entirely. Ninety-six percent said they had enough knowledge about the therapeutic value of generics to prescribe them in confidence. Seventy-two percent of physicians agreed that price difference influenced them to prescribe generics. The study also found that 82% of doctors have perceived confidence in prescribing generic drugs that are approved governmentally approved. However, 35% of doctors who participated in this study indicated that “therapeutic failure” is a serious problem with some generic drugs (Alghasham, 2009).

Theodorou et al. (2009) conducted a survey in 2007 in Greece and Cyprus. Proven clinical effectiveness was found to be the most influential factor for prescribing medication for over 90% of physicians in both Greece and Cyprus. Fifty-one percent of physicians in Greece and 60% of physicians in Cyprus rated the quality of generic drugs compared to brand name drugs to be satisfactory or excellent, while 54% in Greece and 68% in Cyprus rated safety of generic products as satisfactory or excellent. Effectiveness of generic drugs was rated as satisfactory or excellent by 52% of Greek physicians and 62% of the physicians in Cyprus. Overall only 25% of physicians in Greece indicated that they prescribed generic drugs instead of brand name drugs often or very often versus 67% in Cyprus (Theodorou et al., 2009).

In Istanbul, Turkey a survey was conducted (Toklu et al., 2012) among physicians and revealed that around 32% of them believe that generic drugs did not differ from their brand name originals. Eighty-two percent of physicians stated that they were unsure about the bioequivalence of generic drugs.
to their original brands. Also 9% said that they never prescribe generic drugs. Cost was identified as the most important factor affecting their decision to substitute with a generic (Toklu et al., 2012).

The aim of our study, which was conducted in Saudi Arabia, is to understand the level of self-rated physician knowledge, and their opinions and attitudes toward local generic prescription. Since the last survey conducted on this subject in Saudi Arabia in 2007 (Alghasham, 2009), the Saudi pharmaceutical market has gone through significant changes. In 2005 when the total market size was SAR 6.23 billion, local generics constituted around 20% of the market or SAR 1.25 billion (Saudi Ministry of Planning and Economy, 2005). In 2013 the total size of the market had doubled (over SAR 13 billion) and the size of the generic portion had doubled as well (around SAR 2.5 billion) (Al Shaikh and Chahine, 2011). But the percent market share of local generics over the 8 year period has actually dropped from 20% to 16% (Aljazairi et al., 2008). So an up-to-date survey is needed to find out if there has been a significant shift in perceived knowledge and attitude as well. Our study also aims to determine the concerns and limitations that physicians have toward generic drug prescription, and address the factors that influence physicians when deciding to prescribe a brand or a generic.

2. Methods

2.1. Study design and setting

The study was conducted in ten medical departments randomly selected by cluster sampling in two hospitals in Riyadh; one government hospital (NGHA/National Guard Health Affairs Hospital) and one private hospital (SGH or Saudi German Hospital). A total population of 505 physicians was requested to fill the survey. The population included all physicians currently working in any of the ten selected departments in either of the two participating hospitals, of any education level that has been practicing in Saudi Arabia for one year or more. A cross sectional, self-administered questionnaire-based study was conducted. Permission was taken from King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) Collage of Public Health and Health Informatics (CPPHI) Research and Ethics Committee for conducting this study, and ethical approval was obtained from the King Abdullah International Medical Research Centre (KAIMRC) Internal Review Board prior to the actual study. The approval of the CEO was obtained from each hospital.

2.2. Survey development and administration

A questionnaire on physician self-rated level of knowledge, attitudes and opinions was self-developed. The questionnaire was evaluated by qualified research supervisors from CPPHI and KAIMRC. The survey was conducted from March to May 2013 in the two hospitals after permission was obtained from both CEOs. A list of the medical departments in the two hospitals was obtained, arranged in alphabetical order and numbered. Using cluster sampling technique, 10 departments were selected for the study. A list of all 231 physicians in the selected departments was obtained and they were contacted face to face or through the department secretary and invited to fill the questionnaire. Due to the initial low response rate at NGHA we continued to follow up in person, through the department secretaries and through the office of the Head of Medical Services until we reached our target sample size. After applying exclusion criteria of “not less than one year practicing in Saudi Arabia” the total number of filled questionnaires collected was 178 (62 from SGH at a response rate of 80% and 116 from NGHA at a response rate of 76%), giving an overall response rate of 77%. Data were entered into SPSS version 20 and reviewed by a colleague for accuracy.

