



## PRESCRIBING TRENDS AND KNOWLEDGE AND PERCEPTION OF COMMUNITY PHARMACISTS ABOUT GENERIC DRUGS IN UAE

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### ABSTRACT

**Background:** Generic prescribing remains low despite the frequent recommendations regarding this issue. Objectives: The objective of this study was to assess the extent of generic prescribing and evaluate the knowledge and perceptions of community pharmacists towards generic medicines in some United Arab Emirates (UAE). **Methods:** prescriptions issued by consultants from hospitals (145) and by general practitioners (56) from private practice in Sharjah, Ajman and Abu Dhabi-UAE were analyzed using WHO indicators. A cross-sectional survey involving community pharmacists in the three Emirates was undertaken. A 23-item questionnaire was developed, pre-validated and administered. The collected data were analyzed using Statistical Package for the Social Sciences (SPSS, version 17, Chicago, IL, US). **Results:** Fifty out of 75 pharmacists returned filled in questionnaires producing a response rate of 66.7%. Generic prescribing reached 100% by consultants but only 5.3% by general practitioners. The majority (> 90%) of community pharmacists knew that drugs may be brand or generic, knew the differences between them and that generics can be marketed under different names. Pharmacists were aware of the WHO recommendations regarding prescribing generics (38, 76%), believed that physicians should prescribe more generics (35, 70%) and were convinced that dispensing generics would not change the pharmacy's revenue (26, 52%). Most community pharmacists favored informing patients about available generics and actually practiced the substitution after consulting the prescribing physician. **Conclusion:** Rational prescription writing by general practitioners and prescribing generics must be encouraged through legislation and inclusion of relevant topics in medical curriculum and continuing medical education programs.

**KEYWORDS:** Prescription analysis, consultants, general practitioners, community pharmacists, generic medicines, brand medicines.

### INTRODUCTION

Drug utilization studies pinpoint drug misuse trends and help in promoting rational use of drugs. This type of studies can evaluate several parameters of direct impact on therapeutic outcomes. In addition, such studies provide feedback for the physicians, pharmacists and other health care professionals with the hope to enhance responsible drug prescribing, dispensing and use in general.<sup>[1]</sup> Rational drug prescribing is defined as the use of the least number of drugs to obtain the best possible therapeutic effect in the shortest period at a reasonable cost.<sup>[2]</sup>

Prescribers are expected to fill a well-balanced prescription since any lack in the required information can be considered a drawback and can cause major complications to the patient's health. Furthermore, prescriptions are considered legal documents for or against the patient, pharmacist and prescriber. Among

the many indicators to assess, is the % of drugs prescribed as generics. The World Health Organization (WHO) strongly emphasized that under prescribing and use of generic drugs is a main cause of inefficiency in health care.<sup>[3]</sup> Therefore consumption of medicines may be influenced by the prescribing trends of physicians, conception and expectation of patients and the dispensing practice of pharmacists.

It is worth noting that some patients might ask the prescriber for a particular drug by name which is usually brand and expensive drug either because of previous experience with the medicine or due to the impact of promotional activity. It has also been suggested that such an insistence on an expensive medicine may be because the patient does not pay the full cost or because they believe that those drugs are better than cheaper ones.<sup>[4]</sup> On the other hand, low income patients and those without medical insurance coverage may not adhere to

their prescribed drugs if they cannot afford its cost and as such drug compliance may not be achieved and this would negatively impact therapeutic outcomes. On the other hand, prescribing generic medicine by the physician or replacement of brand by generic by the pharmacist would have the opposite effect. Taken cost of medicine into consideration, it must be remembered that generics, according to estimates of Food and Drug Administration (FDA)<sup>[5]</sup>, are usually 20-70% less expensive than their counterpart brands.

Policies of FDA promote generic drug products that are therapeutically equivalent to their brand name counterparts and a generic medicine is usually a pharmaceutical product that can be produced by other than the innovator company upon expiry of the patent and protection rights. According to the WHO a generic drug is defined as a pharmaceutical product which is usually intended to substitute for an innovator product, is manufactured without a license from the original innovator company and is marketed after the expiry date of the patent or other exclusive rights.<sup>[6]</sup> However, an important concern controlling the safety, effectiveness and rational use of generic medicines is the concept of bioequivalence. A recommended generic must prove bioequivalent to a brand or standard reference medicine. The two are considered bioequivalent if they are both pharmaceutically equivalent and with similar bioavailability following their administration in the same molar dose thus their effects can be the same.

