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Perspective of healthcare professionals regarding quality, safety, efficacy and price of local vs. multinational manufactured anti-diabetic & anti-hypertensive brands in Pakistan

Abstract

Introduction: The economic benefits of the use of generic medicines cannot be denied, their use is essential to control healthcare spending especially in treatment of chronic diseases.

Objective: The main objective of the study was to evaluate perceptions of prescribers, pharmacists, and nurses regarding quality, safety, efficacy and price of locally as well as multinational manufactured brands used for treatment of hypertension and type II diabetes in twin cities i.e. Islamabad (Federal Capital) and Rawalpindi (Twin City), Pakistan.

Methodology: A descriptive cross-sectional study design was used. A validated semi-structured questionnaire was distributed to a total sample of 814 healthcare professionals including physicians (n=293), pharmacists (n=346) and nurses (n=173) using convenience sampling technique. After data collection, data was cleaned, coded and analyzed statistically.

Results: Nearly half of the physicians (46.4%, n=36) were of the view that most of the time low cost anti-hypertensive and anti-diabetic brands are being prescribed in Pakistan. Less than half of the pharmacists (40.1%, n=139) were of the view that most of the time pharmaceutical sales representatives can serve as a source of information for quality, safety, efficacy and price of anti-hypertensive and anti-diabetic brands. Most of the physicians (42.3%, n=124) agreed that patient compliance is comparatively one of the major reason for prescribing/ procurement of the locally manufactured anti-hypertensive and anti-diabetic brands in routine practice.

Conclusion: The results of the present study concluded that physicians and pharmacists positively supported the use of locally manufactured brands whereas majority of the nurses preferred brands manufactured by multinational companies for treatment of diabetes and hypertension.

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Introduction

The increasing prevalence of diabetes and hypertension are major concerns to be addressed in Pakistan. The pattern for the treatment of these non-communicable diseases usually include at least two to three drugs per prescription which has seriously raised concerns regarding the affordability in the country.[1] The Generic Drug Act was introduced in 1972 but it had to be retracted in the wake of strong opposition by the commercial sector and the medical community. Although, the purpose of this act was to increase competition between local and multinational manufacturers in order to make the medicines affordable by controlling the medicine prices but apprehensions regarding lack of clear pricing formula were observed as the existing pricing practice was based on reported price of inputs.[2,3] This resulted in wide price unpredictability and was thought to also create opportunities for collusion to obtain high prices due to which this act was revoked in Pakistan. However, use of low priced medicines whether with generic name or brand can be vital for reducing the treatment cost as 77% of the population of the country spends out of pocket on healthcare and the income is less than Rs.500 (3 dollars) per day.[4]

Medicines procurement and prescribing with brand names has become common practice in public sector. Due to high priced branded medicines prescribers tend to prescribe low cost locally manufactured medicines. But still many prescribers believe that low cost medicines are of low efficacy and not aesthetically good in packaging. Brand substitution is a continuing phenomenon at community pharmacy practice in Pakistan.[4,5] However, generic substitution is not allowed by law in the country, but still pharmacists and dispensers are by passing doctors' prescriptions in this regard without doctors' consent. Proprietary products have been currently included in National Essential Drug List (NEDL) which is costly for majority of the population. There is lack of generic policy for promoting generics and improving consumer awareness along with introducing incentives for prescribers and pharmacists for prescribing and procuring generics.[6] Pricing policy of generic medicines needs to be formulated and implemented according to the needs of healthcare system of Pakistan. There is lack of quality control testing and pre-clinical trials at the time of registration of generic medicines. Safety and efficacy of locally manufactured brands needs to be ensured through proper quality control testing and stability studies.[7] There is limited data available

regarding safety, quality, efficacy and price of locally manufactured anti-hypertensive and anti-diabetic brands in Pakistan. Moreover, current practice of healthcare professionals regarding quality, safety, efficacy and price of locally manufactured brands have not been extensively explored in Pakistan. Besides this nurse as the key players in providing health services, greatly impact on the health of a society, their perceptions regarding the quality, efficacy and safety of locally manufactured medicines needs to be highlighted. Thus, the present study was designed to explore the perceptions of physicians, pharmacists and nurses regarding quality, safety, efficacy and price issues related to antihypertensive and anti-diabetic brands in Pakistan.

