

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

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Submitted: 14-06-2023

Accepted: 24-06-2023

ABSTRACT: Medicines constitute a big share of the financial expenses of treating chronic diseases in these countries. A widespread share of persistent sickness morbidity and mortality can be prevented if medicinal drugs are made handy and affordable. World Health Organization (WHO) defined generic medicines as a pharmaceutical product intended to be interchangeable with an innovator product. 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. The present study is perhaps the only study that compares the availability of generic as well as branded medicines and relative prices of essential medicines for chronic diseases in a single district of any state. This research study covers whole of Rohtak district. Twenty seven essential medicines for selected chronic diseases in different dosages forms. To hold out survey, medicines used for the treatment of seven chronic diseases (Epilepsy, Hypertension, Ulcer, Diabetes, Depression, Hypothyroidism, Asthma) were selected from the National List of Essential Medicines. From this study, People of Rohtak will come to know about the availability and relative price of each medicine in their area which is usually not known and people pay. This information is definitely important in those cases, where medicine are taken for longer periods of time and out-of-pocket expenditure is high and moreover, price money goes directly from the pocket of medicine consumer.

KEYWORDS: Essential Medicines, Chronic Diseases, Generic, Hypertension, Asthma.

I. INTRODUCTION

Medicines represent a considerable proportion of the economic prices for treating chronic diseases in most of the countries. Originator brand medicine generally the product that was first authorized worldwide for marketing (normally as a patented product) on the basis of the documentation of its efficacy, safety and quality,

according to requirements at the time of authorization. The originator product always has a brand name; this name may, however, vary between countries. Whereas, Generic medicine is a pharmaceutical product usually intended to be interchangeable with the originator brand product, manufactured without a license from the originator manufacturer and marketed after the expiry of patent or other exclusivity rights.[1,2]

Generic medicines are marketed either under a non-proprietary name (INN), rather than under a proprietary or brand name. However, they are also quite frequently marketed under brand names, often called “branded generics”. 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). Generic medicines are up to 20- 90% cheaper than their innovator brands. Further, in low and middle-income countries 50–90% of the population need to pay money for medicines themselves. A big proportion of chronic illness morbidity and mortality is prevented if medications are created accessible and reasonable (WHO, 2008). Several studies have examined the provision of essential medicines; but none have targeted specifically on medicines used to treat chronic diseases. Globally, approximately thirty five million deaths (60% of all deaths) are attributable to chronic diseases annually, with over thirty million deaths (52% of all deaths) thanks to upset (accounting for half-hour of all deaths), cancer (13% of all deaths), chronic respiratory disorder (7% of all deaths) and polygenic disorder (2% of all deaths).[3,4]

World Health Organization (WHO) estimated that up to 30% of the world’s population lack regular access to essential medicines and up to 50% in the poorest countries of Africa and Asia. Promotion of generic medicines recommended being a part of the national medicine policy to achieve a comprehensive and sustainable health care system in Europe. 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 Rohtak 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 Rohtak district. The method employed in this study is predicated on World Health Organization (WHO), Geneva, and Health Action International (HAI), Amsterdam Guidelines. A manual of WHO/HAI survey methodology was released in 2003. Later this WHO/HAI manual was updated in 2008.[5,6]

II. MATERIALS AND METHODS

Rohtak district of Haryana is found in Northern. Other major administrative areas in district are Sampla and Meham Tehsils. In this study retail pharmacy outlets in Rohtak district and

its two administrative areas included to investigate the comparative availability of selected essential medicines for selected chronic diseases.[7]

Medicines Surveyed: Twenty seven essential medicines for selected chronic diseases in different dosages forms as shown in (table 1) were selected. To hold out survey, medicines used for the treatment of seven chronic diseases (Epilepsy, Hypertension, Ulcer, Diabetes, Depression, Hypothyroidism, Asthma) were selected from the National List of Essential Medicines, India 2011 (NEML, 2011) and hospital formulary of Rohtak district.