2.3. Survey content

The questionnaire was designed to collect data on physicians’ self-perceived level of knowledge, opinions and attitudes toward local generic medication prescription. It also gathered information about concerns physicians have about the local generic industry. The questionnaire was composed of 40 multiple choice questions on Likert scale measurement and three open ended questions, which we estimated would take around 15 min to complete. The questionnaire was divided into four main parts:

Demographic variables; age, years of credential in general, years of practice in Saudi Arabia, credential, medical specialty and employment sector.

Physician perceived level of knowledge; Ten questions that examined how physicians rate their level of knowledge about the meaning of “generic” and “brand”, bioequivalence, and therapeutic bioequivalence. The questions also enquired about awareness of price difference of generic compared to brand. One open-ended question inquired about the most common sources of physician’s knowledge about local generic medication.

Physician opinions; Twelve questions investigated the opinions of physicians on the variables of price range, effectiveness and safety, quality, therapeutic equivalence to brand, availability and diversity of pharmacological classes. In addition, this section addressed the impact of regulations, insurance companies and hospital management on local generic prescription rates. One open-ended question asked about which pharmacological classes of local generics have the biggest shortage.

Physician attitudes; Thirteen questions tackled factors that affect physician’s decision to prescribe a generic medication. These included variables like therapeutic failure, narrow therapeutic index, effectiveness, dosage form, patient improvement, generic side effects, cost difference and patient medical insurance. One open ended question asked physicians about cases in which they would never prescribe generics.

2.4. Statistical analysis

All data collected were entered manually into an Excel worksheet, then checked and screened for errors. Each variable was coded and numbered. Predictive Analytics Software (PASW formerly SPSS) version 20 (IBM, SPSS Inc., Chicago IL, USA) was used for data analysis. Descriptive statistical techniques were used to answer our descriptive research questions. Categorical variables were summarized using frequency tables, pie and bar charts. Logistic regression analysis was used to assess if there exists an association between infrequent prescription of local generic drugs (as the dependent variable) and
the following independent variables: Employment sector, qualification level, years of practice in KSA, opinion about The Saudi Food and Drug Authority (SFDA) approved generic drugs and level of knowledge. The logistic regression models were first fitted with each of these variables separately to estimate the univariate odds ratios (ORs). Then all independent variables that were significant at univariate level were included in the multivariate regression equation to estimate the adjusted OR for each of the variables. A \( P \)-value of at least 0.05 was used to justify a claim of statistically significant effect.

3. Results

Female doctors represented 37% of our surveyed population. Almost half of the study population was consultants and about two thirds of the participants worked in a government hospital (Table 1).

Approximately three quarters of the study population either agreed or strongly agreed that they were familiar with the terms “generic medication” and/or “brand medication”. Around half of the study population stated that they either agreed or strongly agreed that they were familiar with the term “Bioequivalence Process” and/or the price difference between brand and generic medication. Less than half of the study population \( (n = 87, 43.8\%) \) stated that they were able to explain therapeutic bioequivalence to patients. Medical representatives were perceived by the participating physicians to be their main source of knowledge about local generics \( (n = 81, 45.5\%) \) (Table 2).

Fig. 1 summarizes opinion of participating physicians’ in relation to prescribing local generic medications. The percentage of physicians who agreed to prescribe local generics \( (38\%) \) was higher than that who disagreed \( (22\%) \), while the rest had neutral opinion. Higher percentages of physicians acknowledged that the price of generics is low while prices of brand medicines are high. When comparing the quality and effectiveness of local generic medication to that of brand medication, less than one third of the physicians agreed that they were comparable. For safety on the other hand 38.2% agreed on the comparable safety of local generic medication compared to their corresponding brands. Regarding the therapeutic equivalence of SFDA approved local generic medications to their corresponding brand medications 21.9% agreed that they were therapeutically equivalent, while the rest of physicians either disagreed or had a neutral opinion.

