

# Comparative Availability of Selected Essential Medicines for Selected Chronic Diseases in Bhiwani District, Haryana, India

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## ABSTRACT

Medicines represent a substantial proportion of the economic costs for treating chronic diseases. In low and middle income countries (LMIC), 50–90% of the population have to pay for medicines themselves. Inappropriate access and availability of essential medicines contribute substantially to out-of-budget expense. A significant population of developing countries (upto 90%) purchase medicines through out-of-pocket payments. This research study was conducted to investigate the comparative availability of selected essential medicines for selected chronic diseases in Bhiwani district. Standardized methodology of World Health Organization and Health Action International was employed. The research study was conducted on retail pharmacy outlets of Bhiwani District i.e. residential areas of Bhiwani city and five administrative areas of Bhiwani district. Overall percent availability of the most of the surveyed medicines used in the treatment of chronic diseases was found to be less than 50%. Dissemination of well documented information on availability medicine consumers in all residential areas may enhance consumer demand for lower price medicine and thus may serve to enhance the availability of demanded medicine (lowest priced) in all the areas of Bhiwani district.

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## INTRODUCTION

Medicines represent a substantial proportion of the economic costs for treating chronic diseases in most of the countries. In Latin America and the Caribbean, medicine costs account upto 44% of the direct medical costs for diabetes (Barcelo *et al.*, 2003). Further, in low and middle-income countries 50–90% of the population have to pay for medicines themselves (Quick *et al.*, 2002). A significant proportion of chronic disease morbidity and mortality can be prevented if medications are made accessible and affordable (WHO, 2008). Several studies have examined the availability of essential medicines; however none have focused specifically on medicines used to treat chronic diseases (Ewen, 2003). Globally, approximately 35 million deaths (60% of all deaths) are attributable to chronic diseases each year, with more than 30 million deaths (52% of all deaths) due to cardiovascular disease (accounting for 30% of all deaths), cancer (13% of all deaths), chronic respiratory disease (7% of all deaths) and diabetes (2% of all deaths) (WHO, 2005). World Health Organization (WHO)

estimated that upto 30% of the world's population lack regular access to essential medicines and upto 50% in the poorest countries of Africa and Asia (WHO, 2011). Generic medicines are upto 20-90% cheaper than their innovator brands (Shafie and Hassali, 2008) and “gold standard” and “first line therapy” for many acute and chronic diseases (Sheppard, 2011), promoting generic medicines to improve medicine access both for government and individuals who have to pay out of pocket for medicines (Cameron *et al.*, 2009). A generic medicine is identical to its corresponding innovator medicines in terms of safety, quality, efficacy, dosage form, strength and route of administration and has the same intended use as the innovator medicine (FDA, 2009). Promotion of generic medicines recommended being a part of the national medicine policy (Cameron *et al.*, 2011) to achieve a comprehensive and sustainable health care system in Europe (Godman *et al.*, 2010). The present study is perhaps the only study that compares the availability of generic as well as branded medicines of selected essential medicines for selected chronic diseases in a single district of any state. This research study covers whole of Bhiwani district along with administrative areas serve to document comparative availability of generic as well as branded medicines of selected essential medicines used in the treatment of chronic diseases (Hypertension, Ulcers, Diabetes, Depression) in different geographical areas of Bhiwani district.

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The method used in the present study is based on World Health Organization (WHO), Geneva, Switzerland and Health Action International Global (HAI), Amsterdam Netherland Guidelines. A manual of WHO/HAI survey methodology was released in 2003 (WHO and HAI, 2003). Later this WHO/HAI manual was updated in 2008 (WHO and HAI, 2008) to reflect the wealth of practical experience in conducting medicine price and availability survey.

## MATERIALS AND METHODS

### Background

Bhiwani, 21th district of Haryana is located in Northern. Other major administrative areas in district are Charkhi Dadri, Siwani, Loharu, Tosham and Bawanikhera. To investigate the comparative availability of selected essential medicines for selected chronic diseases at retail pharmacy outlets in Bhiwani city and its administrative areas were included in this study.

