Original Article

Availability and Accessibility to Medicines in Primary Health Care in a Brazilian Region

Kátia Reis Dutra[1], Ursula Carolina Morais Martins[2], Marina Guimarães Lima[2*]

[1]Post Graduation Programme in Medicines and Pharmaceutical Services, Federal University of Minas Gerais, Belo Horizonte, Minas Gerais, Brazil. Faculdade de Farmácia, Universidade Federal de Minas Gerais, Avenida Presidente Antônio Carlos, 6627-Campus Pampulha, Belo Horizonte-MG, BRASIL CEP: 31270-901.
[2]Department of Social Pharmacy, Faculty of Pharmacy, Federal University of Minas Gerais, Belo Horizonte, Minas Gerais, Brazil. Faculdade de Farmácia, Universidade Federal de Minas Gerais, Avenida Presidente Antônio Carlos, 6627-Campus Pampulha, Belo Horizonte-MG, BRASIL CEP: 31270-901.

ABSTRACT

Objective: The aim with the present study was to evaluate availability and accessibility to medicines in Primary Health Care in Northeast Health District, Belo Horizonte, Brazil. **Method:** It was an epidemiological, descriptive and cross-sectional study, conducted in the central warehouse and in twenty Primary Health Care units. The data was collected through direct observation, in information systems and in a survey with patients. Indicators proposed by World Health Organization were used to analyze the availability and accessibility. **Results:** The average availability of essential medicines from a key list in stock observed in visits in Primary Health Care units was $98.3 \pm 3.7\%$ and in the past 12 months was $42.5 \pm 13.6\%$. One thousand and three hundred eighty-three medicines were prescribed to patients and 1066 (77.1%) of them were actually dispensed. An association of the presence of medicine in Essential Medicine List with dispensing of medicine was observed (p=0,00). It was observed that 93,2% of patients spent until 30 min in the way from their residence to Primary Health Care unit. **Conclusion:** The conditions of availability of medicines in stock in visits and the accessibility to services in PHC were satisfactory; however, limitations were observed in yearly availability of medicines and in the attendance of patient`s needs for prescribed medicines. Actions are recommended to improve availability of medicines such as the adoption of the Essential Medicine List.

Key words: Health Services Accessibility, Pharmaceutical Services, Primary Health Care.

PICTORIAL ABSTRACT
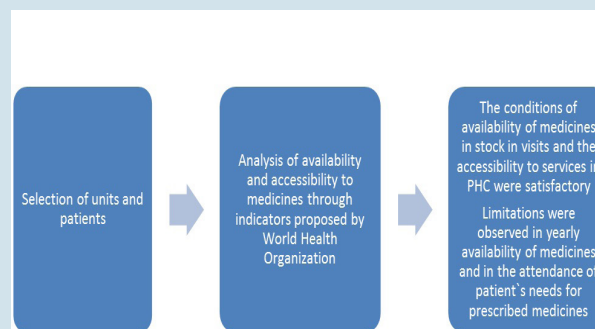
Correspondence :

Marina Guimarães Lima,

Department of Social Pharmacy, Faculty of Pharmacy, Federal University of Minas Gerais, Belo Horizonte, Minas Gerais, Brazil. Faculdade de Farmácia,

Universidade Federal de Minas Gerais, Avenida Presidente Antônio Carlos, 6627-Campus Pampulha, Belo Horizonte-MG, BRASIL CEP: 31270-901.

Pnone no: +553134096849;

E-mail: marina.glima@gmail.com

DOI: 10.5530/jyp.2016.3.15

INTRODUCTION

Pharmaceutical services involve actions aimed at promotion of access and rational use of medicines.[1] Although Brazil has the National Policy of Pharmaceutical Services and the National Policy of Medicines, access to medicines limitations are still observed by the Brazilian population. A survey conducted in 2004 in public health units in Brazil revealed that availability of a key list of essential medicines was 73%.[2]

Access to essential medicines should be evaluated in different dimensions: availability, affordability, acceptability and accessibility.[1] The World Health Organization (WHO) proposes indicators for evaluation of access to medicines in its dimensions in health units.[3]

There are few studies aimed at evaluation of access to essential medicines in Primary Health Care (PHC) in Brazil[2] and in other countries such as Saudi Arabia[4] and China.[5] Those surveys evaluated the availability dimension with data collected invisits to facilities without an analysis of yearly availability and accessibility.

The present study was aimed at evaluating yearly availability and accessibility to medicines in PHC in Northeast Health District of Belo Horizonte, Minas Gerais, Brazil.