Generic medicine use is increasing both in developing and developed countries. However, there is evidence that not only doctors but also pharmacists hold negative views of generics and resist prescribing generic medicines.<sup>[7],[8]</sup>

Many physicians believe that brand medicines are superior to generic ones and do not favor substitution of their prescribed brands by generic medicines.<sup>[8]</sup> Pharmacists<sup>[9]</sup> and patients<sup>[10]</sup> have also been shown to have poor knowledge and misconceptions about generic medicines. Many studies have reported patients to have negative views about generics, believe them to be less effective, of lower quality and unsuitable for treatment of major illnesses, as compared to their branded equivalents.<sup>[10-12]</sup> Keeping this in mind, it seems rather important to evaluate the level of knowledge, perception and attitudes of not only patients but also the practicing community pharmacists and if the levels are poor or misconception were of significant negative impact on generics use, interventions must be implemented to increase awareness of both the public and health care professionals including pharmacists.

In the United Arab Emirates (UAE) there is lack of studies on generic prescribing and knowledge, perception and attitude of community pharmacists and patients on generic drugs. Therefore we decided to carry out this as the first study in the country with the main aims being to

first determine the extent of generic prescribing by consultants and general practitioner through prescription analysis and second to evaluate the level of knowledge, perception and attitude of both community pharmacists and patients towards generic versus brand medicines.

## MATERIALS AND METHODS

### Prescription analysis

For studying the prescribing trends among consultants in hospitals and health centers, and general practitioners (GPs) in private practice, a total of 145 and 56 prescriptions were collected respectively during the month of February, 2016 from general hospital out-patient pharmacies and community pharmacies in the Emirates of Abu Dhabi, Sharjah and Ajman. Prescriptions were subjected to analysis using the indicators suggested by the WHO.<sup>[13]</sup> These include prescriber's information such as name, address, license number and signature; patient's information including the name, age, sex, patient's address, brief diagnosis and history of allergy. All hand-written prescriptions were examined for legibility. In addition, indicators regarding medication information were determined. These include percentage (%) of generic drugs prescribed, the dosage regimen (dose, route and frequency of administration), prescriptions with two drugs of the same class, drug-drug interactions, most common therapeutic classes and the most common drug of each class. Prescriptions were also examined for the average number of drugs per encounter and % of medications prescribed as injections and % antibiotics prescribed. In this study, names of patients were concealed in consideration of patients' privacy protection. Data were collected and analyzed using Microsoft Excel® and expressed in terms of both counts and percentages.

### Community pharmacist's questionnaire

The questionnaire intended for the practicing community pharmacists was prepared in English only and pre-validated by distributing it to 6 practicing pharmacists who were not later included in the study. All raised comments and recommendations were taken in consideration in the final version of the questionnaire. Pharmacists approached were practicing in the Emirates of Abu Dhabi, Sharjah and Ajman, UAE. The study was carried out during the months of February- March, 2016. A total of only 50 out of 75 community pharmacists voluntarily agreed to participate in the study. The questionnaire covered three parts. The first part focused on demographic data of participants. These include ethnic group, age and gender, first pharmacy degree (B.pharm. or pharm. D.), higher degrees, place of graduation, years of experience and number of years practicing in UAE. In the second part, pharmacists were asked whether they know that drugs may be available as brand or generic and if they know any differences between the two categories. In the third part of the questionnaire, pharmacists were asked to respond by selecting agree, not sure or disagree to statements on whether brand medicine is of better quality, more

effective, safer, produces fewer side effects, more expensive and produces higher bioavailability as compared to generic medicines. In the last part of the survey, pharmacists were requested to answer questions covering; informing patients on availability of generic medicines, replacing an unavailable brand with generic, suggesting brand or generic for minor illness, do they know that generic medicines may be marketed under different names, if they have ever replaced brand by a generic, and if yes whether they consulted the prescriber or not and what was the patient's reaction, do they think that the cost of medicine may influence compliance, what is their preference with regard to locally produced and imported generics, what WHO recommends in prescribing, do they think the prescribing physician should prescribe more brands or generics, do they think the prescriber should indicate if brand is necessary and inform patients on possible substitution, do they think patients should have the option of choosing brand or generic and how dispensing generic medicines influence the revenue of the pharmacy.

### Statistical analysis

Responses of the participants were encoded and the data were analyzed using Statistical Package for the Social Sciences (SPSS, version 17, Chicago, IL, US). Three categories of the relevant responses were used so that 95% confidence intervals (95% CI) could be calculated. Descriptive analysis was used to calculate the proportion of each group of respondents who agreed/disagreed with each statement in the questionnaire. Chi square test was used to identify any significant difference among the participants' responses regarding certain statements in the questionnaire with a significant level of  $p$  value of  $< 0.05$ .

## RESULTS

### Prescription analysis

All prescriptions issued by consultants contained the name, address and signature of the prescriber as well as name, age and sex of patient. Moreover, the majority of those prescriptions contained brief diagnosis and history of allergy. Prescriptions by GPs were deficient in name, age, sex, diagnosis and history of allergy of patients (Table 1).

