

Perception and attitude of general practitioners regarding generic medicines in Karachi, Pakistan: A questionnaire based study

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Abstract

Objectives: In developing countries out-of-pocket payments (OOP) are as high as 80% of healthcare spending. Generic medicines can be instrumental in reducing this expenditure. The current study is aimed to explore the knowledge, perception, and attitude of general practitioners towards generic medicines in Karachi, Pakistan.

Methods: This exploratory, descriptive study was conducted on a sample of 289 randomly selected general practitioners who were dispensing at their private clinics in Karachi, Pakistan. The questionnaires were distributed and collected by hand. Data was entered to SPSS version 17. Fischer's exact test was applied to see the association between variables.

Results: A total of 206 questionnaires were included in the study. A response rate of 71.3% was achieved. Out of 206 respondents, 139 (67.5%) were male while 67 (32.5%) respondents were female. Close to three quarters of the respondents (n= 148; 71.8%) showed correct knowledge about generic medicines being a 'copy of the brand name medicines' and 'interchangeable with brand name medicines' (n= 148; 71.8%). In terms of safety, the majority of respondents (n=85; 41.26%) incorrectly understood that the generic medicines are less safe than brand name medicines. The total percentage of correct responses was seen in 53% of the respondents. More than half of the respondents agreed that locally manufactured medicines are of the same effectiveness as brand name medicines (n=114; 55.4%). Male practitioners with practice experience of 11-15 years showed positive perception towards the quality of multinational products. The Majority of respondents believed that their prescribing decision is influenced by medical representatives (n=117; 56.8%). More than three-quarters of the respondents expressed their wish to prescribe low cost medicines in their practice (n=157; 76.2%). More than one third of the respondents expressed their uneasiness to prescribe products from all local manufacturers (n=72; 35%).

Conclusion: There were gaps identified in the knowledge of respondents. Although good perception and attitude were noted among the respondents, dissemination of information regarding generic medicines may perhaps strengthen generic prescribing. There is a need to introduce 'Quality by Design' concept in local manufacturing units. This, in turn, can inculcate confidence in prescribers towards locally manufactured generic medicines.

Keywords: generic medicines, general practitioner, dispensing doctor, perception, attitude, Karachi, Pakistan

Introduction

The requirements and necessities for healthcare services are towards an upward shift. This is due to ageing population, increased life expectancies as well as new developments in treatment modalities [1]. A worldwide increase in healthcare costs poses a burden of affordability of medicines. In developing countries out-of-pocket payment is as high as 80% of healthcare spending [2]. In Pakistan the healthcare spending is less than 3% of GDP and healthcare is mostly financed by private out-of-pocket payments [3]. More than 50% of the population of Pakistan earns less than USD \$ 2 per day. This huge segment of population struggles to afford both prescription and non-prescription medicines. Recently, a sharp increase in medicine prices makes the situation more vulnerable to a large segment of the population in Pakistan [4].

A large body of evidence suggested the significance of generic medicine utilization as a measure to improve affordability and healthcare budgets [5, 6]. In Pakistan the Government has highlighted the importance to market medicines by using their generic names [7].

Chronology of generic medicines in Pakistan

In 1972, Pakistan undertook the task to promote generic competition. The Pakistani Drugs Act (Generic Names) was implemented in 1972 [8]. According to the Act, the prescription by brand or patented name, and manufacturing and selling of medicines under a proprietary name was forbidden [8]. The objective of the government was to put local manufacturers in competition with multinational companies. This was expected to cause a decrease in medicine prices. However there was no significant fall in medicine prices because the competition was shifted from price to quality. Therefore, in 1976, Director General of Health issued orders for another Drug Regulating Act, which terminated the compulsive requirement of manufacturing and marketing drugs by generic names and imposed stringent manufacturing licensing requirements [8].