MATERIALS AND METHODS

Study design and setting

This was a cross-sectional study carried out in Northeast Health District of Belo Horizonte, Minas Gerais State, Brazil. The municipality of Belo Horizonte is administratively divided into nine health districts. The Northeast Health District, setting of the present study, has a warehouse to supply medicines to 21 PHC units that provide health services for 290.353 habitants.

Study sample

The sample of this study was selected in two stages: selection of PHC units for direct observation and selection of patients from those PHC units for the survey. Twenty PHC units that agreed to participate in the study and the warehouse of the Northeast District were included in the direct observation part of the study.

We calculated the minimum sample size of patients to be interviewed in the survey. The parameters used for the calculation were proportion of 50% for indicators due to an unknown frequency of the event of interest, design effect of 1, significance level of 5% and confidence interval of 95%. The calculation was performed using the software Open Epi and the result was a minimum sample size of 384 patients. Three hundred and ninety-nine patients were interviewed in 20 PHC units included in the survey.

For the purpose to evaluate yearly availability in information systems, 21 PHC units and the warehouse of the district were included.

Indicators

The study was based on indicators proposed by WHO.[3] Data collection was performed to evaluate indicators of two dimensions of access to

Table 1: List of indicators used to evaluate availability and accessibility to medicines in in the Northeast District, Belo Horizonte, Brazil, 2014

Access dimension	Unit used for data collection and analysis	Indicator	Method for calculation	Source of information
Availability	Warehouse and PHC units	Availability of key essential medicines to treat common health problems at the time of the visit	(Number of key medicines available/Number of key medicines reviewed)×100	Direct observation of units
		Availability of key essential medicines to treat common health problems in the last 12 months	(Number of key medicines available/Number of key medicines reviewed)×100	Information systems from Municipal Secretariat of Health of Belo Horizonte
		Stockout duration of key essential medicines in the last 12 months (equivalent number of days each medicine is out of stock)	(Number of days each key medicine is out of stock x 365)/Number of days covered by the review for that medicine)	Information systems from Municipal Secretariat of Health of Belo Horizonte
	Patient	Proportion of prescribed medicines dispensed to patients	(Number of medicines dispensed/ Number of medicines prescribed)×100.	Survey with patient and prescription
Geographical accessibility	Patient	Proportion of patients taking more than one hour to travel to the PHC unit	(Number of patients who answered that it took more than one hour for them to get to the PHC unit/Number of interviewed patients)×100.	Survey with patient

Table 2: Availability over the past 12 months of key medicines in stock in the Northeast District, Belo Horizonte, Brazil, 2014

Medicine	Number of days of stockout in the warehouse (N)	Equivalent number of days of stockout in PHC units (mean ± standard deviation)*
Amitriptyline tablet 25 mg	0,0	1,2 ± 2,9
Amoxicillin solid oral dosage form 500 mg	71,8	22,1 ± 16,2
Amoxicillin+clavulanic acid oral liquid (50 mg+2,5 mg)/ml	38,7	17,9 ± 19,1
Atenolol tablet 50 mg	0,0	3,3 ± 5,8
Ciprofloxacin tablet 500 mg	0,0	10,6 ± 8,7
Clonazepam tablet 2 mg	0,0	1,0 ± 2,1
Enalapril tablet 20 mg	0,0	0,4 ± 0,9
Glibenclamide tablet 5 mg	0,0	0,0 ± 0,2
Ibuprofen tablet 600 mg	0,0	0,4 ± 1,0
Metformin tablet 850 mg	0,0	1,0 ± 1,7
Omeprazole solid oral dosage form 20 mg	31,5	21,8 ± 9,4
Paracetamol oral liquid 200 mg/ml	47,5	8,7 ± 11,9
Salbutamol aerosol 100 micrograms per dose	13,5	22,1 ± 12,9
Simvastatin tablet 20 mg	297,8	308,4 ± 44,7
Sulfamethoxazole + trimethoprim oral liquid (40 mg+8 mg)/ml	0,0	4,6 ± 6,8

*The number of equivalent days was calculated according to the following formula: (number of days each medicine was out of stock x 365 divided by number of days covered by the review for that medicine) .

medicines: availability and accessibility. List of indicators and methods for calculation was described in Table 1.

Three data collection forms were designed. The first was aimed at data collection by direct observation of the current stock in the warehouse and in the PHC units of essential medicines from a key list. The second was aimed at data collection of the stock in the last 12 months through information systems. The third was aimed at survey with patients including socio demographic, health services use and prescribed medicines variables.

The authors have chosen to collect data of the current stock through direct observation to allow comparisons with studies that used this method.