In the present study, most prescriptions (134, 92.4 %) by consultants were printed and only 11 (7.5%) encounters were hand written with more than 50% of them being difficult to read making dispensing at increased risk of errors. On the other hand, only 37(66.07%) prescriptions by GPs were printed with 10 (%) being not legible (Table 2) The average number of drugs per prescription was 4 for consultants and 2.96 for GPs (Table 3). Prescribing generic drugs were higher in the case of consultants (145,100%) as compared to GPs where generic medicines were prescribed in only 3 (5.3%) prescriptions. The trend for poly-pharmacy was more evident in prescriptions by consultants where prescriptions with 3 or more drugs totaled to 66.2%

while in the case of GPs it approached 50% (Table 2). Prescriptions by consultants contained injections (13, 9%) as compared to none in those issued by GPs. As shown in Table 1, prescribing two drugs of the same therapeutic class was recorded only in case of prescriptions (26.2%) by consultants. The most commonly prescribed class of drugs was the antibiotics constituting 33.1% and 55.4% for consultants and GPs respectively (Table 4). In both cases amoxicillin was the most commonly prescribed of this class being prescribed in 27% and 44% of prescriptions by consultant and GPs respectively. The second most common therapeutic class in prescriptions by both prescribers was antihistamines with loratadine being the most common of this class. The third class of drugs prescribed by consultants was non-steroidal anti-inflammatory (18.6%) drugs with diclofenac as the most common of the class for consultants and vitamins (33.9%) for GPs (Table 4).

### Pharmacist's Knowledge and perception of generic medicines

We approached 75 community pharmacists in three of the 7 Emirates of UAE and only 50 voluntarily agreed to participate in the survey producing a response rate of 66.7%. Age of the majority of participants (49, 98%) was between 25-49 years and 50% of the respondents were Arabs. Males constituted the majority (32, 64%) of respondents (Table 5). Again, the majority (42, 84%) of community pharmacists hold a bachelor of pharmacy degree with only 8 (16%) were holders of Pharm. D. degree. Pharmacists with higher than first degree comprised 16 (32%) with a diploma and 11 (22%) with a master degree in pharmacy. Most (34, 68%) participants graduated from universities outside UAE and only 16 (32%) were graduate of UAE (Table 5).

The majority (33, 66%) of participants had 1-9 years of experience with 33 (66%) of them having less than 5 years of experience of practice in UAE. As shown in Table 6, the majority (48-49, 96-98%) of pharmacists knew that "drugs may be brand or generic", "the differences between them" and "generics can be marketed under different names". Pharmacists also knew that the "WHO recommends prescribing generics" (38,76%), "believed that physicians should prescribe more generics" (35,70%) and were convinced that "dispensing generics would not influence the usual pharmacy's revenue" (26, 52%).

Views of pharmacists on brand medicine's quality, effectiveness, safety, side effects, cost and bioavailability as compared to those of generics are shown in Table 7.

With the exception of dispensing drugs for minor illness where higher percentage of pharmacists preferred brand medicines, the majority of pharmacists (range between 62-84%) favored informing patients about available generics and replacing unavailable brand with generic. Pharmacists also actually practiced the substitution after consulting the prescribing physician and the patient

willingly accepted the replacement of brand with generic medicine. In addition, the majority think the price of medicines may influence compliance and the prescribing physician should indicate if brand is necessary and should inform patients on possible substitution by the pharmacist. The majority of pharmacists also believed that patients should have the right to choose brand or generic (Table 8).

The responses of community pharmacists were significantly influenced by gender. More male pharmacists agreed to the statements that brand medicines are of higher quality, more expensive and more effective than their counterpart generics (Table 9). They also practiced brand to generic substitution and believe that the cost of medications can influence compliance. Surprisingly more of the group of pharmacists with the least years (1-4) of experience agreed that generic medicines can be marketed under different names and the prescribing physician should inform patients on possible substitution by the pharmacist but they were not sure whether brand medicines produce fewer side effects than generics (Table 10).

Again, significantly more pharmacists with < 5 years of practicing experience in UAE knew the difference between brand and generic medicines, agreed that brand medicines are more expensive than generics and think that the prescribing physician should inform patients on

possible substitution by pharmacist (Table 11). Similarly more pharmacists with a bachelor degree than those with a Pharm. D. degree practiced brand to generic substitution of medications, believed that brand medicines are more expensive than generics and think that the prescribing physician should inform patients on possible substitution by the pharmacist (Table 12).

More pharmacists who obtained their degree from other than UAE universities believe that brand medicines are of better quality than generics, suggest brand medicine for minor illness, and believe that dispensing generics would not influence the pharmacy revenue (Table 13). On the other hand, more holders of UAE degrees replaced the prescribed brand with generic and think the prescribing physician should inform patients on possible substitution by pharmacist. The later statement was also approved by significantly more pharmacists with a master degree than those with a high diploma.