Justification of the Study

The pharmaceutical market of Pakistan enjoys equal division of both domestically produced generic drugs and imported branded prescription pharmaceuticals [9]. The Pakistan Pharmaceutical Manufacturers Association (PPMA) quoted total market share of domestic industry, which is 70-85% by volume and 55% by value. These figures are now shifted more in favor of domestic production [10]. As some major innovators will lose their patent in the near future, the generics-dominated domestic industry is presumably to be benefited more. The utilization of generic medicines in Pakistan is dismally low [11]. It is thus, important to explore those contemporary issues which surround underutilization of generic medicines in Pakistan.

In developing economies, apart from community pharmacies, dispensing of medicines is also done at private clinic of doctors. In the context of healthcare systems within Pakistan, healthcare services are generally received from public and private hospitals

but physicians are still undertaking private practice. These general practitioners (GPs) or private practitioners are not only involved in the diagnosis of disease but they also dispense at their private clinic. They make a large share of their income by dispensing through their clinics [12]. This may be for a number of reasons; possibly monetary gains, unavailability of pharmacy services around the area, or either due to the absence of a pharmacist at community pharmacies [12]. Thus, doctors in Pakistan exercise strong influence on both prescribing and dispensing. In spite of this it is not known how doctors in Pakistan perceive and prescribe generic medicines in their practice.

Several studies have been conducted globally to explore the understanding, views and attitudes of doctors towards generic medicine prescribing [13]. Hassali et al have learned that doctors show an understanding towards generic medicine use and are therefore, inclined to prescribe generic medicines with some uncertainties related to quality, safety and efficacy [13]. There is a need to do similar research in developing countries where low cost generic medicine is the most important viable option for the majority of the population. Factors preventing and facilitating general practitioners from prescribing and dispensing generic medicines need to be explored in the context of Pakistan. Keeping in view this background and the paucity of data surrounding prescribing patterns in Pakistan, this study aims to clarify these issues.

Objectives

The objectives of this study are:

- (i) To evaluate the knowledge, perception, and attitude of general practitioners regarding generic medicines
- (ii) To explore the factors hindering and favoring generic drug prescribing in general practitioners

Methods

Study Population, Sampling, and Sample Size

This is a descriptive, exploratory study, which was conducted among the general practitioners who were dispensing at their private settings in Karachi. The participants were randomly selected from the list of general practitioners, Karachi branch, supplied by the Forum of General Medical Practitioners (FGMP). In this study we wanted to focus on those GPs who not only prescribe but also dispense at their private clinics. Therefore, in order to confirm the list, we contacted the pharmaceutical companies, which generally possess the practicing addresses and mobile numbers of GPs. All the GPs who participated in the study were also involved in dispensing at their private clinics. In this study the method of verifying GPs via a list of addresses and telephones was adopted by a previous study undertaken with GPs in Karachi [14]. We took a random sample by means of a Random Number Generator. Total number of GPs who were dispensing at their clinics was found to be 705. Using raosoft sample size calculator, the sample size was determined to be

249 with an 80% power and 5% significance level. The sample size was increased to 289 to account for a possible non-response rate. Therefore, 289 questionnaires were distributed by hand to general practitioners in Karachi and collected on the same day. No incentives were offered to the participants.

Data collection

The questionnaire was formed on the basis of qualitative research [15]. The questionnaire was piloted on 10 doctors. On the basis of responses obtained from the pilot tests, minor changes were made. Items which lacked clarity and comprehensiveness were deleted. In order to evaluate the internal consistency, Cronbach’s alpha was computed. For the knowledge domain it was found to be 0.645. In the case of perception and attitude domains, it was found to be 0.625.

The questionnaire consisted of four parts. The first part was about sociodemographic and background characteristics of the participants. This covered age, gender, educational qualification, postgraduate qualification, number of years practicing as a GP, area of practice, average number of patients per day, and average number of medical representative visits per month.