Methodology

A descriptive cross-sectional study design was used to evaluate the perceptions of different healthcare professionals (prescribers, pharmacists & nurses) regarding quality, safety, efficacy and cost issues related to anti-hypertensive and anti-diabetic brands in twin cities i.e. Islamabad (Federal Capital) and Rawalpindi (Twin City) of Pakistan. Approval was obtained for the study from the Ethical Committee of Hamdard University. Moreover in Pakistan, questionnaire-based studies do not need any endorsement from Ministry of Health. Despite that, prior information was sent to the Ministry of Health, Government of Pakistan for the execution of this research. Beside this, approval for the data collection was also taken from Medical Superintendent of hospitals, chief executives of pharmaceutical industries, proprietors of community pharmacies, director of pharmacy institutions and respective heads of regulatory authorities.

Study population, sample size and sampling of respondents

This study was conducted from May to August 2017. Physicians, Nurses and Pharmacists working in industry, academia, regulatory, hospitals, retail pharmacies, public and private health care facilities located in twin cities (Islamabad and Rawalpindi) were included as study respondents. Calculation of sample size was performed using Rao Soft sample size calculator to determine the size of sample that represented the population. The calculated sample size was 382 for each group of respondents as to achieve 95% confidence interval with 5% margin of error. The total sample came to be 1146. But due to unavailability of respondents at community pharmacies and reluctance to participate the total sample size achieved for each group of healthcare professionals was: prescribers (n=293), nurses (n=173) and pharmacists (n=346).The response rate for the healthcare professionals was: prescribers (76.7 %), nurses (45.2%) and pharmacists (90.5%). Convenient sampling technique was used to select the respondents.

Study tool

A semi-structured questionnaire was developed with the help of extensive literature review and focused group discussions. The questionnaire was comprised of seven sections. Section I includes demographic data. Section II includes eight questions regarding the quality, safety & price of locally manufactured anti-hypertensive & anti-diabetic medicines. A 5-point Likert scale where 1=strongly disagree, 2=disagree; 3=neutral, 4=agree and 5=strongly agree has been used. Section III includes 17 questions regarding practice that is usually carried for prescribing/procuring locally manufactured anti-hypertensive and anti-diabetic medicines. A 4-point Practice scale has been used i.e. 1=yes most of the time, 2=yes some of the time, 3=not very often, and 4=no never. Section IV includes the efficacy of commonly prescribed anti-hypertensive and anti-diabetic brands scoring as 1= least effective and 2=most effective. Section V includes comparison of local and multinational companies in terms of quality, safety and price of their products scoring 1=as least considered and 5=most considered. Section VI includes opinion regarding the role of Drug Regulatory Authority of Pakistan /Ministry of Health in the regulation of quality, safety and price of locally manufactured anti-diabetic and anti-hypertensive medicines in Pakistan. Section VII includes suggestions to improve quality, safety, efficacy and price of locally manufactured anti-hypertensive and anti-diabetic brands.

Reliability & validity of tool

Face and content validity of the tool was conducted by the panel of experts through two focus group discussions held at different time intervals. The experts included pharmacists involved in formulating pricing policy of medicines in DRAP, community pharmacists, hospital pharmacists along with prescribers and nurses involved in Drug & therapeutic committee. Beside this pilot testing was conducted on 10% of the sample to confirm the reliability of the tool which showed Cronbach alpha value 0.768.

Data collection and analysis

Two teams, one in each city, with 10 data collectors in each team, were trained by the group of experts including the principal investigator. The questionnaires were self-administered to the respondents. Questionnaires were collected back on the same day to avoid study biasness. After data collection, data was cleaned, coded and entered in SPSS version 21. Skewness test was performed and histogram with normal curves was used to check the normal distribution of data. Descriptive statistics comprising of frequency and percentages was calculated. Chi-square test ($p \geq 0.05$) was performed to find out association among different variables.

Results

Out of 812 respondents, 21.3% (n=173) were nurses, 42.6% (n=346) were pharmacists and 36.1% (n=293) were prescribers. Out of the total respondents, 55.2% (n=448) were males while 44.8% (n=364) were females. Thirty five percent (n=280) of the total respondents were working in public sector while 65.5% (n=532) were working in private sector. Of the total respondents, 22.5% (n=183) were from industry, 61.5% (n=499) were from hospital, 6.4% (n=52) were from clinics, 2% (n=16) were from community pharmacies, 3% (n=24) were from regulatory, 1.7% (n=14) were from sales and marketing and 3% (n=24) were from academia. Regarding the experience of respondents, 29.4% (n=239) had working experience of less than or equal to one year, 44% (n=357) had working experience of 2-5 years, 17.4% (n=141) had an experience of 6-9 years while 9.2% (n=75) had working experience of equal to or greater than 10 years (Table 1).