**Table 1. Comparison of % presence of prescriber's and patient's information in prescriptions by consultants and general practitioners.**

| Information                   | Consultants<br>N(%), n=145 | General practitioners<br>N(%), n=56 |
|-------------------------------|----------------------------|-------------------------------------|
| <b>Prescriber information</b> |                            |                                     |
| Name                          | 145 (100%)                 | 47 (83.9%)                          |
| Address                       | 145 (100%)                 | 19 (33.9%)                          |
| License number                | 10 (6.9%)                  | 29 (51.8%)                          |
| Signature                     | 145 (100%)                 | 43 (76.8%)                          |
| <b>Patient information</b>    |                            |                                     |
| Name                          | 145 (10 %)                 | 56 (100%)                           |
| Age                           | 145 (100%)                 | 42 (75%)                            |
| Sex                           | 145 (100%)                 | 32 (57.1%)                          |
| Address                       | 0 (0 %)                    | 6 (10.7%)                           |
| History of allergy            | 140 (96.6%)                | 28 (50 %)                           |
| Brief diagnosis               | 139 (95.9%)                | 31 (55.4%)                          |

Table 2. Medication information present in prescriptions by consultants and general practitioners.

| Medication information             | Consultants<br>N(%), n=145 | General practitioners<br>N(%), n=56 |
|------------------------------------|----------------------------|-------------------------------------|
| <b>Prescription:</b>               |                            |                                     |
| Hand written                       | 11 (7.5%)                  | 19 (33.9%)                          |
| Legible                            | 5 (45.5%)                  | 9 (47.4%)                           |
| Eligible                           | 6 (54.5 %)                 | 10 (52.6%)                          |
| Printed                            | 134 (92.4 %)               | 37 (66.1%)                          |
| <b>Number of generics</b>          | 145 (100%)                 | 3 (5.3%)                            |
| <b>Dose</b>                        | 134 (92.4%)                | 42 (75%)                            |
| <b>Frequency of administration</b> | 134 (92.4%)                | 40 (71.4%)                          |
| <b>Route</b>                       | 130 (89.7%)                | 19 (33.9%)                          |
| <b>Two drugs of the same class</b> | 38 (26.2%)                 | 0 (0%)                              |
| <b>Drug - drug interaction</b>     | 2 (1.4%)                   | 1 (1.8%)                            |
| <b>Number of injections</b>        | 13 (9%)                    | 0 (0%)                              |
| <b>Number of anti-biotics</b>      | 34 (23.4%)                 | 17(30.4%                            |
| Total number of drugs              | 586                        | 166                                 |

Table 3. The number of drugs/encounter in prescriptions by consultants and general practitioners.

| Information                                  | Consultants<br>N(%), n=145 | General practitioners<br>N(%), n=56 |
|----------------------------------------------|----------------------------|-------------------------------------|
| <b>Average number of drugs/ prescription</b> | 4                          | 2.96                                |
| <b>Number of drugs/prescription</b>          |                            |                                     |
| One drug                                     | 29 (20%)                   | 12 (21.4%)                          |
| Two drugs                                    | 20 (13.8%)                 | 16 (28.6%)                          |
| Three drugs                                  | 35 (24.1%)                 | 7 (12.5%)                           |
| Four or more drugs                           | 61 (42.1%)                 | 21 (37.5%)                          |

Table 4. The most commonly prescribed therapeutic classes and the commonest drug of each class in prescriptions by consultants and general practitioners.

| Therapeutic class/drug                 | Consultants<br>N(%), n=145 | General practitioners<br>N(%), n=56 |
|----------------------------------------|----------------------------|-------------------------------------|
| <b>Anti-biotics</b>                    | 48 (33.1%)<br>Amoxicillin  | 29 (55.4%)<br>Amoxicillin           |
| <b>Anti-histamines</b>                 | 39 (26.9%)<br>Loratadine   | 25 (44.6%)<br>Loratadine            |
| <b>Non-steroidal anti-inflammatory</b> | 27 (18.6%)<br>Diclofenac   |                                     |
| <b>Vitamins</b>                        |                            | 19 (33.9%)<br>Multi vitamins        |

Table 5. Demographic characteristics of community pharmacists.

| Criteria              | Community Pharmacists<br>N (%), n=50 |
|-----------------------|--------------------------------------|
| <b>Gender</b>         |                                      |
| Male                  | 32 (64%)                             |
| Female                | 18 (36%)                             |
| <b>Age</b>            |                                      |
| 25-34                 | 35 (70%)                             |
| 35-49                 | 14 (28%)                             |
| 50& more              | 1 (2%)                               |
| <b>Ethnic group</b>   |                                      |
| Arabic                | 25 (50%)                             |
| Non-Arabic            | 25 (50%)                             |
| <b>Type of Degree</b> |                                      |

|                            |          |
|----------------------------|----------|
| B. Pharm.                  | 42 (84%) |
| Pharm. D.                  | 8 (16%)  |
| <b>Place of graduation</b> |          |
| UAE                        | 16 (32%) |
| Other                      | 34 (68%) |