The key list of essential medicines considered priorities for PHC was developed through a consensus among researchers, according to WHO guidelines. The list included 15 medicines from Municipal List of Essential Medicines of Belo Horizonte for treatment of main health problems of the population of the municipality, such as diabetes, systemic arterial hypertension, acute respiratory infections, urinary tract infections, symptoms of inflammation and pain, rheumatoid arthritis, peptic ulcer and hypercholesterolemia.

Data collection

Prior to data collection, a guideline was developed to standardization of procedures. A one-week training was held to data collectors. A pilot study was conducted to verify the feasibility of the data collection. Data collection through direct observation and survey were conducted in November to December 2014 and data collection of yearly availability through information systems was in January 2015. Data entry was performed in a datasheet of PSPP software. A guideline was developed

to standardization of data entry procedures. Data generated had double entry for 10% of the sample to check reliability between researchers. Four datasheets were developed for the warehouse, PHC units, patients and medicines prescribed.

Data analysis

The indicators were described through frequencies, means and standard deviations. Analysis units were the warehouse, PHC unit and patient.

A chi-square test was used to analyze the association of the presence of medicine in Essential Medicine List with dispensing of medicine. An univariate analysis was performed to determine the association of medicine stockout in PHC unit with absence of receiving medicines through logistic regression with calculation of Odds Ratio (OR). A significance level of 5% and a confidence interval of 95% were considered in statistical analyses. The authors used PSPP software to perform statistical analyses.

Ethical aspects

Formal approval from the Ethics Committee of Federal University of Minas Gerais and from the Municipal Secretariat of Health of Belo Horizonte (CAAE 31867714.6.0000.5149) was taken before conducting the research. The interviewed patients signed an Informed Consent Form.

RESULTS

The authors collected data from twenty PHC units and the warehouse of the Northeast District through direct observation. In PHC units, 399 patients were interviewed after dispensing procedure at pharmacies and data from their prescriptions were collected.

The availability of key medicines in current stock in the warehouse of the Northeast District at the time of the visit was 100% and in the past 12 months was 60%. The availability of key medicines in current stock in PHC units at the time of the visit ranged from 86,7% to 100%, with an average of 98,3 ± 3,7%. In the last 12 months, availability in PHC units ranged from 6,7% to 53,3%, with an average of 42,5 ± 13,6%.

Considering the last 12 months, there was a shortage in stocks of the following products in the warehouse: amoxicillin, amoxicillin+clavulanic acid, omeprazole, paracetamol, salbutamol and simvastatin. The medicines that showed a higher average number of days of stockout in PHC units were simvastatin, amoxicillin and salbutamol (Table 2).

The authors found that 1383 medicines were prescribed to patients and 1066 (77,1%) were actually dispensed. The proportion of patients who had received all medicines prescribed was 58,4%. The frequency of medicines dispensed to patients ranged from 0% to 100%, with an average of 81 ± 28%. An association of the presence of medicine in Essential Medicine List with dispensing of medicine was observed (p=0,00).

The patients who had at least one medicine stockout in PHC unit showed 1,8 more chance of not receiving at least one medicine prescribed (OR=1,8; IC95%= 1,1-3,0; p=0,02).

Considering medicines as unit of analysis, 22,8% (315) products prescribed were not dispensed. Among the 315 medicines that were not dispensed, 209 were essential (66,3%). The most frequent medicines among the ones were not dispensed to patients were simvastatin (7,7%), omeprazole (6,2%), paracetamol (5,7%) and ibuprofen (4,3%).

With regard to geographical accessibility, 93,2% of patients took less than 30 min to travel to the PHC unit and 0,8% took more than an hour.

DISCUSSION

The study illustrated that the Northeast District, Belo Horizonte, presented acceptable conditions of availability of key essential medicines

at the time of the visit and of geographical accessibility to PHC services. However, limitations were observed in yearly availability of medicines and in the attendance of patient`s needs for prescribed medicines.

The availability of medicines in stock at the time of the visit was higher than that checked in the last 12 months. This situation may have occurred due to seasonal shortage of medicines in the municipality. In recent years, Municipal Secretariat of Health of Belo Horizonte has had problems acquiring medicines, such as absence of interested companies in selling to public sector and delays in delivery of products. However, association of acquiring problems with availability of medicines should be investigated by other studies designed for this purpose.

The average availability of essential medicines from a key list in stock observed in visits to PHC units was 98,3%. This value was higher than that reported in a study conducted at PHC facilities in Brazil[2] and in Saudi Arabia (59,2%).[4] This situation should be observed considering organization of process of selection and distribution of medicines in Belo Horizonte municipality and considering the use of computerized system, facilitating replacement of products and avoiding shortage.