The results of the current study highlighted that majority of pharmacists (69.8%, n=243) were of the view that locally manufactured anti-hypertensive and anti-diabetic brands are more affordable than multinational brands. More than half of the physicians (55.6%, n=163) agreed that low-cost anti-hypertensive and anti-diabetic brands are as safe as high-priced brands. Majority of the physicians (76.4%, n=224) were of the view that health care professionals should be educated more about quality, safety and prices of brands. Significant association ($p \leq 0.05$) was found in perceptions of healthcare professionals working on different organizational positions (Table 2).

The results of the current study highlighted that less than half of the physicians (46. 4%, n=136) were of the view that most of the time low cost anti-hypertensive and anti-diabetic brands are being prescribed/procured in the current practice of Pakistan. Out of the total pharmacists (40.1%, n=139) were of the view that most of the time pharmaceutical sales representatives can serve as a source of information for quality, safety and price of anti-hypertensive and anti-diabetic medicines. Of the total physicians (42.3%, n=124) agreed that patient compliance is comparatively one of the major reason for prescribing/ procurement of the locally manufactured anti-hypertensive and anti-diabetic brands in routine practice. Significant association ($p \leq 0.05$) was found in perceptions of healthcare professionals working on different organizational positions (Table 3).

The results of the current study highlighted that more than half of the pharmacists (53.4%, n=185) were of the view that getformin is an effective anti-diabetic medicine. Moreover, 43.6% (n=151) of the pharmacists were of the view that capoten is an effective anti-hypertensive medicine. Significant association ($p \leq 0.05$) was found in perceptions of healthcare professionals working on different organizational positions (Table 4).

The results of the current study highlighted that 38.1% (n=66) of the nurses were of the view that GSK has effective anti-hypertensive and anti-diabetic products in terms of quality, safety and price while 23.1% (n=80) of the pharmacists were of the view that GSK has effective anti-hypertensive and anti-diabetic products in terms of quality, safety and price. Significant association ($p \leq 0.05$) was found in perceptions of healthcare professionals working on different organizational positions (Table 5).

Table 1 Demographic characteristics

	Indicator	n (%)		Indicator	n (%)
Age	20-29 Y	545(67.1)	**Level of Experience**	≤1 Year	239(29.4)
	30-39 Y	197(24.3)		2-5 Years	357 (44)
	40-49 Y	50(6.2)		6-9 Years	141(17.4)
	≥50 Y	20(2.5)		≥10 Years	75(9.2)
Field of Practice	Industry	183(22.5)	**Level of Qualification**	MBBS	275(33.9)
	Hospital	499(61.5)		BDS	15(1.8)
	Clinics	52(6.4)		Pharm.D	299(36.8)
	Community	16(2)		M.Phil	40(4.9)
	Regulatory	24(3)		PhD	6(0.7)
	Marketing & Sales	14(1.7)		Nursing	173(21.3)
	Academia	24(3)		Others	4(0.5)
Gender	Male	448(55.2)	**Current position in Organization**	Nurse	173(21.3)
	Female	364(44.8)		Pharmacist	346(42.6)
Marital status	Married	333(41)		Physician	293(36.1)
	Unmarried	479(59)	**Sector**	Public	280 (34.5)
				Private	532(65.5)

Table 2 Perceptions of healthcare professionals regarding quality, safety and price of locally manufactured anti-hypertensive and anti-diabetic brands