Table 6. The practicing experience of community pharmacists and their knowledge of generic drugs.

|                                                                         | Frequency (%), n=50 |
|-------------------------------------------------------------------------|---------------------|
| <b>Years of practicing pharmacy</b>                                     |                     |
| 1-4                                                                     | 20 (40%)            |
| 5-9                                                                     | 13 (26%)            |
| 10-14                                                                   | 9 (18%)             |
| 15-19                                                                   | 2 (4%)              |
| >20                                                                     | 6 (12%)             |
| <b>Years of practice in UAE</b>                                         |                     |
| < 5 Years                                                               | 33 (66%)            |
| 5-9 Years                                                               | 10 (20%)            |
| 10-20 Years                                                             | 3 (6%)              |
| >20 Years                                                               | 6 (12%)             |
| <b>Do you know that drugs may be brand or generic?</b>                  |                     |
| Yes                                                                     | 49 (98%)            |
| No                                                                      | 1 (2%)              |
| <b>Do you know any differences between Brand and generics?</b>          |                     |
| Yes                                                                     | 49 (98%)            |
| No                                                                      | 1 (2%)              |
| <b>Do you know that generics can be marketed under different names?</b> |                     |
| Yes                                                                     | 48 (96%)            |
| No                                                                      | 2 (4%)              |
| <b>You prefer generics produced</b>                                     |                     |
| Locally                                                                 | 23 (46%)            |
| Imported                                                                | 27 (54%)            |
| <b>How dispensing generics influence the pharmacy revenue?</b>          |                     |
| Reduce it                                                               | 10 (20%)            |
| Increase it                                                             | 14 (28%)            |
| No change                                                               | 26 (52%)            |
| <b>Do you think physicians should prescribe more</b>                    |                     |
| Generic                                                                 | 35 (70%)            |
| Brand                                                                   | 15 (30%)            |
| <b>What WHO strongly recommends?</b>                                    |                     |
| Generic                                                                 | 38 (76%)            |
| Brand                                                                   | 12 (24%)            |

Table 7. Views of community pharmacists on various aspects of brand versus generic drugs.

| Statement                                       | Frequency (%), n=50 |          |          | 95% CI for Agree Responses |
|-------------------------------------------------|---------------------|----------|----------|----------------------------|
|                                                 | Agree               | Not sure | Disagree |                            |
| Brand medicines are of better quality           | 35 (70%)            | 7 (14%)  | 8 (16%)  | 57.4 - 82.6                |
| Brand Medicines are more effective              | 23 (46%)            | 12 (24%) | 15 (30%) | 32.3 - 59.7                |
| Brand medicines are safer than generics         | 15 (30%)            | 22 (44%) | 13 (26%) | 17.4 - 42.6                |
| Brand medicines produce less side effects       | 7 (14%)             | 27 (54%) | 16 (32%) | 4.4 - 23.6                 |
| Brand medicines are more expensive              | 40 (80%)            | 7 (14%)  | 3 (6%)   | 68.9 - 91.0                |
| Brand medicines produce higher bioavailability. | 10 (20%)            | 27 (54%) | 13 (26%) | 8.9 - 31.0                 |

Table 8. Pharmacist's attitude and behavior with regard to generics when dispensing prescriptions.

| Question                                                                                       | Frequency (%), n=50 |          | 95% CI for Yes responses |
|------------------------------------------------------------------------------------------------|---------------------|----------|--------------------------|
|                                                                                                | Yes                 | No       |                          |
| Do you inform your patients about available generics?                                          | 42 (84%)            | 8 (16%)  | (73.8 - 94.1)            |
| Do you substitute generic for unavailable brand?                                               | 39 (78%)            | 11 (22%) | (66.6 - 89.4)            |
| Have you ever substituted generic for a prescribed brand?                                      | 33 (66%)            | 17 (34%) | (52.9 - 79.1)            |
| Do you consult the prescribing physician before substitution?                                  | 32 (64%)            | 18 (36%) | (50.8 - 77.2)            |
| For a patient with minor illness do you suggest generic?                                       | 16 (32%)            | 34 (68%) | (19.1 - 44.9)            |
| Did the patient accept the substitution of generic for brand?                                  | 44 (88%)            | 6 (12%)  | (79.0 - 96.9)            |
| Do you think the price of medicines may influence compliance?                                  | 41 (82%)            | 9 (18%)  | (74.4 - 92.6)            |
| Do you think the prescriber should indicate if brand is necessary?                             | 31 (62%)            | 19 (38%) | (48.6 - 75.4)            |
| Do you think the prescriber should inform patients on possible substitution by the pharmacist? | 40 (80%)            | 10 (20%) | (68.9 - 91.0)            |
| Do you think patients have the right to choose brand or generic.                               | 31 (62%)            | 19 (38%) | (48.6 - 75.4)            |