Data Collection: WHO/HAI methodology was adopted to carry out the survey. It's typically not possible to gather knowledge from an oversized number of health facilities, pharmacies and different drugs retailers, so a small sample of facilities was elect in a minimum of three geographical areas: a country's main urban centre and 2 different administrative areas (WHO and HAI, 2008)

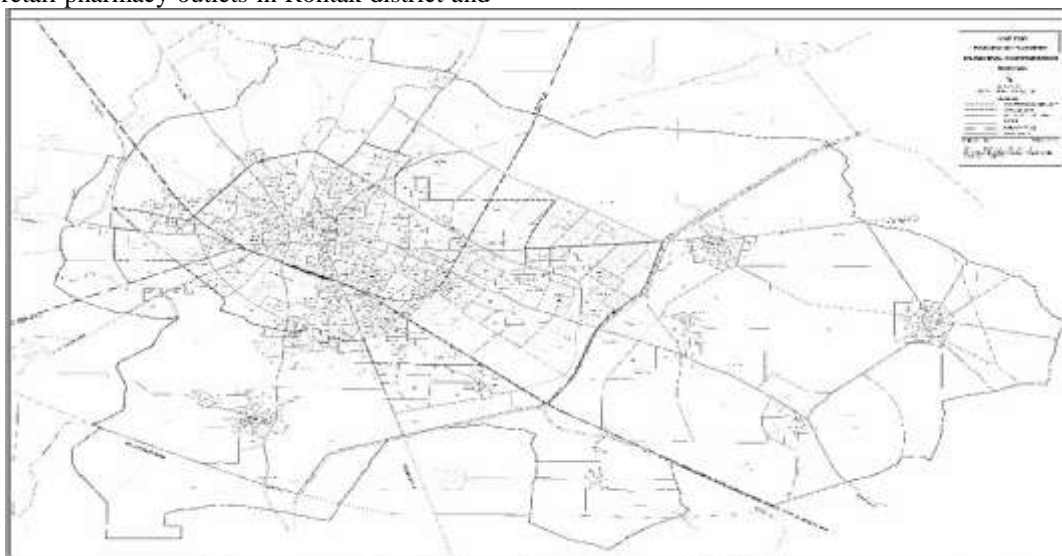


Figure1: Main Urban centre and its body areas: Sampla Tehsil and Meham Tehsil body areas of Rohtak district as per WHO/HAI Methodology.

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

S.NO.	Categories	Medicines
1.	Antiepileptic	Carbamazepine, Lorazepam, Phenobarbitone, Phenytoin, Valparaoic acid
2.	Antihypertensive	Hydralazine, Enalapril, Telmisartan, Losartan, Hydrochlorthiazide, Atenolol, Labetalol, Metoprolol, Amlodipine
3.	Antiulcer	Omeperazole, Pantoprazole, Ranitidine
4.	Anti diabetic Medicines	Glimipide, Gliclazide, Metformin

5.	Hypothyroid drug:	Levothyroxine
6.	Antidepressant	Alprazolam, Fluoxetine
7.	Anti Asthamatic	Aminophylline, Beclomethasone, Salbutamol, Theophylline+Etophylline

Percent availability of hand-picked essential medicines used for the treatment of chronic diseases (Epilepsy, Hypertension, Ulcer, Diabetes, Depression, Hypothyroidism, Asthma) in numerous geographical areas of Rohtak city. In this procedure knowledge was collected on the given format i.e. availableness of hand-picked essential medicines used for the treatment of chronic diseases in Rohtak district. Percent availability every surveyed drugs was calculated in each geographical area of Rohtak by dividing the amount of retail pharmacy shops having that drugs by total no. of retail pharmacy shops of that geographic region.[8]

Cumulative percent availability of hand-picked essential medicines used for the treatment of hand-picked chronic diseases in Rohtak district:

In this procedure knowledge was collected on the given format from Rohtak city and 2 body areas (Sampla Tehsil and Meham Tehsil). Cumulative % availability of every drug was checked and it absolutely was divided by total range of retail pharmacy shops of Rohtak district.

Percent availability of each brand/generic of hand-picked essential medicines used for the treatment of hand-picked chronic diseases in different geographical areas (BA1, BA2, BA3, BA4, BA5) of Rohtak City: In this procedure knowledge was collected on the given format from Rohtak city (BA1, BA2, BA3, BA4, BA5), and two

administrative areas (Sampla and Meham). The % availability of each brand/generic in each geographical area and administrative area was calculated separately and also for Rohtak city.

Cumulative percent availability of total range of brands/generics of every selected drug out there in Rohtak district: In this procedure total range of brands/generics available for every surveyed drugs in Rohtak district was collected on the given format in a very specific administrative/Geographical area/main urban centre out there in whole Rohtak district

Data processing: Percent availability of every selected drug for selected chronic diseases in Rohtak district and its body areas was analyzed by standard mean error.