Variables	Field of practice	Strongly disagree n (%)	Neutral n (%)	Strongly agree n (%)	+ p-value
I believe that locally manufactured anti-hypertensive and anti-diabetic medicines are more affordable than multinational medicines.	Nurse	25(14.4)	61(35.2)	87(50.2)	
	Pharmacists	71(20.4)	32(9.19)	243(69.8)	0.001
	Physician	38(12.9)	65(22.1)	190(64.8)	
I think locally manufactured anti-hypertensive and anti-diabetic medicines produce more side effects than multinational medicines.	Nurse	43(24.8)	53(30.6)	77(44.5)	
	Pharmacists	155(44.7)	80(23.1)	111(32)	0.002
	Physician	69(23.5)	93(31.7)	131(44.7)	
I believe low-cost hypertensive and medicines are as safe as high-priced medicines.	Nurse	53(30.6)	61(35.2)	59(34.1)	
	Pharmacists	116(33.5)	70(20.2)	160(46.2)	0.003
	Physician	66(22.5)	64(21.8)	163(55.6)	
I believe that prescribing decision for anti-hypertensive and anti-diabetic medicines is influenced by companies marketing techniques.	Nurse	31(17.9)	71(41)	71(41)	
	Pharmacists	59(17)	59(17)	228(65.8)	0.001
	Physician	63(21.5)	63(21.5)	144(49.1)	

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Table Continued...

Variables	Field of practice	Strongly disagree n (%)	Neutral n (%)	Strongly agree n (%)	+ p-value
I believe that the local companies in Pakistan are not following Good Manufacturing Practices (GMP) guidelines as multinationals companies for the manufacturing of anti-hypertensive and anti-diabetic medicines.	Nurse	35(20.2)	64(36.9)	74(42.7)	0.008
	Pharmacists	93(26.8)	72(20.8)	181(52.3)	
	Physician	61(20.8)	83(28.3)	149(50.8)	
I consider few local companies as reputable anti-hypertensive and anti-diabetic medicine manufacturers.	Nurse	26(15)	61(35.2)	86(49.7)	0.001
	Pharmacists	54(15.6)	74(21.3)	218(63)	
	Physician	42(14.3)	51(17.4)	200(68.2)	
I believe that health care professionals should educate more about quality, safety and prices of medicine.	Nurse	24(14.3)	46(26.5)	103(59.5)	0.001
	Pharmacists	49(14.1)	51(14.7)	246(71)	
	Physician	30(45.3)	39(13.3)	224(76.4)	
I believe that healthcare professionals should be given incentives to prescribe/procure locally manufactured anti-hypertensive and anti-diabetic medicines.	Nurse	35(20.2)	68(39.3)	70(40.4)	0.002
	Pharmacists	157(45.3)	77(22.2)	112(32.3)	
	Physician	90(30. 7)	42(14.3)	161(54.9)	

Chi-square test (p≥0.05)

Table 3 Perceptions of healthcare professionals for prescribing/procuring locally manufactured anti-hypertensive and anti-diabetic brands

Variables	Different positions in organization	Most of the time n (%)	Some of the time n (%)	Not very often n (%)	Never n (%)	No idea n (%)	p-value
Low cost anti-hypertensive and anti-diabetic brands are being prescribed/ procured in the current practice of Pakistan.	Nurse	59(34.1)	61(35.2)	28(16.1)	5(2.8)	20(11.5)	0.001
	Pharmacists	106(30.6)	151(43.6)	66(19.0)	19(5.4)	4(2.3)	
	Physician	136(46. 4)	105(35.8)	34(11.6)	12(4.0)	6(2.0)	
Therapeutic failures are the major concerns faced with the use of some of the locally manufactured anti-hypertensive and anti-diabetic medicines.	Nurse	38(21.9)	66(38.1)	37(21.3)	7(4.0)	25(14.4)	0.002
	Pharmacists	66(19.0)	165(47.6)	96(27.7)	18(5.2)	1(0.20)	
	Physician	104(35.4)	107(36.5)	52(17.7)	27(9.2)	3(1.0)	
Socioeconomic condition of the patient may influence the prescribing/procuring of anti- hypertensive and anti-diabetic medicines.	Nurse	60(34.6)	46(26.5)	30(17.3)	10(5.7)	27(15.6)	0.00
	Pharmacists	153(44.2)	120(34.6)	53(15.3)	18(5.2)	2(0.5)	
	Physician	128(43.6)	109(37)	29(9.8)	26(8.8)	1(0.3)	
Personal/ Peer influence affect the prescribing/procuring decisions for anti-hypertensive and anti-diabetic in current practice of Pakistan.	Nurse	38(21.9)	69(39.8)	27(15.6)	13(7.51)	26(15)	0.003
	Pharmacists	132(38.1)	147(42.4)	47(13.5)	19(5.49)	10(0.28)	
	Physician	75(25.5)	138(47)	55(18.77)	22(7.5)	3(1.02)	
Medical representative is a good source of information for quality, safety and price of anti-hypertensive and anti-diabetic medicines.	Nurse	66(38.1)	49(28.3)	26(15.0)	8(4.62)	24(13.8)	0.001
	Pharmacists	139(40.1)	92(26.5)	79(22.8)	35(10.1)	1(0.28)	
	Physician	112(38.2)	103(35.1)	60(20.4)	17(5.8)	1(0.34)	
Lack of quality check for locally manufactured anti-hypertensive and anti-diabetic medicines is one of the major concerns.	Nurse	59(34.1)	52(30.0)	28(16.1)	9(5.2)	25(14.4)	0.002
	Pharmacists	124(35.8)	120(34.6)	81(23.4)	19(5.4)	2(0.51)	
	Physician	127(43.3)	108(36.8)	40(13.6)	17(5.8)	1(0.34)	
Substitution of multinational brands in prescribing/procuring is expected in routine practice.	Nurse	47(27.1)	67(38.7)	19(10.9)	13(7.5)	27(15.6)	0.003
	Pharmacists	97(28.0)	149(43.0)	75(21.6)	23(6.6%)	2(0.57%)	
	Physician	82(27.9)	144(49.1)	45(15.3)	21(7.1%)	1(0.34%)	