### Sampling

This baseline data collection research study was documented at retail pharmacy outlets in different geographical and administrative areas of Bhiwani district.

### Medicines Surveyed

Twenty essential medicines for selected chronic diseases in different dosage forms as shown in (table 1) were selected. To carry out survey, medicines used for the treatment of four chronic diseases (Ulcer, Depression, Hypertension, Diabetes) were selected from the National List of Essential Medicines, India 2011 (NEML, 2011) and hospital formulary of Bhiwani.

### Data Collection

This survey had been designed to provide a comprehensive picture of comparative availability of selected essential medicines for selected chronic diseases in a single district of any state.

To carry out the survey WHO/HAI methodology was adopted. It is usually not feasible to Collect data from a large number of health facilities, pharmacies and other medicine outlets, so a small sample of facilities was selected in at least six geographical areas: a country's main urban centre and five other administrative areas (WHO and HAI, 2008) (survey areas) as shown in figure 1 and 2.

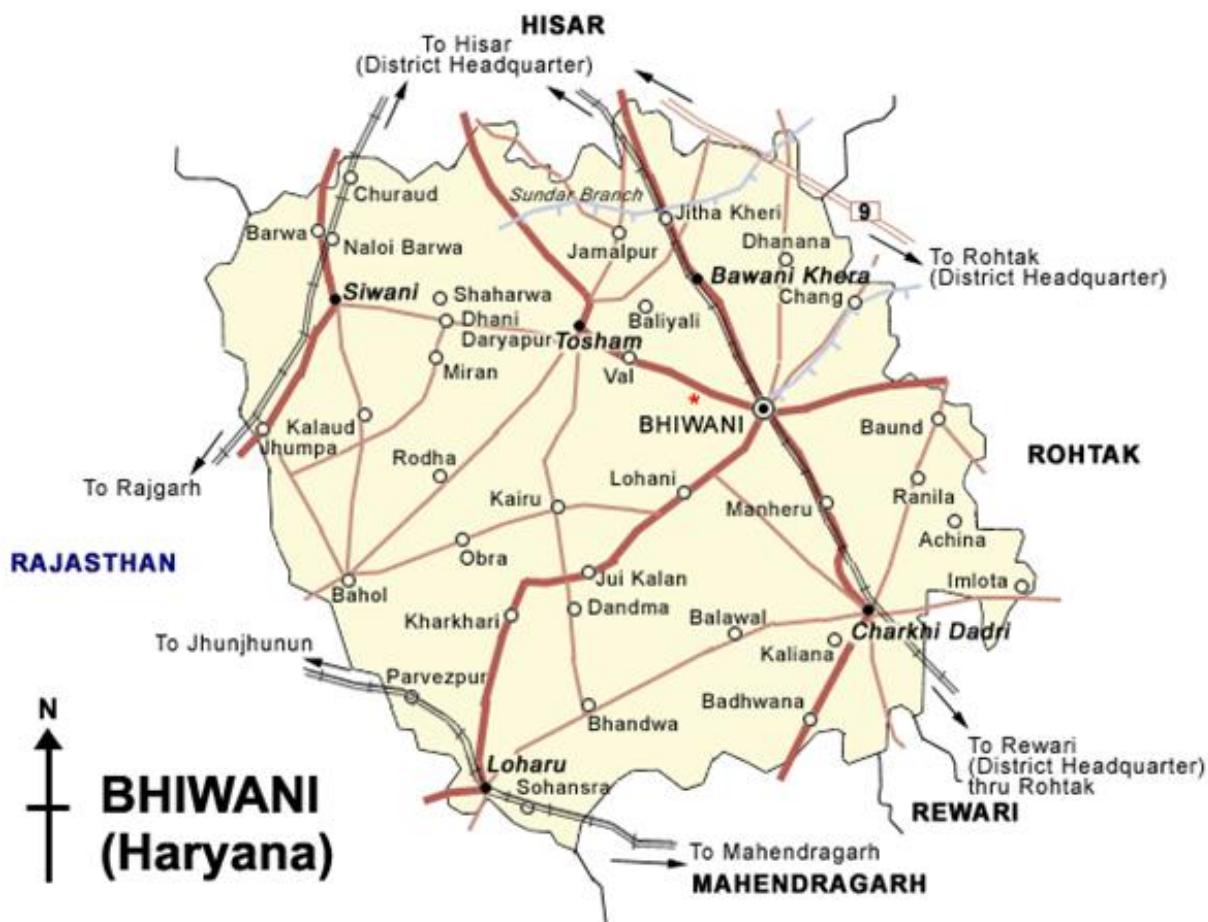


Fig.1: Main urban center ( Bhiwani city ) and its administrative areas: Dadri, Siwani, Loharu, Tosham and Bawanikhera administrative areas of Bhiwani district as per WHO/HAI Methodology.



**Fig. 2 Different Geographical areas of Bhiwani city:** BA1 - Opposite Civil Hospital, Ghantaghar/ Bapura chowk, Krishna colony, Dinod Gate: BA2 - Hansi gate/ road, Opp. Old Bus stand, Sec -13, Friends colony, Chiriyaghar road, old housing board: BA3 - Mehram Gate, Mehram Road / Vidyanagar: BA4 - Rohtak gate/ road, M.C. Colony, New Bharat Nagar, Opp. New Bus Stand, Vikas Nagar: BA5 – Dadri Gate, Bawari Gate, Hanuman Gate

**Table 1:** List of selected essential medicines for selected chronic diseases.

Gastrointestinal- antiulcer medicines	Anti-depressant medicines	Cardiovascular medicines	Anti diabetic medicines
Omeperazole 20mg cap/tab	Amitriptyline 25mg cap/tab	Amlodipine 5mg cap/tab	Glibenclamide 5mg cap/tab