III. RESULTS

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

Availability is presented as percentage of the essential medicines used for the treatment of chronic diseases (Hypertension, Ulcer, Diabetes, Depression, Hypothyroidism, Asthma), found on retail pharmacy outlets surveyed. Overall availability of essential medicines is shown in Table 2 and graphical representation shown in the fig no. 2

Table 2: Essential medicines in different geographical areas of Rohtak district

Medicines	Rohtak	Sampla	Meham	BA1	BA2	BA3	BA4	BA5
Carbamazepine	78.57	33.33	50	66.66	42.85	83.33	100	100
Lorazepam	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Phenobarbitone	40.47	16.66	62.50	33.33	14.28	33.33	50.00	61.53
Phenytoin	61.90	50.00	75.00	83.33	42.85	83.33	25.00	84.61
Valparaic Acid	83.33	88.88	50.00	75.00	57.14	83.33	100.00	100.0
Amlodipine	92.85	83.33	81.25	91.66	85.71	83.33	100.0	100.0
Atenololl	73.80	38.88	81.25	83.33	71.42	83.33	50.00	60.23
Enalapril	61.90	16.66	50.00	75.00	42.85	83.33	75.00	46.15
Hydrochlorthiazide	23.80	00.00	12.50	33.33	28.57	00.00	25.00	30.76
Hydralazine	2.380	00.00	00.00	8.333	00.00	00.00	00.00	00.00

Labetalol	16.66	5.555	00.00	8.333	00.00	00.00	25.00	38.46
Losartan	78.57	22.22	56.25	75.00	71.42	83.33	75.00	84.61
Metaprolol	78.57	33.33	56.25	83.33	51.14	66.66	50.00	100.0
Telmisartan	83.33	33.33	62.50	83.33	71.42	83.33	50.00	100.0
Omeprazole	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Pantaprazole	100.0	83.33	100.0	100.0	100.0	100.0	100.0	100.0
Ranitidine	100.0	94.44	100.0	100.0	100.0	100.0	100.0	100.0
Gliclazide	35.71	27.77	12.50	50.00	14.28	33.33	50.00	30.76
Glimepride	71.42	22.22	68.75	83.33	28.75	50.00	75.00	92.30
Metformin	71.42	33.33	62.50	75.00	71.42	66.66	50.00	76.92
Levothyroxine	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Alprazolam	2.380	00.00	00.00	00.00	00.00	00.00	25.00	00.00
Fluoxetine	7.142	00.00	6.250	16.66	00.00	00.00	25.00	00.00
Aminophylline	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Beclomethasone	4.761	00.00	00.00	8.333	14.28	00.00	00.00	00.00
Salbutamol	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Theophylline + Etophylline	92.85	72.22	100.0	100.0	71.42	100.0	75.00	100.0