Table Continued...

Variables	Different positions in organization	Most of the time n (%)	Some of the time n (%)	Not very often n (%)	Never n (%)	No idea n (%)	p-value
Patient compliance is comparatively one of the major reason for prescribing/ procurement of the locally manufactured anti-hypertensive and anti-diabetic medicines in routine practice.	Nurse	36(20.8)	69(39.8%)	32(18.4)	10(5.7%)	26(15%)	0.001
	Pharmacists	54(15.6)	132(38.1%)	103(29.7)	54(15.6%)	3(0.8%)	
	Physician	124(42.3)	96(32.7%)	53(18.0)	18(6.1%)	2(0.6%)	
Locally manufactured anti-hypertensive and anti-diabetic medicines are comparatively better in labeling and aesthetic appeal as compared to multinational brands.	Nurse	31(17.9%)	58(33.5%)	47(27.1%)	11(6.3)	26(15.0%)	0.001
	Pharmacists	38(10.9%)	116(33.5%)	118(34.1%)	68(19.6)	6(1.7%)	
	Physician	77(26.2%)	98(33.4%)	84(28.6%)	30(10.2)	4(1.3%)	
Less side effects of locally manufactured anti-hypertensive and anti-diabetic medicines is a reason for frequent prescribing/ procurement in current practice.	Nurse	29(16.7%)	60(34.6%)	38(21.9%)	19(10.9)	27(15.6%)	0.002
	Pharmacists	35(10.1%)	97(28.0%)	132(38.1%)	76(21.9)	6(1.7%)	
	Physician	56(19.1%)	90(30.7%)	99(33.7%)	45(15.3)	3(1.0%)	
Availability of more combination in locally manufactured anti-hypertensive and anti-diabetic medicines is one of the reasons for frequent prescribing/ procurement in current practice.	Nurse	46(26.5%)	55(31.7%)	35(20.2%)	11(6.3%)	26(15.0%)	0.002
	Pharmacists	58(16.7%)	121(34.9%)	113(32.6%)	52(15.0%)	2(0.5%)	
	Physician	88(30. 0%)	101(34.4%)	72(24. 5%)	29(9.8%)	3(1%)	
Availability of more strength in locally manufactured anti-hypertensive and anti-diabetic medicines are one of the reasons frequent prescribing/ procurement in current Practice.	Nurse	46(26.5%)	54(31.2%)	31(17.9%)	18(10.4%)	24(13.8%)	0.001
	Pharmacists	50(14.4%)	125(36.1%)	110(31.7%)	56(16.1%)	5(1.4%)	
	Physician	84(28.6%)	88(30.0%)	81(27.6%)	36(12.2%)	4(1.3%)	

Table 4 Opinions of healthcare professionals regarding the effectiveness of different brands of locally manufactured and multinational anti-hypertensive and anti-diabetic medicines