Pantoprazole injection 40 mg injection	Fluoxetine 20mg cap/tab	Atenolol 50mg cap/tab	Insulin injection (soluble) 40 iu/ml
Ranitidine 150mg cap/tab	Imipramine 25 mg cap/tab	Enalapril 5mg cap/tab	Intermediate acting (lente/ NPH Insuline) 40 iu/ml
Famotidine 20 mg cap/tab		Losartan Potassium 25mg tab	Premix Insulin 30:70 injection 40 iu/ml
		Methyldopa 250mg tab	Metformin 500mg cap/tab
		Nifedipine 20mg cap/tab	
		Sodium Nitroprusside inj. 50mg/5ml	
		Hydrochlor thiazide 25mg tab/cap	

**Methodology**

**Percent availability of selected essential medicines used for the treatment of chronic diseases (Hypertension, Ulcer, Diabetes, Depression) in different geographical areas of Bhiwani city**

In this procedure data was collected on the given format i.e. availability of selected essential medicines used for the treatment of chronic diseases in Bhiwani district. Percent availability of each surveyed medicine was calculated in each geographical area of Bhiwani city by dividing the number of retail pharmacy outlets having that medicine by total number of retail pharmacy outlets of that geographical area.

**Cumulative percent availability of selected essential medicines used for the treatment of selected chronic diseases in Bhiwani district**

In this procedure data was collected on the given format from Bhiwani city and five administrative areas (Dadri, Siwani, Loharu, Tosham, and Bawanikhera). Cumulative percent availability of each medicine was checked and it was divided by total number of retail pharmacy outlets of Bhiwani district.

**Percent availability of each brand/generic of selected essential medicines used for the treatment of selected chronic diseases in different geographical areas (BA1, BA2, BA3, BA4, BA5) of Bhiwani city**

In this procedure data was collected on the given format from Bhiwani city (BA1, BA2, BA3, BA4, BA5). The percent availability of each brand/generic in each geographical area was calculated by dividing the number of retail pharmacy outlets having that brand/generic by total number of retail pharmacy outlets in that geographical area.