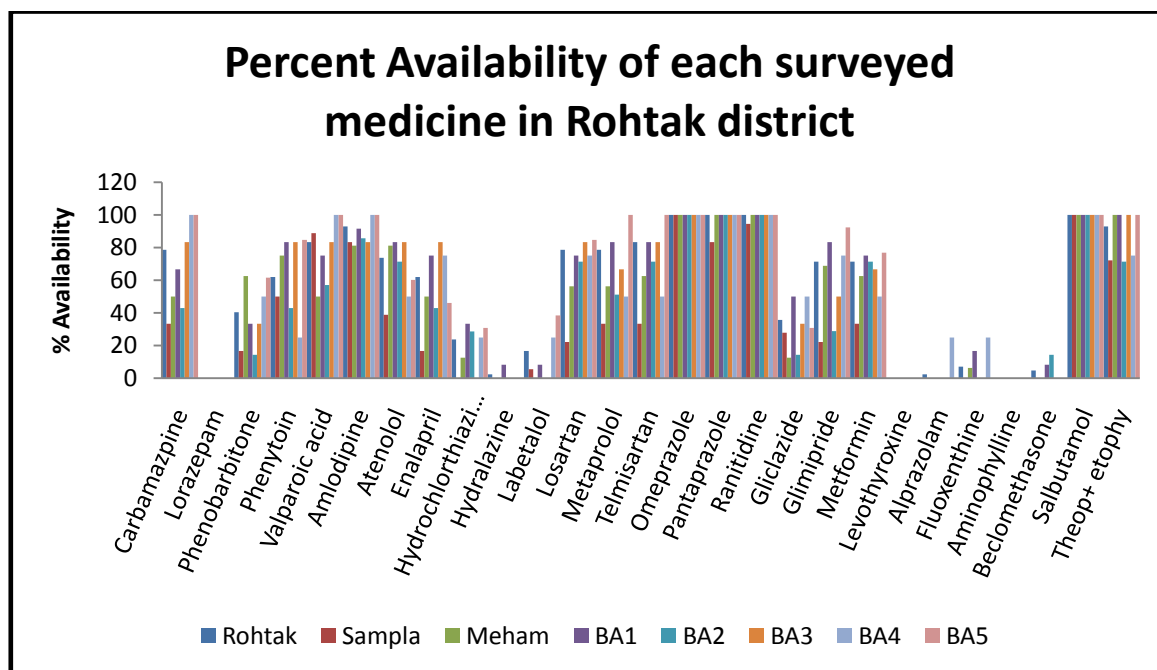


Figure 2: Overall percent availability of each surveyed medicine in different areas of Rohtak district

Rohtak city and its administrative areas:Rohtak-Rohtak city, BA1 – Old Gohana stand, Gohana road, Mata Darwaja chowk. BA2 – Opposite Civil

Hospital, Civil Road, Chotu Ram Chowk, Palika Bazar, BA3 - Hissar By-pass Chowk, BA4 – Bhiwani Stand, Quilla Road,BA5 – Medical Mor

Administrative areas: Sampla, Meham, 2-surveyed administrative areas of Rohtak district as per WHO/HAI Methodology.

Cumulative Percent availability of each surveyed medicine for selected chronic diseases in Rohtak city i.e. in different geographical

areas of Rohtak: Cumulative Percent Availability is presented as percentage of the essential medicines used for the treatment of chronic diseases (Hypertension, Ulcer, Diabetes, Depression, Hypothyroidism, Asthma), found on retail pharmacy outlets surveyed.

Table 3: Cumulative Percent availability of each medicine in Rohtak district

Medicines	Rohtak city (%availability+ S.E.M	Sampla Tehsil (%availability+ S.E.M	Meham Tehsil (%availability+ S.E.M	Rohtak district (%availability+ S.E.M
Carbamazepine	78.57 ± 6.053015	33.33 ± 6.846804	50.00 ± 7.363037	65.7894 ± 7.363037
Lorazepam	00.00 ± 6.053015	00.00 ± 6.846804	00.00 ± 7.363037	0.00 ± 7.363037
Phenobarbitone	40.47 ± 6.053015	16.66 ± 6.846804	62.50 ± 7.363037	39.4736 ± 7.363037
Phenytoin	61.90 ± 6.053015	50.00 ± 6.846804	75.00 ± 7.363037	69.7368 ± 7.363037
Valparaic acid	83.33 ± 6.053015	88.88 ± 6.846804	50.00 ± 7.363037	65.7894 ± 7.363037
Amlodipine	92.85 ± 6.053015	83.33 ± 6.846804	81.25 ± 7.363037	88.1578 ± 7.363037
Atenolol	73.80 ± 6.053015	38.88 ± 6.846804	81.25 ± 7.363037	75.00 ± 7.363037
Enalapril	61.90 ± 6.053015	16.66 ± 6.846804	50.00 ± 7.363037	47.3684 ± 7.363037
Hydrochlorthiazide	23.80 ± 6.053015	00.00 ± 6.846804	12.50 ± 7.363037	17.1052 ± 7.363037
Hydralazine	2.380 ± 6.053015	00.00 ± 6.846804	00.00 ± 7.363037	1.3157 ± 7.363037
Labetalol	16.66 ± 6.053015	5.555 ± 6.846804	00.00 ± 7.363037	11.8421 ± 7.363037
Losartan	78.57 ± 6.053015	22.22 ± 6.846804	56.25 ± 7.363037	57.8947 ± 7.363037
Metaprolol	78.57 ± 6.053015	33.33 ± 6.846804	56.25 ± 7.363037	64.4736 ± 7.363037
Telmisartan	83.33 ± 6.053015	33.33 ± 6.846804	62.50 ± 7.363037	67.1052 ± 7.363037
Omeprazole	100.0 ± 6.053015	100.0 ± 6.846804	100.0 ± 7.363037	100.000 ± 7.363037
Pantaprazole	100.0 ± 6.053015	83.33 ± 6.846804	100.0 ± 7.363037	93.4210 ± 7.363037