Brand names	Different positions in organization	Not effective n (%)	Least effective n (%)	Effective n (%)	Very effective n (%)	Most effective n (%)	No idea n (%)	p-value
*Tenormin	Nurse	16 (9.2%)	19(10.90%)	82 (47.3%)	17 (9.8%)	15 (8.6%)	24(13.80%)	0.001
	Pharmacists	23(6.6%)	40(11.5%)	187(59.0%)	77(22.2%)	16(4.6%)	3(0.8%)	
	Physician	18(6.1%)	41(13.9%)	105(35.8%)	69(23.5%)	59(20.1%)	1(0.3%)	
*Getformin	Nurse	2(1.1%)	19(10.9%)	82(47.3 %)	27(15.6%)	13(7.5%)	30(22.5%)	0.001
	Pharmacists	8(2.3%)	26(7.5%)	185(53.4%)	98(28.3%)	27(7.8%)	2(0.5%)	
	Physician	7(2.3%)	17(5.8%)	104(35.4%)	91(31.0%)	72(24. 5%)	2(0. 6%)	
Glucophage	Nurse	3(1.7%)	11(6.3%)	74(42.7%)	36(20.8)	19(10.9%)	30(17.3%)	0.002
	Pharmacists	9(2.6%)	21(6.0%)	152(43.9%)	118(34.1%)	44(12.7%)	2(0.5%)	
	Physician	10(3.4%)	10(3.4%)	82(27.9%)	102(34.8%)	87(29.6%)	2(0.6%)	
*Eziday	Nurse	1(0.5%)	11(6.3%)	76(43.9%)	39(22.5%)	15(8.6%)	31(7.5%)	0.001
	Pharmacists	7(2.0%)	18(5.2%)	151(43.6%)	125(36.1%)	43(12.4%)	2(0.5%)	
	Physician	8(2.7%)	8(2.7%)	76(25.9%)	108(36.8%)	91(31.0%)	2(0.6%)	

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Table Continued...

Brand names	Different positions in organization	Not effective n (%)	Least effective n (%)	Effective n (%)	Very effective n (%)	Most effective n (%)	No idea n (%)	p-value
	Nurse	1(0.5%)	10(5.7%)	87(50.2%)	34(19.6%)	10(5.7%)	31(17.9%)	
Capoten	Pharmacists	8(2.3%)	26(7.5%)	151(43.6%)	120(34.6%)	37(10. 6%)	4(1.1%)	0.003
	Physician	12(4.0%)	12(4.0%)	82(27.9%)	119(16.1%)	66(22.5%)	2(0.6%)	
	Nurse	3(1.7%)	13(7.5%)	87(50.2%)	28(16.1%)	9(5.2%)	33(19.0%)	
*Glibomet	Pharmacists	16(3.0%)	34(9.8%)	185(53.4%)	78(22.8%)	28(22.5%)	5(8.0%)	0.002
	Physician	9(3.0%)	16(5.4%)	143(48.8%)	94(32%)	26(8.8%)	5(1.4%)	
	Nurse	2(1.1%)	13(7.5%)	84(48.5%)	36(20.8%)	6(3.4%)	32(18.4%)	
Daonil	Pharmacists	8(2.3%)	31(8.2%)	162(48.8%)	106(30.4%)	36(10.4%)	3(0.8)	0.001
	Physician	6(2.0%)	26(8.8%)	137(44.6%)	93(31.7%)	29(9.8%)	2(0.6%)	
	Nurse	2(1.1%)	20(11.5%)	78(45.0%)	33(19.0%)	8(4.6%)	32(14.4%)	
*Zoliget	Pharmacists	11(3.1%)	33(9.5%)	150(43.3%)	101(29.1%)	46(13.2%)	5(1.4%)	0.002
	Physician	10(3.41%)	22(7.5%)	109(37.2%)	100(34.1%)	46(15.6%)	6(2.0%)	
	Nurse	4(2. 3%)	9(5.2%)	73(42.3%)	39(22.5%)	17(9.8%)	31(17.9%)	
Norvasc	Pharmacists	7(2.3%)	16(4.6%)	131(37.8%)	102(29.4%)	87(25.1%)	3(0.8%)	0.001
	Physician	7(2.0%)	11(3.7%)	97(33.1%)	98(33.4%)	76(25.9%)	4(1.3%)	
	Nurse	2(1.1%)	10(5.7%)	69(39.8%)	45(26.0%)	16(26.0%)	31(17.90%)	
Lasix	Pharmacists	5(1.4%)	14(4.0%)	106(30.6%)	117(33.8%)	102(29.4%)	2(0.5%)	0.002
	Physician	9 (3%)	14(4.7%)	77(26.9%)	110(37.5%)	79(26.9%)	4(1. 3%)	