Table 1  Characteristics of the study population \((N = 178)\).

| Variable                  | Number (%) |
|---------------------------|------------|
| Gender                    |            |
| Male                      | 112 (62.9) |
| Female                    | 66 (37.1)  |
| Total years of practice   |            |
| 1–5                       | 39 (21.9)  |
| 6–10                      | 30 (16.9)  |
| 11–15                     | 31 (17.4)  |
| 16–20                     | 39 (21.9)  |
| >20                       | 39 (21.9)  |
| Years of practice in KSA  |            |
| 1–5                       | 80 (44.9)  |
| 6–10                      | 35 (19.7)  |
| 11–15                     | 25 (14.0)  |
| 16–20                     | 22 (12.4)  |
| >20                       | 16 (9.0)   |
| Credential                |            |
| GP                        | 39 (21.9)  |
| Specialist                | 58 (32.6)  |
| Consultant                | 81 (45.5)  |
| Employment sector         |            |
| Governmental              | 116 (65.2) |
| Private                   | 62 (34.8)  |

Table 2  Perceived knowledge of the participating physicians about local generics.

| Variable                                      | Number (%) |
|-----------------------------------------------|------------|
| Range of price difference familiarity         |            |
| Strongly disagree                             | 23 (12.9)  |
| Disagree                                      | 26 (14.6)  |
| Neutral                                      | 42 (23.6)  |
| Agree                                        | 53 (28.8)  |
| Strongly agree                                | 34 (19.1)  |
| Ability to explain therapeutic BE to patients |            |
| Strongly disagree                             | 23 (6.7)   |
| Disagree                                      | 26 (17.4)  |
| Neutral                                      | 42 (32.0)  |
| Agree                                        | 53 (32.0)  |
| Strongly agree                                | 34 (11.8)  |
| Source of knowledge about local generics      |            |
| Medical Reps                                  | 81 (45.5)  |
| Medical publication                           | 35 (19.7)  |
| Textbooks                                     | 25 (14.0)  |
| Insurance company                             | 2 (1.1)    |
| Others                                        | 35 (19.7)  |

Fig. 1  Physicians opinion and attitude toward the prescription of local generic drugs \((N = 178)\).
Around one third disagreed that there is pressure from medical insurance companies for prescribing specific drugs. Our study also showed that half of the participating physicians \((n = 90, 50.6\%)\) indicated that they prescribed local generic medications daily. Less than one third that was 26.4\% of participants agreed or strongly agreed that there was a serious problem with therapeutic failure of local generics. Regarding the existence of cases where local generic drugs must never be prescribed 37\% agreed that this was true. However 43.3\% indicated that they were neutral.

Participating physicians believed there was a shortage in the supply of local generic medication in a number of pharmacological classes such as antidepressants and antipsychotics, which was reported by 10.67\% followed by enzymes and hormones which was reported by 9.55\% and anti-hypertensive which were reported by 8.43\%. Also, the study addressed the cases where practicing physicians never prescribed local generics. 7.87\% named serious infections as the most common cases where they would never prescribe local generic medication followed by emergency and/or terminal cases which were reported by 5.625\% and cardiac cases and cardiac surgeries which were reported 5.06\%.

Fig. 3 summarizes the results of the survey questions related to the factors that influence physician prescription decisions. The most influential factor according to the survey was clinical effectiveness, followed by patient improvement, where 71.9\% and 64.6\% respectively, agreed or strongly agreed that these factors were influential. The least influential factor was patient medical insurance coverage, which only 31.50\% agreed was influential in the prescription decision making process.