			7.363037	7.363037
Ranitidine	100.0 ± 6.053015	94.44 ± 6.846804	100.0 ± 7.363037	97.3684 ± 7.363037
Gliclazide	35.71 ± 6.053015	27.77 ± 6.846804	12.50 ± 7.363037	27.6315 ± 7.363037
Glimipride	71.42 ± 6.053015	22.22 ± 6.846804	68.75 ± 7.363037	66.5263 ± 7.363037
Metformin	71.42 ± 6.053015	33.33 ± 6.846804	62.50 ± 7.363037	55.2631 ± 7.363037
Levothyroxine	00.00 ± 6.053015	00.00 ± 6.846804	00.00 ± 7.363037	00.00 ± 7.363037
Alprazolam	2.380 ± 6.053015	00.00 ± 6.846804	00.00 ± 7.363037	02.6315 ± 7.363037
Fluoxenthine	7.142 ± 6.053015	00.00 ± 6.846804	6.250 ± 7.363037	06.5789 ± 7.363037
Aminophylline	00.00 ± 6.053015	00.00 ± 6.846804	00.00 ± 7.363037	00.00 ± 7.363037
Beclomethasone	4.761 ± 6.053015	00.00 ± 6.846804	00.00 ± 7.363037	05.2631 ± 7.363037
Salbutamol	100.0 ± 6.053015	100.0 ± 6.846804	100.0 ± 7.363037	100.00 ± 7.363037
Theop+ etophy	92.85 ± 6.053015	72.22 ± 6.846804	100.0 ± 7.363037	88.1578 ± 7.363037

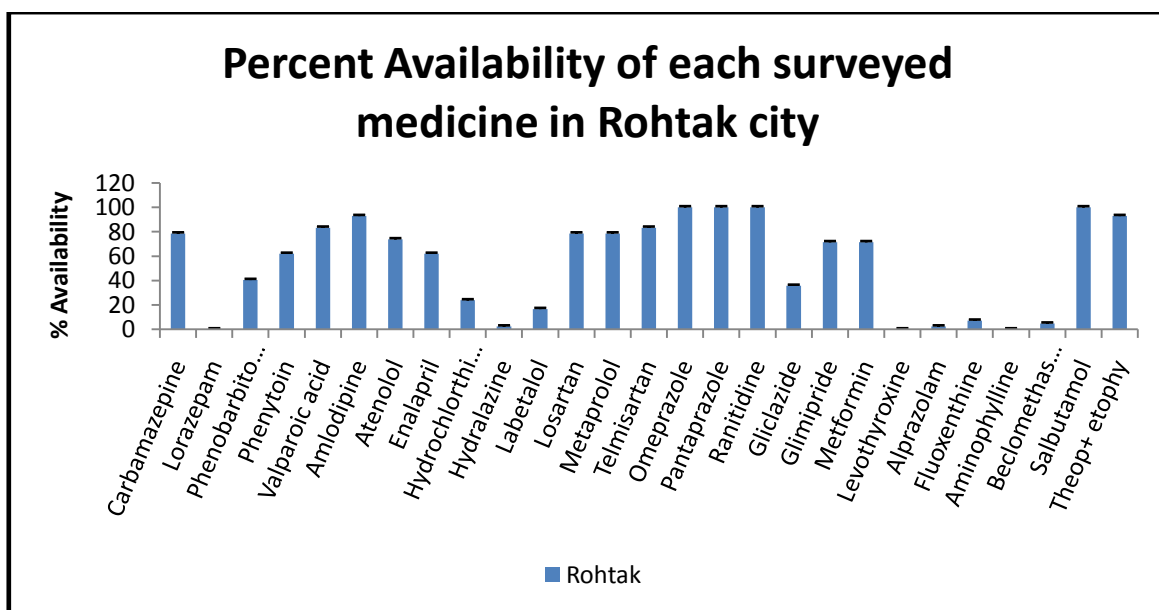


Figure 3: Cumulative Percent availability of each surveyed medicine in Rohtak city.