**Percent availability of each brand/generic of selected essential medicines used for the treatment of selected chronic diseases in different geographical areas of Bhiwani city and five administrative areas of Bhiwani district**

In this procedure data was collected on the given format from Bhiwani city (BA1, BA2, BA3, BA4, BA5) and five administrative areas (Dadri, Siwani, Loharu, Tosham, Bawanikhera) of Bhiwani district. Percent availability of each brand/generic of each surveyed medicine for each geographical

and administrative area was calculated separately and also for Bhiwani city.

**Cumulative Percent availability of total number of brands/generics of each selected medicine available in Bhiwani district**

In this procedure total number of brands/generics available for each surveyed medicine in Bhiwani district was collected on the given format in a specific administrative/geographical area/main urban centre available in whole Bhiwani district.

**Data processing**

Percent availability of each selected medicine for selected chronic diseases in Bhiwani district and its administrative areas was analyzed by standard mean error.

**Ethical approval**

Ethical approval of the research study was obtained from Distt. Drug Controller Officer, Bhiwani and map of Bhiwani city was collected from municipal council, Bhiwani.

**RESULTS**

**Overall percent availability of each surveyed medicine for selected chronic diseases in different geographical areas of Bhiwani district**

Availability is presented as percentage of the essential medicines used for the treatment of chronic diseases (Hypertension, Ulcer, Diabetes, and Depression) found on retail pharmacy outlets surveyed. Overall percent availability of selected medicine for selected chronic diseases is 39% in Bhiwani district as shown in figure 3.

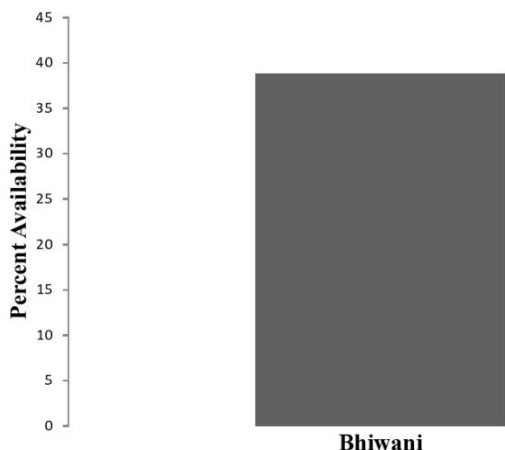


Fig. 3: overall percent availability of selected medicine for selected chronic diseases in Bhiwani district.

Percent availability of selected essential medicines for selected chronic diseases in Bhiwani district i.e. in Bhiwani city and its administrative areas is shown in the figure 4. Cumulative Percent availability of each surveyed medicine for selected chronic

diseases in Bhiwani city i.e. in different geographical areas of Bhiwani is shown in figure 5.

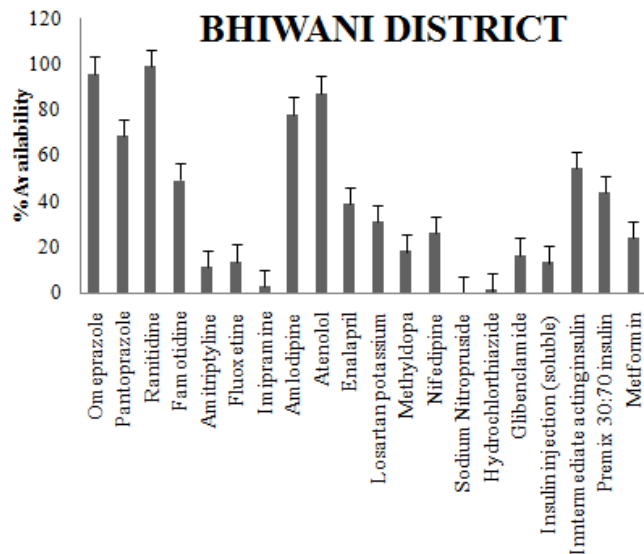


Fig. 4: Overall Percent availability of each surveyed medicine for selected chronic diseases in Bhiwani district.