*Represent brands of local pharmaceutical companies; Chi-square test ($p \geq 0.05$)

Table 5 Opinions of healthcare professionals regarding local and multinational companies considered best for quality, safety and price for their anti-hypertensive and anti-diabetic products

Company names	Different positions in organization	Not effective (n%)	Least effective n (%)	Effective n (%)	Very effective n (%)	Most effective n (%)	No idea n (%)	p-value
	Nurse	2(1.1%)	5(2.8%)	66(38.1%)	36(20.8%)	30(17.3%)	34(21.3%)	
GSK	Pharmacists	1(0.2%)	9(2.6%)	80(23.1%)	112(32.3%)	142(41.0%)	2(0.5%)	0.001
	Physician	9(3.0%)	4(1.3%)	51(17.4%)	96(32.7%)	130(44.3%)	3(1.0%)	
	Nurse	3(1.7%)	13(7.5%)	45(26.0%)	42(24.2%)	35(20.2%)	35(20.2%)	
Abbott	Pharmacists	1(0.2%)	8(2.32%)	76(21.9%)	115(33.2%)	144(41.6%)	2(0.5%)	0.002
	Physician	9(3.0%)	5(1.7%)	45(15.3%)	102(34.8%)	130(44.3%)	2(0.6%)	
	Nurse	6(3.4%)	6(3.4%)	58(33.5%)	40(23.1%)	27(15.6%)	36(20.8%)	
Sanofi	Pharmacists	1(3.0%)	9(2.6%)	76(21.9%)	143(41.3%)	115(42.6%)	2(0.5%)	0.002
	Physician	9(3.4%)	5(1.7%)	68(23.2%)	84(28.6%)	125(42.6%)	2(0.6%)	
	Nurse	6(3.4%)	11(6.3%)	52(30.0%)	39(22.5%)	28(16.1%)	37(21.3%)	
Pfizer	Pharmacists	1(0.2%)	7(2.0%)	90(26.0%)	137(39.5%)	109(31.5%)	2(0.5%)	0.001
	Physician	8(2.73%)	7(2.38%)	63(21.5%)	93(31.7%)	120(40.9%)	2(0.68%)	
	Nurse	6(3.46%)	11(6.35%)	54(31.4%)	41(26.6%)	25(14.4%)	36(20.8%)	
Novartis	Pharmacists	3(0.86%)	16(4.62%)	89(25.7%)	146(42.1%)	91(26.3%)	1(0.28%)	0.001
	Physician	10(3.41%)	10(3.41%)	66(22.5%)	97(33.1%)	108(36.8%)	2(0.68%)	

Table Continued...

Company names	Different positions in organization	Not effective (n%)	Least effective n (%)	Effective n (%)	Very effective n (%)	Most effective n (%)	No idea n (%)	p-value
	Nurse	7(4.04%)	18(10.7%)	55(31.7%)	37(21.3%)	19(10.9%)	37(0.68%)	
Werrick*	Pharmacists	5(1.44%)	23(6.61%)	166(47.9%)	105(30.3%)	46(13.2%)	1(0.28%)	0.002
	Physician	11(3.75%)	56(19.1%)	97(33.1%)	76(25.9%)	51(17.4%)	2(0.68%)	
	Nurse	5(144%)	16(9.2%)	67(38.2%)	29(16.7%)	19(10.9%)	37(21.3%)	
Highnoon*	Pharmacists	3(0.8%)	35(10.1%)	169(48.8%)	95(27.4%)	43(12.4%)	1(0.2%)	0.003
	Physician	11(3.7%)	16(5.4%)	112(38.2%)	113(38.2%)	39(13.3%)	2(0.6%)	
	Nurse	5(2.8%)	15(4.32%)	56(32.3%)	32(18.4%)	28(16.1%)	37(21.3%)	
Getz*	Pharmacists	1(0.28%)	15(4.33%)	162(46.8%)	114(32.9%)	53(15.3%)	1(0.28%)	0.001
	Physician	9(3.07%)	8(2.73%)	104(35.4%)	111(37.8%)	59(20.1%)	2(0.68%)	
	Nurse	7(4.0%)	7(4.0%)	53(30.6%)	46(26.5%)	23(13.2%)	37(21.3%)	
Searle*	Pharmacists	2(0.5%)	16(4.6%)	157(45.3%)	110(31.7%)	59(20.1%)	2(0.68%)	0.001
	Physician	9(3.0%)	9(3.0%)	76(3.3%)	127(25.9%)	70(23.4%)	2(0.68%)	
	Nurse	6(3.46%)	14(8%)	48(21.7%)	33(19%)	34(19.6%)	38(21.9%)	
Merck	Pharmacists	9(2.6%)	18(5.2%)	149(43%)	109(31.5%)	60(17.39%)	1(0.2%)	0.002
	Physician	11(3.75%)	19(6.48%)	73(24.9%)	112(38.2%)	75(22.5%)	3(1.02%)	