Table 3 shows the results of the univariate and multivariate logistic regression analysis. The univariate analysis indicates that physicians working for the governmental sector are 5.48 times more likely to be infrequent prescribers of local generic medication than physicians working for the private sector. In addition, consultants are 2.63 times more likely than specialists to be infrequent local generic prescribers. Also physicians with 6 or more years of practice in KSA are twice as likely to be infrequent prescribers as those who have worked in KSA for 1–5 years. Finally the univariate analysis indicates that physicians with low level of knowledge about generic medication are 3 times more likely to be infrequent prescribers than those with high level of knowledge about generic medication. The multivariate analysis shows that the significant independent predictive factors for infrequent prescription of local generic medication were government sector employment \((OR = 3.74, [95\%CI 1.50–9.43])\), consultant level qualification \((OR = 3.94, [95\%CI 1.50–10.31])\) and low level of knowledge about generic medication \((OR = 4.11, [95\%CI 1.56–10.84])\). Years of practice in KSA and opinion about therapeutic equivalence of SFDA approved local generic medications, become insignificant at multivariate level. Also, opinion of physicians about therapeutic equivalence of SFDA approved local generic medications was not predictive of infrequent prescribing of local generics \((OR = 0.51, [95\%CI 0.20–1.30])\).

4. Discussion

This study showed that a majority of physicians perceived themselves to have good knowledge of the terms generic, brand and bioequivalence, but they have less ability to explain the meaning of bioequivalence to their patients (Table 2). Compared to a USA study conducted in 2005 (Barrett, 2005) where 86\% of physicians reported that they could explain bioequivalence to their patients, only one half of that percentage
reported that they could do that from our Saudi study sample. This could be due to a lack of knowledge, or a lack of motivation on the part of our physicians to explain details to patients who in many cases are uneducated or old. Or it could be due to the difference in culture and malpractice regulations between the USA and Saudi Arabia that force USA physicians to explain all medication details to their patients.

Almost one half of physicians in our study perceived that they knew about the price difference between brand and generic medication. This is much lower than figures reported in previous studies in the USA (73%) (Barrett, 2005) and in Saudi Arabia (75%) (Alghasham, 2009). The reason for this drop in awareness could be that with patients obtaining treatment either from a government hospital or through an insurance company, physicians do not feel the need to find the most economical medications for their patients.

Our surveyed physicians in this study also perceived that medical representatives were the most common source of knowledge about generic medications, while in the USA health insurers and pharmacy benefit managers were the most common source of knowledge about generic drugs (Barrett, 2005). This is also an indicator that as medical insurance regulations mature in Saudi Arabia the influence of insurance companies should increase like in the USA, and they should be more proactive in promoting local generic medication. Only 1.1% of our surveyed physicians stated that they received the information from insurance companies.

Our study revealed that about half of the physicians surveyed believed that local generics should be prescribed if they were available and suitable for the case. This number is less than both of the similar previous studies conducted in the USA (Barrett, 2005) and Saudi Arabia (Alghasham, 2009) which both reported this figure at around 80%. The confidence of our study sample in local generic drugs is lower than what we expected after conducting our literature review. This lower confidence could lead to lower prescription rates of local generics.

Among our study population the number of physicians who thought that local generics were not comparable to brand name drugs in quality and effectiveness was higher than the number who thought they were comparable. Regarding safety the numbers that believed generics were comparable to brands were similar to the numbers who believed they were not comparable. However for quality, effectiveness and safety the highest response rate was for the neutral group which indicated that there could be a lack of knowledge about therapeutic bioequivalence of generic drugs among participating physicians. In contrast more than 60% of physicians surveyed in Cyprus (Theodorou et al., 2009) believed that the efficacy, safety and effectiveness of generic medication were comparable to the corresponding brand.

Only one fifth of the physicians that participated in our survey agreed that the local generic medications approved by the SFDA were therapeutically equivalent to their corresponding brand. In the USA exactly double this number (Barrett, 2005) agreed that FDA approved drugs were equivalent to their brand counterparts. This opinion could be due to a fundamental lack of trust in the SFDA approval process among physicians in Saudi Arabia. Despite this our study still showed that half of the participating physicians prescribed local generics on a daily basis.