Table 2: Knowledge of generic medicines among general practitioners

Statements	Correct Responses n (%)	Incorrect Responses n (%)
Generic medicines are copy of brand name medicines	148 (71.8)	58 (28.2)
Generic medicines are interchangeable with brand name medicines	148 (71.8)	58 (28.2)
Generic medicines are therapeutically equivalent to brand name medicines	115 (55.8)	91 (44.2)
Generic medicines must be in the same dosage form (such as tablet, capsule) as brand name medicines	156 (75.7)	50 (24.3)
Generic medicines are less safe than brand name medicines*	121(58.7)	85 (41.3)
Only those generic medicines are safe which are made by some local reputable manufacturers*	58 (28.2)	148 (71.8)
Generic medicines are available in the market of Pakistan	164 (79.6)	42 (20.4)
Generic medicines are manufactured after the patent expiry of originator/innovator	88 (42.7)	118(57.3)
Brand name medicines are of good quality than generic medicines*	59 (28.6)	147 (71.4)
Brand name medicines are required to meet higher safety standards than generic medicine*	77 (37.4)	129 (62.6)
Brand name medicines produce lesser side effects than generic medicines*	66 (32.0)	140 (68.0)
Low-priced medicines are as effective as high-priced medicines	113 (54.9)	93(45.1)

*Items are negatively coded

The third part addressed the perceptions of general practitioners about generic medicines. This included 14 statements on the views about safety, quality and efficacy of generic medicines and the reputation of local manufacturers and their low-cost brands. The fourth part evaluated the attitude of general practitioners towards generic medicine prescribing. This included 12 statements on prescribing attitude in light of the socioeconomic condition of the patient, patients’ demands, influence of medical representatives, as well as quality in local manufacturers’ brands. Perception and attitude domains have response categories on Likert scale: 5=strongly agree, 4=Agree, 3=neither disagree nor agree, 2=Disagree, 1=Agree.

It is important to mention that during the study no question was asked from the respondents about the bioequivalence criteria for locally manufactured generics.

Ethical consideration

Informed consent was sought from every participant. They was informed that participation is voluntary and that confidentiality would be maintained. It was further explained to them that at any point they could withdraw their participation from the study. Moreover in Pakistan, questionnaire-based studies do not need any Ministry of Health endorsement. Despite that, prior information was sent to the then Ministry of Health, Government of Pakistan for the execution of this research among GPs who were also dispensing at their clinics in Karachi.

Statistical Analysis

All the data were entered into the Statistical Package for Social Sciences (SPSS, version 17). Descriptive statistics were performed to evaluate the sociodemographic characteristics of the respondents. Fisher’s exact test was applied to see the association between variables. A default Monte Carlo Simulation in SPSS software was used to reach Fisher’s exact p values because the data was considerably big and, therefore, normal exact computations need more time and computer memory. A p value of less than 0.05 was considered to be statistically significant.

In the domain of knowledge only descriptive statistics were applied. In other domains, the variables were tested to see the association with age, sex, and years of practice. Fishers’ exact test was applied to see the association between dependent and independent variables.

Results

A total of 209 questionnaires were returned. Three questionnaires were found to have missing values in demographics as well as other domains of attitude and perception and, therefore, discarded. Thus, a total of 206 questionnaires were included in the study. A response rate of 71.3% was achieved. Ash and associates (1997) reported that in published studies of physicians the response rate was only 54% [16] therefore the response rate of 71.3% is considered acceptable.

Out of 206 respondents, 139 (67.5%) were male while 67 (32.5%) respondents were female. The majority of respondents (n=79) were in the age range of 20-30 (38.3%) and 31-40 (n=52; 25.2%). The detailed demographic characteristics and practice information are shown in Table 1.

Table 1: Demographic characteristics of general practitioners

Characteristics		Frequency (%)	
Age range	20-30	79 (38.3)	
	31-40	52 (25.2)	
	41-50	56 (27.2)	
	>50	19 (9.2)	
Gender	Male	139 (67.5)	
	Female	67 (32.5)	
Basic Medical Qualification	MBBS	196 (95.1)	
	MD	10 (4.9)	
Postgraduate Qualification	Yes	100 (48.5)	
	No	106 (51.5)	
Experience	1-5	93 (45.1)	
	6-10	39 (18.9)	
	11-15	26 (12.6)	
	16-20	28 (13.6)	
	>20	20 (9.7)	
Average number of patients per day	1-30	114 (55.3)	
	31-60	68 (33.0)	
	61-90	20 (9.7)	
	>90	4 (1.9)	
Locality of Practice	Urban	147 (71.4)	
	Peri-urban	59 (28.6)	
Average number of medical representatives' visits per month	Multinational	1-10	196 (95.1)
		11-20	7 (3.4)
		>20	3 (1.5)
	Local	1-10	166 (80.6)
		11-20	32 (15.5)
		>20	8 (3.9)