*Represent local pharmaceutical companies; Chi-square test (p≥0.05)

Discussion

An increase in healthcare costs has been observed globally due to the burden of chronic diseases such as Hypertension and Diabetes. The use of locally manufactured brands can considerably reduce the healthcare costs for chronic diseases in developing countries.[8] The results of the current study highlighted that majority of the healthcare professionals had positive perceptions regarding use of locally manufactured brands for diabetes and hypertension. Majority of the healthcare professionals were of the view that locally manufactured anti-hypertensive and anti-diabetic brands are more affordable as well as safe as compared to those manufactured by multinational pharmaceutical industries. Similar findings were reported in a study conducted in Pakistan where healthcare professionals reported satisfaction with use of locally manufactured brands.[4]

Non-adherence to Good Manufacturing Practices (GMP) by pharmaceutical industries, lack of awareness regarding safety, quality, price and provision of incentives to prescribe were few of the factors considered by healthcare professionals affecting the procurement and prescribing of locally manufactured available brands for diabetes and hypertension.[5] The results of the current study highlighted that majority of the physicians considered therapeutic failures, socio-economic conditions of patient and patient compliance as important factors affecting prescribing of locally manufactured available brands while pharmacists considered peer influence as an important factor affecting prescribing of locally manufactured brands. Similar findings were reported in a study conducted in South Africa where peer influence and compliance of patients were considered as important factors affecting use of locally manufactured medicines.[9] The results of the present study reported that most of the healthcare professionals considered locally manufactured anti-hypertensive and anti-diabetic brands such as Tenormin (Atenolol) and glibomet (Glibenclamide and Metformin) as comparatively more effective brands among the others available brands in the country. Although, nearly all of the healthcare professionals believed that multinational brands are effective but along with this perception, majority of them were of the view that local manufacturing companies such as Highnoon and Getz are also manufacturing effective anti-diabetic and anti-hypertensive medicines with similar effectiveness comparable to multinational brands. Similar findings were reported in a study conducted in Pakistan where locally manufactured brands were considered equally effective as compared to multinational brands.[10]

The results of the present study highlighted that most of the pharmacists believed that locally produced brands are affordable as compared to multinational products. Similar results were reported in a study conducted in Afghanistan where pharmacists were of the view that locally manufactured medicines are cost-effective.[11] While most of the physicians enrolled in the current study agreed that safety of low cost brands is well comparable to that of those manufactured by multinational companies. However, they were of the view that incentives should be given to promote prescribing of locally manufactured brands. The results are in line with a study conducted in Saudi Arabia.[12] On the other hand, the results of the current study highlighted that majority of the nurses considered brands of multinational pharmaceutical companies as most effective whereas majority of pharmacists considered products of local pharmaceutical companies as most effective. Similar results were reported in a study conducted in Malaysia where pharmacists were satisfied with the effectiveness of locally manufactured medicines.[13]

Conclusion

The results of the present study concluded that physicians and pharmacists preferred the use of locally manufactured brands whereas majority of the nurses preferred brands manufactured by multinational companies. Socioeconomic conditions, patient compliance, peer influence and use of incentives were considered as important factors favoring prescribing of locally manufactured brands. In order to increase the prescribing and acceptability of locally manufactured brands by healthcare professionals, educational interventions aimed at promoting the efficacy and safety of such medicines should be designed for healthcare professionals. Information from bioequivalence studies should be disseminated to healthcare professionals to promote local pharmaceutical industry in Pakistan.

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Conflict of interest

The author declares that there is no conflict of interest.

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