A small proportion of participating physicians felt pressure from regulators, insurance companies or hospital administrators to prescribe more local generics. In the USA more than 80% of physicians (Barrett, 2005) said that they felt they were encouraged by healthcare authorities, insurance companies or pharmacy benefit management companies to prescribe more local generics. Governmental healthcare authorities and medical insurance companies should introduce measures that encourage physicians to prescribe more local generic medication. Almost all of the medication prescribed in Saudi Arabia is either dispensed in a governmental medical facility or in a private medical center through a medical insurance company. Government regulators and medical insurance companies are

| Table 3 | Summary of logistic regression Analysis for variables predicting infrequent prescribing of local generic medications (N = 178). |
|---------|----------------------------------------------------------------------------------------------------------------------------------|
| Factors | Univariate analysis OR (95% CI) | Multivariate analysis OR (95% CI) |
| Employment sector | | |
| Private (Ref) | 5.48(2.39–12.55) | 3.74(1.50–9.42) |
| Governmental | | |
| Credential | | |
| Specialist (Ref) | 1.54(0.62–3.85) | 0.98(0.34–2.82) |
| GP | 2.63(1.24–5.62) | 3.94(1.50–10.31) |
| Consultant | | |
| Years of practice in KSA | | |
| 1–5 yrs (Ref) | 2.07(1.08–3.95) | 1.27(0.54–2.99) |
| 6 yrs or more | | |
| Opinion about that SFDA Equivalent to brand drugs (Ref) | 1.02(0.48–2.17) | 0.51(0.20–1.30) |
| Approved generic drugs | | |
| Level of knowledge | | |
| High Level (Ref) | 0.85(0.39–1.87) | 1.16(0.48–2.79) |
| Moderate | 3.11(1.41–6.83) | 4.11(1.56–10.84) |
| Low | | |

The bold indicates statistical significance at a P-value level of 0.05.
both major players in promoting the increased market share of local generics.

Our study indicated that clinical effectiveness was the most influential factor for more than 70% of participating physicians when prescribing a brand over a generic. This is similar to a study in Greece and Cyprus (Theodorou et al., 2009) that showed that clinical effectiveness was the most important factor for over 90% of physicians when deciding to prescribe a brand over a generic. On the other hand, the factor that was reported as least influential among our study sample was narrow therapeutic index, which was mentioned as influential by only 40% of participants. In the USA study (Barrett, 2005) narrow therapeutic index was indicated as influential by more than two thirds of participating physicians. This result could be an indicator for lack of knowledge about the mean of narrow therapeutic index medication among our study population.

Around one third of the physicians participating in our survey indicated that there were specific cases when they would never prescribe generic medication. The cases mentioned most frequently were serious infections. Also about two thirds of the study population indicated that there were specific pharmacological classes where they had experienced a shortage of local generic medication in their practice. The highest pharmacological class mentioned was antidepressants and antipsychotics, followed by enzymes and hormones then anti-hypertensive.

Working in the governmental sector, physicians with low level of knowledge were found to be predictors of infrequent prescribing of local generic medication among our study population. Awareness among governmental hospitals is needed to motivate physicians to prescribe more local generic medications. Consultants need to be approached and encouraged to prescribe more local generics, however manufacturers and regulators should find a way to increase their confidence in generic medication. In general, there is a need to increase the overall level of knowledge about local generic products among physicians.

We have gathered information about the perceived knowledge, opinion and attitude toward local generic medication among physicians using a self-developed questionnaire. Given that physicians are difficult to recruit as study subjects, we were able to reach the target sample size for the population, but only because we anticipated a low response rate from the NGHA physicians and distributed 231 questionnaires. The response rate in our study was acceptable (77%). However, like any other survey, non-participation bias is possible if those who did not participate have different levels of knowledge and beliefs.

Another limitation in our research was that the sample all came from two general hospitals which have drug formularies that limit the range of drugs that physicians have to choose from. Even though physicians were asked to respond based on their perceived knowledge, opinions and attitudes there is a risk that their responses are biased by the drug formularies that they have to use in their daily practice. This bias may have a negative impact on the reliability and validity of the survey results, and therefore affect our ability to generalize the results to the whole population.

5. Conclusion

The most important factors that influence infrequent prescribing of local generic medications by physicians are low level of knowledge about local generics, working in a governmental hospital and at a consultant level. Future bigger studies should confirm such results and focus on suggesting ways to address these three factors by increasing overall physician awareness and knowledge in governmental hospitals, and by improving confidence in local generic products.

Acknowledgements

We would like to acknowledge Kind Abdullah International Medical Research Center for finding this study. We are very thankful for the physicians who took part of this survey and completed the questionnaires.