Table 9. Influence of gender of community pharmacists on their responses to

| Question/statement                                                 | Frequency (%), n=50 |          | P value      |
|--------------------------------------------------------------------|---------------------|----------|--------------|
|                                                                    | Male                | Female   |              |
| <b>Brand medicine is of better quality</b>                         |                     |          |              |
| Agree                                                              | 27 (54%)            | 8 (16%)  | <b>0.010</b> |
| Disagree                                                           | 3 (6%)              | 4 (8%)   |              |
| Not sure                                                           | 2 (4%)              | 6 (12%)  |              |
| <b>Brand medicine is more effective</b>                            |                     |          |              |
| Agree                                                              | 29 (58%)            | 11 (22%) | <b>0.012</b> |
| Disagree                                                           | 1 (2%)              | 6 (12%)  |              |
| Not sure                                                           | 2 (4%)              | 1 (2%)   |              |
| <b>Brand medicine is more expensive</b>                            |                     |          |              |
| Agree                                                              | 29 (58%)            | 11 (22%) | <b>0.012</b> |
| Disagree                                                           | 1 (2%)              | 6 (12%)  |              |
| Not sure                                                           | 2 (4%)              | 1 (2%)   |              |
| <b>For a patient with minor illness do you suggest:</b>            |                     |          |              |
| Brand                                                              | 18 (36%)            | 15 (30%) | <b>0.074</b> |
| Generic                                                            | 14 (28%)            | 3 (6%)   |              |
| <b>Have you ever replaced the prescribed brand with generic?</b>   |                     |          |              |
| Yes                                                                | 18 (36%)            | 14 (28%) | <b>0.049</b> |
| No                                                                 | 14 (28%)            | 4 (8%)   |              |
| <b>Do you think the price of medicine would affect compliance?</b> |                     |          |              |
| Yes                                                                | 24 (48%)            | 6 (12%)  | <b>0.044</b> |
| No                                                                 | 8 (16%)             | 12 (24%) |              |

Table 10. Influence of years of experience of community pharmacists on aspects of generic prescribing.

| Question/statement                                                               | Years of experience, Frequency (%), n=50 |          |         |        |         | P value      |
|----------------------------------------------------------------------------------|------------------------------------------|----------|---------|--------|---------|--------------|
|                                                                                  | 1-4                                      | 5-9      | 10-14   | 15-19  | >20     |              |
| <b>Do you know that generic medicines can be marketed under different names?</b> |                                          |          |         |        |         |              |
| Yes                                                                              | 20 (40%)                                 | 13 (26%) | 8 (16%) | 1 (2%) | 6 (12%) | <b>0.008</b> |
| No                                                                               | 0 (0%)                                   | 0 (0%)   | 1 (2%)  | 1 (2%) | 0 (0%)  |              |
| <b>Brand medicines produce fewer side effects.</b>                               |                                          |          |         |        |         |              |
| Agree                                                                            | 4 (8%)                                   | 0 (0%)   | 3 (6%)  | 0 (0%) | 0 (0%)  | <b>0.022</b> |
| Disagree                                                                         | 9 (18%)                                  | 9 (18%)  | 6 (12%) | 2 (4%) | 1 (2%)  |              |
| Not sure                                                                         | 7 (14%)                                  | 4 (8%)   | 0 (0%)  | 0 (0%) | 5 (10%) |              |
| <b>Do you think prescribing physician should inform</b>                          |                                          |          |         |        |         |              |

|                                                  |          |          |         |        |        |       |
|--------------------------------------------------|----------|----------|---------|--------|--------|-------|
| patients on possible substitution by pharmacist? |          |          |         |        |        |       |
| Yes                                              | 17 (34%) | 11 (22%) | 9 (18%) | 1 (2%) | 2 (4%) | 0.017 |
| No                                               | 3 (6%)   | 2 (4%)   | 0 (0%)  | 1 (2%) | 4 (8%) |       |

Table 11. Influence of years of experience in UAE of community pharmacists on their responses to some aspects of generic prescribing.

| Question/statement                                                                                | Years of experience in UAE, Frequency (%), n=50 |          |        |        | P value |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------|----------|--------|--------|---------|
|                                                                                                   | < 5                                             | 5-9      | 10-20  | >20    |         |
| Do you know the difference between brand and generic medicines?                                   |                                                 |          |        |        |         |
| Yes                                                                                               | 33 (66%)                                        | 10 (20%) | 2 (4%) | 4 (8%) | 0.001   |
| No                                                                                                | 0 (0%)                                          | 0 (0%)   | 1 (2%) | 0 (0%) |         |
| Brand medicine is more expensive than generics.                                                   |                                                 |          |        |        |         |
| Agree                                                                                             | 28 (56%)                                        | 5 (10%)  | 3 (6%) | 4 (8%) | 0.022   |
| Disagree                                                                                          | 5 (10%)                                         | 2 (4%)   | 0 (0%) | 0 (0%) |         |
| Not sure                                                                                          | 0 (0%)                                          | 3 (6%)   | 0 (0%) | 0 (0%) |         |
| Do you think prescribing physician should inform patients on possible substitution by pharmacist? |                                                 |          |        |        |         |
| Yes                                                                                               | 28 (56%)                                        | 9 (18%)  | 2 (4%) | 1 (2%) | 0.029   |
| No                                                                                                | 5 (10%)                                         | 1 (2%)   | 1 (2%) | 3 (6%) |         |