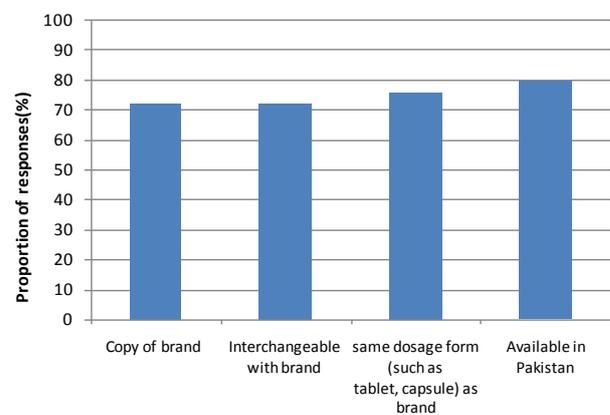
Knowledge of Generic Medicines

When the respondents were asked about the basic information regarding generic medicines, close to three quarters of respondents (n= 148; 71.8%) answered 'yes' that generic medicines are the copy of the brand name medicines and they are interchangeable with brand name medicines. When the respondents were questioned about the manufacturing

of generic medicines, more than half of the respondents (n=118; 57.28%) answered 'yes' that 'generic medicines are manufactured after patent expiry or innovator'. In terms of safety, the majority of respondents (n=85; 41.26%) answered 'no' that generic medicines are less safe than brand name medicines. In terms of quality, more than two thirds of the respondents (n=147; 71.35%) answered 'no' that 'brand name medicines are of better quality than generic medicines'. All the responses are indicated in Table 1 as correct and incorrect answers.

The total percentage of correct responses regarding knowledge of generic medicines was seen in 53% (n=110) of the respondents. The maximum number of correct responses was obtained from the statements pertaining to the basic knowledge and availability of generic medicines (Figure 1).

Figure 1: Maximum Number of Correct Responses (GM=Generic Medicine)



Perception about Generic Medicines

Table 3 represents the outcome of items in perception with respect to independent variables. When GPs were asked about the affordability of generic medicines, the majority of respondents agreed that generic medicines are more affordable than brand name medicines (n=188; 91.2%). More than half of the respondents agreed that locally manufactured medicines are of the same effectiveness as brand name medicines (n=114; 55.4%). This showed a statistically significant value with respect to age (p=0.015) and years of practice (p=0.018). Those who were in the age range of 41-50 and have been in private practice for 16-20 years showed greater significant association. Similarly, when respondents were questioned about the side effects, they disagreed that generic medicines produce more side effects than brand name medicines (n=99; 48%). This showed statistical significance with respect to age (p=0.023). Greater association was observed in respondents of more than 50 years of age. A large majority of respondents showed positive perception towards the safety of low-priced medicines (n=126; 61.2%). This indicated statistical significance with respect to age (p=0.019) with positive perception higher in the middle age range of 41-50 years.

Interestingly, in terms of quality, more than half of the respondents viewed multinational products of better quality than local company products (n=123; 59.7%) and this indicated significance with gender (p=0.034) and years of practice (p=0.021). Male general practitioners with practice experience of 11-15 years showed positive perception towards the quality of multinational products. The majority of respondents believed that their prescribing decision is influenced by medical representatives (n=117; 56.8%). This demonstrated significance

with respect to age (p=0.009). This perception is mainly expressed by general practitioners of middle age group. In terms of perception regarding the reputation of local manufacturers a large majority of the doctors viewed some of the local companies as reputable generic manufacturers (n=130; 63.1%). This view showed significance with respect to age (p=0.019) and greater association was again expressed by middle age doctors of 41-50 years.