References

Alghasham, A.A., 2009. Generic drug prescribing in central Saudi Arabian: perceptions and attitudes of physicians. Ann Saudi Med. 29 (1), 24–29.
Aljazairi, A.S., Balhareth, S., Eqtfan, I.S., Al-swayeh, S., 2008. Brand and generic medications: are they interchangeable? Ann Saudi Med. 28 (1), 33–41.
Al Shaikh, S.A., Chahine, P., 2011. In-Focus Report, Saudi Pharmaceuticals Sector Review, Jeddah Saudi Arabia. National Commercial Bank Economics Department, vol. 2. pp. 9–8
Barrett, L.L., 2005. Physicians’ Attitudes and Practices Regarding Generic Drugs, Washington DC, AARP Knowledge Management, 33p. <http://assets.aarp.org/gcenter/health/phys_generic.pdf>.
Bioequivalence Requirements Guidelines, Riyadh Saudi Arabia, the Saudi FDA, 2005. <http://old.sida.gov.sa/NR/drdonylres/6A114B70-4201-46EF-B4C7-127FD66D3314/0/BioequivalenceRequirementGuidelines.pdf>.
Fischer, M.A., Avorn, J., 2003. Economic consequences of underuse of generic drugs: evidence from Medicaid and implications for prescription drug benefit plans. Health Serv. Res. 38, 1051–1063.
Chidambaram, A., 2011. What lures the attention of global generic drug makers towards China? (Frost & Sullivan, internet) 2011, Aug 12 (cited 2013 March 7). <http://www.frost.com/sublib/display-market-insight-top.do?id=240018520>.
Gamble, P., 2011. Saudi Arabia’s 2012 Budget, Riyadh Saudi Arabia, Jadwa Investment. 26, 9p. <http://www.bitrading.org/downloads/Saudi%20Arabian%20Budget%202012.pdf>.
Global Pharmaceutical Industry and Market (Association of the British Pharmaceutical Industry ABPI, Internet) 2012 March (cited 2013 March 6). <http://www.abpi.org.uk/industry-info/knowledge-hub/global-industry/pages/industry-market-aspx>.
Haas, J.S., Phillips, K.A., Gerstenberger, E.P., Seger, A.C., 2005. Potential savings from substituting generic drugs for brand-name drugs: medical expenditure panel survey, 1997–2000. Ann. Intern. Med. 142 (11), 891–897.
Market Analysis (Generics and Biosimilar Initiatives Online) 2012 November 14 (cited 2013 March 8). <http://www.gabionline.net/layout/set/print/content/view/full/2211>.
Moon, M., 2005. How Beneficiaries Fare under the New Medicare Drug Bill. Potential Savings from Substituting Generics for Brand-Name Drugs. Ann. Intern. Med. 142 (11), 896. www.annals.org Downloaded From: <http://annals.org/on 11/04/2014CommonWealthFund> June 2004. Available at <www.cmwf.org/usr_doc/moon_medicarerxdrug_ib_730.pdf>.
Saudi Ministry of Planning and Economy, Central Department of Statistics, 2005.
Shrank, W.H., Cox, E.R., Fisher, M.A., Mehta, J., Choudhry, N.K., 2009. Patients’ perceptions of generic medications. Health Aff. 28 (2), 546–556.
The Pharmaceutical Industry in Figures, Brussels Belgium, European Federation of Pharmaceutical Industries and Associations
Theodorou, M., Tsiantou, V., Pavlakis, A., Maniadakis, N., Fragoulakis, V., Pavi, E., Kyriopoulos, J., 2009. Factors influencing prescribing behaviour of physicians in Greece, and Cyprus: results from a questionnaire based survey. Ann. Intern. Med. 142 (11), 891–897.

Toklu, H.Z., Dülger, G.A., Hidiroğlu, S., Akici, A., Yetim, A., Gannemoğlu, H.M., Güneş, H., 2012. Knowledge and attitudes of the pharmacists, prescribers and patients toward generic drug use in Istanbul – Turkey. Pharm. Practice 10 (4), 199.

WHO, The WHO Factsheet No 335, (internet), 2009 December, (cited on 2012 August 3), <http://www.who.int/mediacentre/factsheets/fs335/en/>.