Table 12. Influence of type of pharmacy degree of community pharmacists on their responses to some aspects of generic prescribing.

| Question/statement                                                                                    | Pharmacy degree, Frequency (%), n=50 |           | P value |
|-------------------------------------------------------------------------------------------------------|--------------------------------------|-----------|---------|
|                                                                                                       | B. Pharm.                            | Pharm. D. |         |
| Brand medicine are more effective than generics.                                                      |                                      |           |         |
| Agree                                                                                                 | 16 (32%)                             | 7 (14%)   | 0.033   |
| Disagree                                                                                              | 12 (24%)                             | 0 (0%)    |         |
| Not sure                                                                                              | 14 (28%)                             | 1 (2%)    |         |
| Have you ever replaced the prescribed brand with brand generic?                                       |                                      |           |         |
| Yes                                                                                                   | 30 (60%)                             | 3 (6%)    | 0.076   |
| No                                                                                                    | 12 (24%)                             | 5 (10%)   |         |
| Do you think the prescribing physician should inform patients on possible substitution by pharmacist? |                                      |           |         |
| Yes                                                                                                   | 37 (74%)                             | 3 (6%)    | 0.005   |
| No                                                                                                    | 5 (10%)                              | 5 (10%)   |         |
| Do you suggest brand or generic Medicine for minor illness?                                           |                                      |           |         |
| Brand                                                                                                 | 30 (60%)                             | 6 (12%)   | 0.040   |
| Generic                                                                                               | 12 (24%)                             | 2 (4%)    |         |
| How dispensing generics influence the pharmacy revenue?                                               |                                      |           |         |
| Reduce it                                                                                             | 8 (16%)                              | 2 (4%)    | 0.060   |
| Increase it                                                                                           | 14 (28%)                             | 1 (2%)    |         |
| No change                                                                                             | 20 (40%)                             | 5 (10%)   |         |

Table 13. Influence of place of graduation of practicing pharmacists on their responses to some aspects of generic prescribing.

| Question/statement                                   | Country in which the pharmacy degree was obtained, N(%), n=50 |       | P value |
|------------------------------------------------------|---------------------------------------------------------------|-------|---------|
|                                                      | UAE                                                           | Other |         |
| Brand medicines are of better quality than generics. |                                                               |       |         |

|                                                                                                       |          |          |       |
|-------------------------------------------------------------------------------------------------------|----------|----------|-------|
| Agree                                                                                                 | 8 (16%)  | 27 (54%) | 0.017 |
| Disagree                                                                                              | 2 (4%)   | 5 (10%)  |       |
| Not sure                                                                                              | 6 (12%)  | 2 (4%)   |       |
| Have you ever replaced the prescribed brand with generic?                                             |          |          | 0.076 |
| Yes                                                                                                   | 6 (12%)  | 25 (50%) |       |
| No                                                                                                    | 10 (20%) | 9 (18%)  |       |
| Do you think the prescribing physician should inform patients on possible substitution by pharmacist? |          |          | 0.005 |
| Yes                                                                                                   | 6 (12%)  | 25 (50%) |       |
| No                                                                                                    | 10 (20%) | 9 (18%)  |       |

## DISCUSSION

This study carries out a systematic inquiry to examine the trends for drug prescribing by consultant physicians and general practitioners in hospitals, medical health centers and private clinics. A total of 100 prescriptions representing consultants in hospitals and health centers in addition to 50 prescriptions for GPs in private clinics were collected in Abu Dhabi, Sharjah and Ajman. We analyzed the prescriptions for the presence of information regarding the patient, prescriber and the prescribed drug with assistance of drug use indicators described by WHO.<sup>[13]</sup> Generic prescribing according to consultants was ideal, because in hospitals they are adapting a system that makes physicians prescribe only generics and it does not allow brand prescribing. However, with GPs generic prescribing was very low (3, 5.3%). It has been reported in previous studies that physicians and pharmacists have negative views of generic prescribing<sup>[7,8]</sup>, mainly because they think generics are inferior to brands.<sup>[8]</sup>

Most of the prescriptions were easy to read, with only a few that were not so mainly due to the unclear physician's handwriting which were considered not legible. These unclear prescriptions can contribute to dispensing errors which leads to undesirable consequences.<sup>[2]</sup> The number of drugs per prescription was 4 for consultants and 2.96 for GPs. This is far in excess of the optimal value of <2 drugs/encounter recommended by WHO.<sup>[11][12]</sup> The figures obtained for consultants in the present study were also more than those reported in our earlier investigations.<sup>[1]</sup> In addition, a proportional percentage of prescriptions by both prescribers contained 3 drugs and more. This added to the burden of cost of treatment on patients without medical insurance coverage or those with low monthly Income, reduces compliance and increases the risk of drug-drug interactions and can also lead to more errors of dispensing particularly in the case of hand written prescriptions that were difficult to read.