Table 3: Perception of general practitioners towards generic medicines

Statements	Agree n (%)	Neutral n (%)	Disagree n (%)	Age ^a	Gender	Exp ^b
I believe that locally manufactured medicines are more affordable than brand name medicines	188 (91.2)	9 (4.4)	9 (4.4)	0.847	0.931	0.908
I believe that locally manufactured medicines are of same effectiveness as brand name medicines	114 (55.4)	42 (20.4)	50 (24.2)	0.015*	0.758	0.018*
I view generic medicines of low quality than brand name medicines	81 (39.3)	49 (23.8)	76 (36.9)	0.142	0.702	0.604
I think generic medicines produce more side effects than brand name medicines	55 (26.7)	52 (25.2)	99 (48.0)**	0.023*	0.390	0.060
I believe low-cost medicines are as safe as high-priced medicines	126 (61.1)	36 (17.5)	44 (21.3)**	0.019*	0.317	0.249
I believe that multinational products are of good quality than local company products	123 (59.7)	49 (23.8)	34 (16.5)	0.152	0.034 *	0.021*
I believe that my prescribing decision is influenced by medical representatives	117 (56.8)	43 (20.9)	46 (22.3)	0.009 *	0.534	0.282
I believe that all the local companies in Pakistan are not following Good Manufacturing Practices (GMP) guidelines as multinationals	111 (53.9)	59 (28.6)	36 (17.5)	0.303	0.001 *	0.258
I view few local companies as reputable generic medicine manufacturers	130 (63.1)	45 (21.8)	31 (15.1)	0.019 *	0.211	0.515
I believe that doctors should be educated more about prices of medicines	183 (88.8)	13 (6.3)	10 (4.9)	0.006 *	0.406	0.017 *
I believe that doctors should be given incentives to write generic names	69 (33.5)	49 (23.8)	88 (42.7)	0.012 *	0.564	0.006*
I believe that generic medicines are only meant for poor	73 (35.4)	41 (19.9)	92 (44.7)	0.613	0.161	0.695
I think that confidence should be built in the patient about the low-cost brand	149 (72.3)	40 (19.4)	17 (8.3)	0.320	0.984	0.859
I believe that it is easier to remember a brand name medicine	124 (60.2)	39 (18.9)	43 (20.9)	0.366	0.416	0.879

^aAge range: (20-30); (31-40); (41-50); greater than 50

^bExperience: (1-5); (6-10); (11-15); (16-20); greater than 20

* p<0.05;

**Total percentage may not add to 100 because of rounding.

Attitude towards Generic Medicines

Although more than three-quarters of the respondents expressed their wish to prescribe low cost medicines in their practice (n=157; 76.2%), approximately half of the respondents showed their hesitancy to prescribe low cost brands in some therapeutic categories (n=108; 52.4%). This showed statistical significance with respect to experience (p=0.013) and is shown in Table 4. General practitioners who have more than 10 years of practice experience expressed their doubtfulness towards the

prescribing of low cost brands among some specific therapeutic classes. More than one third of the respondents expressed their discomfort to prescribe products from all local manufacturers (n=72; 35%) and this was found to be statistically significant with respect to age (p=0.038). Older general practitioners expressed greater sense of discomfort to prescribe all local manufacturers' products when compared to their younger and middle age counterparts. In the case of lack of quality check in locally manufactured products more than half of the

respondents expressed their concern towards lack of quality check in locally manufactured products (n=109; 52.9%). This was found to be in strong association with age (p=0.005) and experience (p=0.017). Highly experienced and older general practitioners expressed their concern about the quality check of locally manufactured medicines.