The proportion of prescribed medicines actually dispensed to patients was 77,1%. Studies performed in Brazil[2] and in Saudi Arabia[4] found higher values for medicines dispensed. The patients who had at least one medicine stockout in PHC unit showed more chance of not receiving at least one medicine prescribed, illustrating negative impact of shortage on patients. The discontinuity in supply of medicines may result in non-adherence to treatment or in acquisition of medicines in private sector at the expense of patients. Among the medicines that presented higher number of days of stockout was salbutamol. This medicine is indicated to asthma treatment, disease that affects around 4,4% of Brazilian population.[6] In the present study, an association of the presence of medicine in Essential Medicine List with dispensing of medicine was observed. The effective adoption of essential medicines list may contribute to improve availability of prescribed medicines to patients in PHC units.

The proportion of patients that spent until 30 min in the way from their residence to PHC unit (93,2%) was similar to that observed from a study conducted in rural communities in Australia.[7] An Australian study found that 90% of residents from closely settled rural communities travel until 30 min to access general practitioner (GP).[7] Comparisons of the results of the present study with the ones found by the Australian study is difficult because of differences in profile of the samples. However, results suggest that time to travel to PHC unit is satisfactory in the Northeast District, but this hypothesis should be tested in other studies.

The limitation of that study was that accessibility was evaluated using only one indicator and did not take into account preferences of patients about travel time to PHC unit. The present study presented information on yearly availability of medicines and accessibility that are evaluated in a limited number of studies.

The improvement in availability of medicines influences the rational use of medicines. The inclusion of pharmacist in the health care team and the academic training of health professionals should contributes to patients receives medicines appropriate to their clinical needs.[8]

CONCLUSION

Actions are recommended to improve availability of medicines in the Northeast District, Belo Horizonte, Brazil. First, carrying out studies analyzing association of shortage with financing and acquisition issues. Second, the adoption of Essential Medicines List by prescribers and their interaction with other professionals of the healthcare team to align prescription to availability of medicines, avoiding interruptions in the patient`s treatment. Third, continuous monitoring of the stock in PHC units by well-trained professionals.

ACKNOWLEDGEMENT

CONFLICT OF INTEREST

The author decalare no conflict of interest.

ABBREVIATION USED

PHC: Primary Health Care; **WHO:** World Health Organization; **OR:** Odds Ratio; **GP:** general practitioner.

ABOUT AUTHORS

Kátia Reis Dutra: Pharmacist, Master in Medicines and Pharmaceutical from Post Graduation Programme in Medicines and Pharmaceutical Services , Manager of District Pharmacy in Northeast Health District of Municipal Secretariat of Health of Belo Horizonte.

Ursula Carolina Morais Martins: Pharmacist, Volunteer researcher in Department of Social Pharmacy, Faculty of Pharmacy, Federal University of Minas Gerais.

Marina Guimarães Lima: Professor in Department of Social Pharmacy, Faculty of Pharmacy, Federal University of Minas Gerais. Her research interest is in the areas of drug utilization and evaluation of pharmaceutical services

REFERENCES

1. Management Sciences for Health. Managing access to medicines and health technologies. Arlington: Management Sciences for Health; 2012.
2. Emmerick IC, Luiza VL, Pepe VL. Pharmaceutical services evaluation in Brazil: broadening the results of a WHO methodology. Cien Saude Colet. 2009;14(4):1297-306.
3. World Health Organization. WHO Operational package for assessing, monitoring and evaluating country pharmaceutical situations: Guide for coordinators and data collectors. Geneva: WHO; 2007.
4. El Mahalli AA, Akl OA, Al-Dawood SF, Al-Nehab AA, Al-Kubaish HA, Al-Saeed S. WHO/INRUD patient care and facility-specific drug use indicators at primary health care centres in Eastern province, Saudi Arabia. East Mediterr Health J. 2012;18(11):1086-90.
5. Xi X, Li W, Li J, Zhu X, Fu C, Wei X. A survey of the availability, prices and affordability of essential medicines in Jiangsu Province, China. BMC Health Serv Res. 2015;15:345.
6. Tavares NUL, Costa KS, Mengue SS, Vieira MLFP, Malta DC, Silva Júnior JB. Uso de medicamentos para tratamento de doenças crônicas não transmissíveis no Brasil: resultados da Pesquisa Nacional de Saúde, 2013. Epidemiol Serv Saude. 2015;24(2):315-23.
7. McGrail MR, Humphreys JS, Ward B. Accessing doctors at times of need-measuring the distance tolerance of rural residents for health-related travel. BMC Health Serv Res. 2015;15:212.
8. Toklu HZ, Hussain A. The changing face of pharmacy practice and the need for a new model of pharmacy education. J Young Pharm. 2013;5(2):38-40.