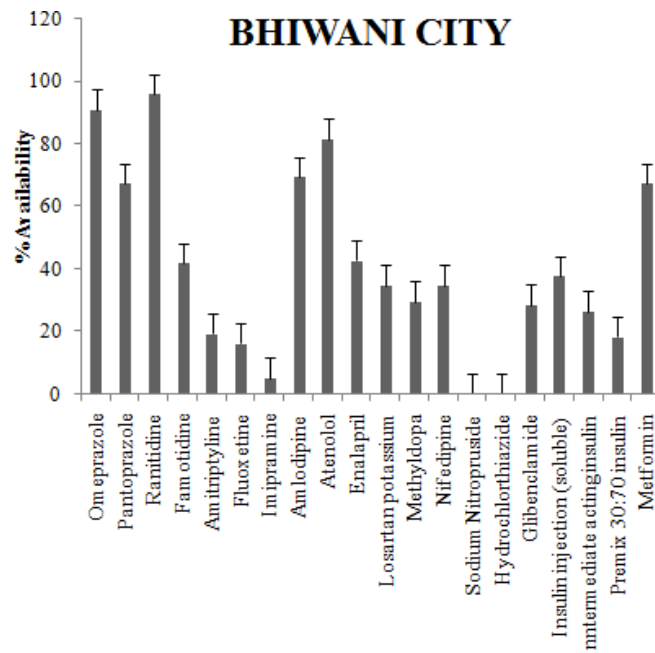


Fig. 5: Cumulative Percent availability of each surveyed medicine for selected chronic diseases in Bhiwani city.

**Percent availability of surveyed medicine in Bhiwani district**

Percent availability of each surveyed medicine for selected chronic diseases in Bhiwani city and its administrative areas is shown in the table 2.

**Cumulative percent availability of surveyed medicine in Bhiwani district**

Cumulative percent availability of each surveyed medicines for selected chronic diseases in Bhiwani district can be summarized as shown in the table 3.

**Table 2:** Percent availability of each selected medicine for selected chronic diseases in Bhiwani district and its administrative areas.

Medicine	Dadri (% availability + S.E.M)	Siwani (% availability + S.E.M.)	Loharu (% availability + S.E.M)	Tosham(%availabil ity+ S.E.M)	Bawanikhera (% availabi-lity + S.E.M)	Bhiwani district (% availability +S.E.M)
Omeprazole	100.0 ±7.08018	100.0±8.525002	91.66±7.281334	93.33±7.70973	100.0±8.380714	95.9666±7.205807
Pantoprazole	86.66±7.08018	81.81±8.525002	33.33±7.281334	53.33±7.70973	88.88±8.380714	68.5583±7.205807
Ranitidine	100.0±7.08018	100.0±8.525002	100.0±7.281334	100.0±7.70973	100.0±8.380714	99.3183±7.205807
Famotidine	46.66±7.08018	63.63±8.525002	41.65±7.281334	46.66±7.70973	55.55±8.380714	49.3283±7.205807
Amitriptyline	26.64±7.08018	09.09±8.525002	00.00±7.281334	13.33±7.70973	00.00±8.380714	11.4066±7.205807
Fluoxetine	40.00±7.08018	00.00±8.525002	00.00±7.281334	26.66±7.70973	00.00±8.380714	13.8300±7.205807
Imipramine	06.66±7.08018	00.00±8.525002	00.00±7.281334	06.66±7.70973	00.00±8.380714	03.0700±7.205807
Amlodipine	89.91±7.08018	72.72±8.525002	66.54±7.281334	93.33±7.70973	77.77±8.380714	78.2916±7.205807
Atenolol	93.33±7.08018	81.81±8.525002	74.97±7.281334	93.33±7.70973	100.0±8.380714	87.5066±7.205807
Enalapri	46.62±7.08018	45.45±8.525002	33.33±7.281334	33.33±7.70973	33.33±8.380714	39.1500±7.205807
Losartan Pot.	46.62±7.08018	36.36±8.525002	16.66±7.281334	40.00±7.70973	11.11±8.380714	30.9050±7.205807
Methyldopa	43.29±7.08018	18.18±8.525002	00.00±7.281334	06.66±7.70973	11.11±8.380714	18.1383±7.205807
Nefidipine	46.62±7.08018	18.18±8.525002	08.33±7.281334	26.66±7.70973	22.22±8.380714	26.1150±7.205807
Sod. Nitropruside	00.00±7.08018	00.00±8.525002	00.00±7.281334	00.00±7.70973	00.00±8.380714	00.0000±7.205807
Hydrochlor-thiazide	00.00±7.08018	00.00±8.525002	00.00±7.281334	06.66±7.70973	00.00±8.380714	01.1100±7.205807
Glibenclamide	39.96±7.08018	00.00±8.525002	00.00±7.281334	20.00±7.70973	11.11±8.380714	16.6050±7.205807
Insulin inj. (Soluble)	13.330±7.08018	00.00±8.525002	16.66±7.281334	00.00±7.70973	11.11±8.380714	13.1400±7.205807
Intermediate acting insulin inj	60.00±7.08018	90.90±8.525002	33.33±7.281334	73.33±7.70973	44.44±8.380714	54.7533±7.205807
Premix insulin 30:70 inj.	40.00±7.08018	54.54±8.525002	33.33±7.281334	73.33±7.70973	44.44±8.380714	44.0000±7.205807
Metformin	46.62±7.08018	09.09±8.525002	00.00±7.281334	33.33±7.70973	22.22±8.380714	24.2116±7.205807