Table 4: Attitude of general practitioners towards generic medicines

Statements	Agree n (%)	Neutral n (%)	Disagree n (%)	Age ^a	Gender	Exp ^b
I wish to prescribe low cost medicines in my practice	157 (76.2)	20 (9.7)	29 (14.1)	0.135	0.061	0.053
I am concern about the therapeutic failures that are serious problems with some locally manufactured medicines	130 (63.1)	41 (19.9)	35 (17.0)	0.307	0.281	0.146
I am hesitant to prescribe low-cost brands in some specific therapeutic classes in my practice	108 (52.4)	44 (21.4)	54 (26.2)	0.264	0.210	0.013*
I feel that the socioeconomic condition of my patient influence the prescription	163 (79.1)	23 (11.2)	20 (9.7)	0.825	0.597	0.974
I am comfortable to prescribe products from all local manufacturers	68 (33.0)	66 (32.0)	72 (35.0)	0.038*	0.26	0.074
I feel that my personal experience with medicines influence my prescribing decisions	151 (73.3)	29 (14.1)	26 (12.6)	0.308	0.751	0.318
I feel that patient's demand of medicine influence my prescription	97 (47.1)	50 (24.3)	59 (28.6)	0.429	0.685	0.538
I feel that medical representative is a good source of information for me	158 (76.6)	24 (11.7)	24 (11.7)	0.415	0.860	0.895
I feel that pharmaceutical companies' premium offers (gifts) influence my prescribing behavior	62 (30.1)	54 (26.2)	90 (43.7)	0.021*	0.700	0.548
I feel a lack of quality check in locally manufactured products	109 (52.9)	71 (34.5)	26 (12.6)	0.005*	0.167	0.017*
I am comfortable if the brand name medicine in prescription is changed by drug seller or pharmacist	52 (25.2)	21 (10.2)	133 (64.6)	0.126	0.882	0.210
I offer my patients generic medicines	129 (62.6)	46 (22.3)	31 (15.0)**	0.062	0.935	0.389

^aAge range: (20-30); (31-40); (41-50); greater than 50

^bExperience: (1-5); (6-10); (11-15); (16-20); greater than 20

* p<0.05;

**Total percentage may not add to 100 because of rounding.

Discussion

This study is the first of its kind in Pakistan to explore the understanding, perception, and attitude of general practitioners towards generic medicine utilization including factors which hinder and favor generic prescribing. The findings of the qualitative phase identified gaps in knowledge about the availability of generic medicines in Pakistan [15]. Moreover, in the qualitative phase, mixed perception and attitudes were identified towards generic medicine utilization. Some of the major implicating factors like quality, therapeutic efficacy, and distrust in local manufacturers were identified as barriers to prescribing generic medicines. Few of the contributory factors like socioeconomic condition of the patient and the influence of medical representatives were considered to be strong advocators of generic prescribing [15].

A response rate of 71.3% was achieved. The current response rate (71.3%) is counted as one of the strengths of study. In addition, Kellerman and Herold (2001) reported that non-response bias may be of less concern in physicians. This is because physicians are considered to be consistent in opinion regarding understanding, views, attitudes, training, and behavior [17].

According to the present quantitative analysis, there were gaps identified in the knowledge of generic medicines. Misunderstandings were identified about the safety, efficacy and quality of generic medicines. Nearly similar findings were reported by studies done in Australia [18], Iraq [19], and Malaysia [20]. This sparse understanding among GPs was not surprising as information gaps need to be filled initially. This could be done at undergraduate training level by making curricular innovations. We, therefore, suggest introducing a module on

Policy Awareness Interactive Discussion (PAID) as curricular innovation. This should provide basic information on health policy, pharmaceutical policy, essential drug list, innovators and generic medicines, and their availability and affordability. Later this should be followed by interactive discussion sessions among policy makers, policy analysts and future medical practitioners.

In the case of GPs, the Medical Associations and Medical Council in collaboration with the Government of Pakistan should distribute wall hangings for their private clinics. These wall hangings should be inscribed with basic facts about generic medicines. In Pakistan, only 50% of medicines are prescribed as generics [21]. Herein lies an opportunity for expansion of utilization in terms of generic prescribing. This baseline study attempts to elucidate which factors hinder and favor generic medicine prescribing.