In our study, Prescriptions with four drugs and more accounted to 68.6% and 60.9 in case of consultants and GPs respectively. Polypharmacy is considered a common issue in prescription writing that contributes to increased risk of adverse drug reactions and various drug –drug interactions.

The aim of generic prescribing is to reduce the drug costs and rationalize drug use. Thus inclusion in medical curriculum of topics introducing important concepts of the list of essential drugs, generic drug prescribing and good prescription writing is considered necessary. In this study, most of the analyzed prescriptions included brief diagnosis by consultants (96.9%) and GPs (55.35%), in addition to the history of allergy by consultants (96.6%) and GPs (50%). Concerning dosage regimen, the majority of prescriptions by both prescribers contained related information but still far from ideal. This shows an integral relationship between the prescribing physician and the dispensing pharmacist, as the role of the pharmacist is complementary to that of the physician and the pharmacist role should be to practice his/her skills as a health care provider and attend to deficiencies in prescriptions. A qualified pharmacist is considered an effective health care member and expert in responsible drug use and management in the health care team for the best health outcomes and satisfaction of patients. As opposed to community pharmacists, hospital pharmacists have easier access to the prescribing doctors which helps in reducing misunderstandings and drug dispensing errors. However, the prescribing physician should be easily accessible to both the community pharmacist and the patient and should also practice using the available guidelines for rational drug use.

In the present study, prescribing generics by GPs was very low, therefore we decided to assess the knowledge and perceptions of community pharmacists towards generic medicines. The majority of the respondent community pharmacists were young, with bachelor degree and graduated outside the UAE. Their knowledge about generic and brand drugs was good, but their views and perceptions of certain aspects lacks accuracy. Regarding the gender influence, males were more knowledgeable than females in differentiating between generic and brand drugs. It has been reported that pharmacists who themselves have negative views against generic drugs will not properly educate the patient about generic drugs. In general, patients also have less confidence in generic drugs, because, among other reasons, the packaging of generics does not have acceptable appearance as brand drugs do. It has been reported that a significant disadvantage to the use of generics – and a factor identified as conducive to

continued use of proprietary medicines – was variability in appearance of generics.<sup>[14]</sup> Also some patients insist on certain drugs, because of their previous experience or due to the impact of promotional activity in favor of these drugs. In addition, pharmacists may not promote generics as this may negatively affect their sales. Both physicians and pharmacists who have direct contact with the patients, should be more convinced that generic drugs can have as good quality as brands. Also they themselves should be educated that brand drugs are not necessarily of higher and better quality than generics. The present patients' poor ability to differentiate between generic and brand drugs, could improve tremendously if both the pharmacists and the physicians focus on communicating more with their patients, educate them about the correct selection between generic and brand drugs and inform them that both categories of medicines have similar effectiveness but generics are cheaper. It is also a fact that some patients are with wrong impression that the more expensive the medication, the better its quality and its effectiveness. Similar perception of community pharmacists was evident when compared brand medicines to generics as the majority of them believed that brands are of better quality, more effective and more expensive. On the other hand, they were not sure whether brand medicines are safer, with fewer side effects or produce higher bioavailability than generics. The lower prices of generic medicines may discourage community pharmacists from promoting generics as this may negatively impact sales. However, we observed that slightly more than 50% of participants believed that dispensing generics does not influence the revenue of the pharmacy. Results of the present study demonstrate that the attitude of pharmacists and their behavior while dispensing are in favor of generic medicines. The majority inform their patients on generic drugs, substitute unavailable brands with generics after consultation with the prescriber and their patients willingly accept, believe that prescribers should inform patients on possibility of replacing brand with generic and should indicate in the prescription if brand medicine is necessary. They also believe that dispensing generics would affect the revenue of the pharmacy. Surprisingly enough, the community pharmacists did not agree on suggesting generics to patients with minor illness.

Our results indicate that although knowledge of generic and brand medicines is good among community pharmacists, their perception and attitude may seem inadequate and education of not only pharmacists but also the prescribing physician about generic medicines is required. Moreover increasing awareness of the public of these medications, their similarities to brand name drugs and their possible substitution is urgently needed.

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