Bhiwani district and its administrative areas: Dadri, Siwani, Loharu, Tosham and Bawanikhera.

**Table 3:** Percent availability of each surveyed medicine for selected chronic diseases in different geographical areas of Bhiwani city.

Medicine	Bhiwani	BA1	BA2	BA3	BA4	BA5
Omeprazole	90.810	96.00	85.00	90.00	80.00	100.0
Pantoprazole	67.340	76.00	50.00	75.00	60.00	72.22
Ranitidine	95.910	92.00	95.00	100.0	93.33	100.0
Famotidine	41.820	16.00	45.00	55.00	13.33	83.33
Amitriptyline	19.380	04.00	25.00	30.00	20.00	22.22
Fluoxetine	16.320	16.00	10.00	30.00	20.00	05.55
Imipramine	05.100	00.00	00.00	25.00	00.00	00.00
Amlodipine	69.380	80.00	65.00	70.00	33.33	88.88
Atenolol	81.600	80.00	80.00	85.00	73.33	88.88
Enalapril	42.840	48.00	20.00	40.00	40.00	66.66
Losartan Pot.	34.680	48.00	15.00	45.00	20.00	38.88
Methyldopa	29.590	32.00	20.00	50.00	26.66	16.66
Nefidipine	34.680	36.00	25.00	45.00	13.33	50.00
Sod. nitropruside	00.000	00.00	00.00	00.00	00.00	00.00
Hydrochlorthiazide	00.000	00.00	00.00	00.00	00.00	00.00
Glibenclamide	28.560	36.00	25.00	45.00	20.00	11.11
Insulin injection (Soluble)	37.740	68.00	15.00	55.00	13.33	22.22
Intermediate acting (lente/NPH) insulin injection	26.520	44.00	25.00	35.00	00.00	16.66
Premix insulin 30:70 injection	18.360	16.00	00.00	45.00	06.66	22.22
Metformin	67.340	40.00	65.00	75.00	40.00	72.22

**Bhiwani city and its different geographical areas**

BA1 - Opposite Civil Hospital, Ghantaghar/ Bapura chowk, Krishna colony, Dinod Gate. BA2 - Hansi gate/ road, Opp. Old Bus stand, Sec -13, Friends colony, Chiriyaghar road, old housing board. BA3 - Meham Gate, Meham Road / Vidyanagar. BA4 - Rohtak gate/ road, M.C. Colony, New Bharat Nagar, Opp. New Bus Stand, Vikas Nagar. BA5 – Dadri Gate, Bawari Gate, Hanuman Gate.

**Table 4:** Cumulative percent availability location/area of each surveyed medicine for selected chronic diseases in Bhiwani District.