We observed that GPs believed that locally manufactured medicines are more affordable and of the same effectiveness when compared to brand medicines. We also observed from our findings the economic condition of the patient as well as their demand influence the prescribing behavior. We tried to link those responses. This showed that GPs positive attitudes could be due to the compelling needs of patients, which make the inherent persuasive power of GPs work for prescribing. This is further confirmed by our findings which showed that the large majority of GPs reported concerns for quality check in locally manufactured medicines. This concern for quality was also supported in a recent US study [22]. A system is needed to ensure the quality of generics. The Government of Pakistan should be prompted to develop trust for local manufacturers. This could be done by conducting bioequivalence studies in some of the specific therapeutic classes and disseminate information about the similarity of both generic and brand medicines. Furthermore the government can play a positive role by means of communication messages, pamphlets and flyers about generic medicines. This could be put in line with persuasive communication theory. It is the theory that endeavors to explicate how behavior is affected by communication and attitude processes. This paradigm explains the underlying flow of doctors' behavior from communication to attitude and behavior. The aim of persuasive communication is to influence the doctor and to change the attitude. Thus, the essential intent of persuasive communication is attitude change.

In both qualitative [15] and quantitative phases doctors admitted that the persuasion of medical representatives affected their prescribing patterns and prescribing decision. Interestingly, a large body of evidence suggested that medical representatives are a good source of information and pharmaceutical industries and their representatives do have direct and indirect effect on prescribing outcomes [18, 23-29]. On the contrary, a study conducted on GPs in the UK denied any undue impact of drug representatives on their prescribing [30]. Rather than to decide on the awkward demands of industries, the prescriber must remember that generally industries run on the decades old

notion of Milton Friedman (1970); that the social responsibility of any business is to amplify its gain [31]. Furthermore, previously published studies suggested that GPs consider commercial sources of drug information more powerful than non-commercial information sources [32] [33]. We propose a system where non-commercial sources of information for doctors should be promoted. Journals, product monographs, non-commercially sponsored CME programs could be useful to seek information. A 24x7 Drug Information Center (DIC) at a national level which expect to foster dissemination of unbiased information will pave the way for rational prescribing. One of the convincing findings in this study is the doctors' expectations to be educated more about the prices of medicines. This is in concordance with the previous studies done in USA and Ireland in which physicians' understanding of the cost is an important determinant in prescribing, awareness about the cost of medicines, as well as the need of interventional strategies and educational activities are prerequisites to make doctors cost-effective prescribers [34, 35]. Moreover, Howell (2007) reported that understanding drug cost is an important element of best possible prescribing [36]. We endorsed the suggestions of Cooke (2010) which highlighted the significance of a basic understanding of healthcare financing and cost-consciousness among future medical practitioners [37].

Lastly we propose to introduce 'Quality by Design' (QbD) concept for our local manufacturing units. The Government of Pakistan and the pharmaceutical industry must exercise collaborative efforts to promote this FDA proposed concept of pharmaceutical QbD. This is to introduce quality into end product by establishing cGMP compliant manufacturing plants. This will perhaps inculcate trust in prescribers towards locally manufactured generic medicines.

We identified some limitations in the study which should be taken into account.

The study was performed in only one city of Pakistan. Therefore, the current findings cannot be generalized to doctors practicing in other cities of Pakistan. Despite the study being conducted in the largest city of Pakistan, there was limited access to doctors practicing in military cantonment areas and slum areas. This, furthermore, limits the generalizability of the findings. Due to the self-report format of questionnaires, we cannot rule out the possibility of social desirability bias. If the study participants had been interviewed personally by the principal researcher along with a team of research students the study bias may have been minimized.

Conclusion

The current quantitative approach identified gaps in knowledge of generic medicines among general practitioners who are dispensing at their private clinics. Generally, good perceptions and attitudes were observed in the study. Barriers like lack of quality in generic medicines and distrust in local manufacturers were found to be implicated in generic prescribing.

Socio-economic condition of the patient and the influence of medical representatives were some of the cited measures to favor generic prescribing. Therefore, in order to have a better understanding and perception of generic medicines the doctor must be well-informed about the quality, efficacy, and safety standards of generic medicines during their academic and professional career.

Authors' contributions

SQJ, MIMI, MAH, and ZUDB were involved in conceptualizing the study. All authors contributed to paper's design and production. All authors participated in the critical revision and have approved the final version for submission.

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Conflict of Interest

None

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