Table 4: Cumulative percent availability and availability location/area of each surveyed medicine in Rohtak Districts

Cumulative Availability (%)	% in	Name of medicine (with cumulative % availability)	Availability location/area
00 – 05		Lorazepam,Levothyroxine, Aminophylline(0%) Hydralazine (1.31%) Alprazolam(2.63%)	N.A N.A Rohtak,BA1 Rohtak
05 – 10		Beclomethasone-(5.26%) Fluoxenthine-(6.57%)	Rohtak,BA1,BA2 Rohtak,Meham,BA1
10 – 15		Labetalol-(11.84%)	Rohtak,Sampla,BA1,BA4,BA5
15 – 20		Hydrochlorthiazide-(17.10%)	All over except Sampla & BA3
20 – 25		N.A	
25 - 30		Gliclazide-(27.63%)	All
30 – 35		N.A	
35 – 40		Phenobarbitone-(39.47%)	All
40 – 45		N.A	
45 – 50		Enalapril-(47.36%)	All
50 – 55		N.A	
55 – 60		Metformin-(55.26%) Losartan-(57.89%)	All All
60 – 65		Metaprolol-(64.47%)	All
65 – 70		Carbamazepine-(65.78%) Valparaic Acid-(65.78%) Glimipride-(66.52%) Telmisartan-(67.10%) Phenytoin-(69.73%)	All All All All
70 - 75		Atenolol-(75%)	All
75 – 80		N.A	
80 – 85		N.A	
85 – 90		Amlodipine-(88.15%) Theop+ etophy-(88.15%)	All
90 – 95		Pentaprazode-(93.42%)	All
95 – 100		Ranitidine-(97.36%) Omaprazole-(100%) Salbutamol-(100%)	All All All

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.

Table 5: List of Brands/Generics available for each surveyed medicine in Rohtak district

Name Of Medicine	Brands/Generics available for each medicine in Rohtak district
Carbamazepine	Carmaz, Mezetol, Tegritol, Zepteal
Lorazepam	Not Available
Phenobarbitone	Gardenal, Phental
Phenytoin	Eptoin
Valparaic acid	Encorate, Epilex, Valparin, Valparol
Amlodipine	Amlip, Amlodac, Amlokind, Amlopress, Amlovas, Amloc
Atenolo	Aten, Hipress
Enalapril	Envas
Hydrochlorthiazide	Aquazide, Hydrazide, Hydride
Hydralazine	Hatran
Labetalol	Labebet
Losartan	Losar
Metoprolol	Metpure, Metolar
Telmisartan	Telistar, Telma, Telmkind, Ttelpress, Telvas, Temsan, Tazloc
Omeprazole	Nogacid, Ocid, Omnisec, Omtech, Ozole
Pantaprazole	Pan-40, Pantakind, Pantocid, Pantodac, Pantosac
Ranitidine	Aciloc, Rantac, Zantac
Gliclazide	Glizid
Glimepride	Glimmer, Glimstar, K-Glim
Metformin	Exermet, Galvasmet, Gluconorm, Gluformin, Glyciphage, Glynase, Glycomet, metmass, Myformin, Okamet, Zoform
Levothyroxine	Not Availabl
Alprazolam	Alprex
Fluoxenthinee	Fludac, Fluty
Aminophylline	Not Available
Beclomethasone	Aerocort
Salbutamol	Asthaline, Sabetol
Theophylline+Etophylline	Dericip, Deriphylline, Deriphylline Retard, Theoasthaline

IV. DISCUSSION

Rohtak covers a larger geographical area. This study could be useful to government health policy makers in providing a broad picture of the present situation regarding availability and relative price of essential medicines used for the treatment of the chronic diseases. Dissemination of well documented information on availability and relative price 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 Rohtak district. The present study is perhaps the only study that compares the availability and relative price of essential medicines used for the treatment of chronic diseases in a single district of any state. From this study, People of Rohtak will come to know about the availability

and relative price of each medicine in their area which is usually not known and people pay, what is asked by chemists to pay. This information is definitely important in those cases, where medicine are to taken for longer periods of time and out-of-pocket expenditure is high and moreover, price money goes directly from the pocket of medicine consumer. This data would serve as reference for consumers, policy makers or non-governmental organizations interested to take up such projects.

V. 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 be 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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