Cumulative % Availability in (%)	Name of medicine (with cumulative % availability)	Availability location/area
00 – 05	Sodium Nitroprusside inj. (0%)	N.A.
	Hydrochlorothiazide (1.11%)	Tosham
	Imipramine (3.07%)	Dadri, Tosham, BA3
05 – 10	N.A.	
10 – 15	Amitriptyline ( 11.40%)	Dadri, Siwani, Tosham, Bhiwani
	Insulin Injection (soluble) (13.14%)	Dadri, Loharu, Bhiwani, bawanikhera
	Fluoxetine (13.83%)	Dadri, Tosham, Bhiwani
15 – 20	Glibenclamide (16.60%)	All over except Loharu, Siwani
	Methyldopa (18.13%)	All over except Loharu
20 – 25	Metformin (24.21%)	All over except Loharu
25 - 30	Nifedipine (26.11%)	All
30 – 35	Losartan Potassium (30.90%)	All
35 – 40	Enalapril (39.15%)	All
40 – 45	Premix Insulin 30:70 (44%)	All over except BA2
45 – 50	Famotidine (49.32%)	All
50 – 55	Intermediate acting (lente/ NPH Insuline) (54.75%)	All over except BA4
55 – 60	N.A.	
60 – 65	N.A.	
65 – 70	Pantoprazole (68.55%)	All
70 - 75	N.A.	
75 – 80	Amlodipine (78.29%)	All
80 – 85	N.A.	
85 – 90	Atenolol (87.50%)	All
90 – 95	N.A.	
95 – 100	Omeprazole (95.96%)	All
	Ranitidine (99.31%)	All

**Table 5:** List of Brands/Generics available for each surveyed medicine in Bhiwani district.

Name Of Medicine	Brands/Generics available for each medicine in Bhiwani district
Omeprazole	Ocid, Omitome, Omez-insta, Ometac, Nogacid, Omesecc, Omecip, Pikloz, Lomak, Omecid, Ometab, O.D.
Pantoprazole	P-PPI, Pantin, Pantocid, Panta G, Pantodex, Pan i.v., Pantodac, Panto- i.v., Pentab, Pantowok, Panver, Pantosec, Makoos, Pantocip, Nicopenta, Pentome
Ranitidine	Rantac, Zinetac, Aceloc, Histak, Monorin, Zantac, Ranitidine, Peloc
Famotidine	Famocid, Famonext, Topcid, Famotec
Amitriptyline	Tryptomer, Amitome, Elavil, Sarotena
Fluoxetine	Fludac, Prodep, Flunil, Fluty
Imipramine	Dapsonil, Tencodep
Amlodipine	Amlovas, Amlopress, Amodep, Amlokind, Amlodac, Amtas, Aginal
Atenolol	Aten-50, Atecard, Cardules, Tenoric, Tenolol, Hipres, Hipress
Enalapril	Envas, Dilvas
Losartan Potassium	Losar, Losakind, Loram- H, Omnitran
Methyldopa	Alphadopa
Nifedipine	Nicardia, Depin, Nefidine
Sod. Nitroprusside inj.	Not available
Hydrochlorothiazide	Altem
Glibenclamide	Daonil, Glinil, Glibet, Glynase
Insulin inj. (soluble)	Human Actrapid, Lupisulin, Wosulin, Huminsulin- R, Insugen, Lantus, Lupinsulin-M-30, Human insulin
Intermediate acting insulin inj.	Human mixtard, Lupinsulin- N, Huminsulin- N, Human insulin
Premix insulin 30:70 inj.	Huminsulin 30/70, Lupisulin 30/70, Insugen 30/70
Metformin	Glycomet, Metatime, Walaphage, Glyciphage, Gluformin, Carbophage, Gluconorm, Exermet, Sugarmet

### Availability of surveyed medicines and its brands

According to World Health Organization and Health Action International (WHO & HAI) manual 2008; each medicine has originator brand i.e. international originator brand product for the medicine and generic equivalent is all products other than originator brand that contain same active ingredient whether marketed under a brand name or the generic name. Availability of number of brands of selected essential medicines for selected common ailments is shown in table 5.

### Availability of most selling and low priced sold brand of selected essential medicines

Most selling or available brands/generics found for the surveyed medicines for chronic diseases in Bhiwani city were

Ocid, P-PPI, Rantac, Faocid, Tryptomer, Fludac, Dapsonil, Amodep, Aten, Atecard, Envas, Losar, Alphadopa, Daonil, Nicardia, Actrapid, Mixtard, Huminsulin 30/70 and Glycomet.

Lowest priced brands/generics found for the surveyed medicines in bhiwani city were Omesecc, Pentab, Monorin, Famonext, Amitome, Prodep, Dapsonil, Amodep, Hipres, Envas, Losakind, Alphadopa, Depin, Glibet, Actrapid, Human mixtard, Walaphage, Glyciphage.

### DISCUSSION

Bhiwani covers a larger geographical area as compare to other districts of Haryana state. Therefore, in order to get more précised results about the percent availability each surveyed

medicine, it is necessary to cover maximum geographical area. This research study should be useful to government health policy makers in providing a broad picture of the present situation regarding availability of selected essential medicines used for the treatment of the chronic diseases. Dissemination of well documented information on availability to medicine consumers in all residential areas may enhance consumer demand for lower price medicine and thus may serve to enhance the availability of demanded medicine in all the areas of Bhiwani district. The present study is perhaps the only study that compares the availability of selected essential medicine for selected chronic diseases in a single district of any state.

This research study covers those retail pharmacy outlets of Bhiwani district who gave response and showed interest in this practice and serve to document the overall availability, availability of most selling brands/generics, low priced sold brands/generics, availability of number of brands of selected essential medicines used for the treatment of chronic diseases in different geographical areas and shall be source of information; which medicine is available in which area of Bhiwani district. From this study, People of Bhiwani will come to know about the availability of each medicine in their area which is usually not known. This data would serve as reference for consumers, policy makers or non-governmental organizations interested to take up such projects.

### Overall availability

The availability of most of medicines was found to be good except Imipramine, Sodium nitropruside and hydrochlorothiazide (Less than 5% availability). For many medicines, only one version of the product was available that was the costly or branded medicine (popular name) or the availability of cheaper options was very low. Therefore, the consumer has no option to buy that costly branded product. Retail pharmacy outlets stock those medicines that are mostly prescribed by doctors; indicates that doctors tend to prescribe branded medicines to consumers. People are suffering as they do not know exactly what is the difference between cheaper brands/generics and expensive brands/generics they prefer only the prescribed brands/generics. The availability of brands/generics was found to be maximum for Pantoprazole (total no. of brands/generics- 16) and Omeprazole (total no. of brands/generics- 12) in bhiwani district.

### Policy options to improve availability

Awareness about the medicine brands/generics options in community could be beneficial to people in selecting a cheaper medicine and therefore availability of that product may enhance in market as the consumer would demand for that option at retail pharmacy outlets. Lower availability of few medicines is due to inefficient purchasing or distribution in the retail pharmacy outlets (Cameron *et al.*, 2009; Kotwani, 2011). For improving availability of essential medicines various recommendations such as Government to increase the budget of medicines, prepare Standard treatment guidelines (STGs) and EML on the basis of essential medicine concept; separate EML for primary care and hospitals;

procurement and distribution of medicines on the basis of EML; prescription according to STGs and EML and regular monitoring and evaluating system (Quick, 2003; Holloway, 2011).

### CONCLUSION

From observations in the present study, overall percent availability of the maximum of the surveyed medicines was found to be less than 50 %. Also, for the available medicines there is a difference in the most selling and cheapest brands/generics i.e. most selling brands/generics are not always the cheapest available brands/generics. As the patients suffering from chronic diseases have to use the medicines for a longer period of time and also the expenditure is more, they should make aware about cheaper options. The availability of cheaper options in market can be increased if the consumers always demand for the cheaper options.

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