





Omeprazole prescriptions for older adults in health care units in Curitiba, Brazil: an analysis based on Beers Criteria

Prescrições de omeprazol para idosos em unidades de saúde de Curitiba: análise segundo os Critérios de Beers

Juliana Sambugaro^a , Hudson Prestes dos Santos^b ,
Linda Tiekko Kakitani Morishita^a , Alexandra Ingrid dos Santos Czepula^b 

ABSTRACT

OBJECTIVE: To evaluate omeprazole prescriptions for older adults based on the Beers Criteria, with an analysis of indications and duration of use longer than eight weeks. **METHODS:** In this retrospective cross-sectional study, data were collected from the electronic medical records of older adults with an omeprazole prescription seen at two health care units in Curitiba, Brazil, between June and August 2019. Data were subjected to descriptive statistical analysis, Student t and χ^2 tests. **RESULTS:** Medical records of 386 patients were analyzed, and 69.95% were female. The mean age was 71 (SD, 8.15) years. Most patients had incomplete primary education (50.52%) and income level ranging from one to two Brazilian minimum monthly wages (39.90%). No indication for omeprazole prescription was found in 23.83% of medical records. Use longer than eight weeks was predominant for all indications in 96.60% of medical records. Duration of use more extended than the Beers Criteria recommendation was independent of sex ($p = 0.327$), education ($p = 0.805$), and income level ($p = 0.629$). A relationship between polypharmacy and long-term drug use was demonstrated ($p < 0.001$). **CONCLUSION:** The results of this study suggest the need for periodic review of omeprazole prescriptions considering deprescribing when they appropriate. **KEYWORDS:** omeprazole; proton pump inhibitors; aged; medication errors.

RESUMO

OBJETIVO: Avaliar as prescrições de omeprazol para idosos de acordo com os Critérios de Beers, por meio das indicações e do tempo de uso do medicamento por período superior a oito semanas. **METODOLOGIA:** Estudo transversal, retrospectivo, no qual foram coletados dados dos prontuários eletrônicos de idosos com prescrição de omeprazol atendidos entre junho e agosto de 2019 em duas unidades de saúde em Curitiba. Os dados foram submetidos à análise estatística descritiva e aos testes t de Student e do χ^2 . **RESULTADOS:** Foram analisados prontuários de 386 usuários, sendo 69,95% do sexo feminino. A média de idade foi de 71 anos (DP, 8,15). A maioria dos usuários tem ensino fundamental incompleto (50,52%) e faixa de renda de um a dois salários mínimos (39,90%). Não foi encontrada a indicação para a prescrição de omeprazol em 23,83% dos prontuários. O uso por período superior a oito semanas foi predominante, para todas as indicações, em 96,60% dos prontuários. Demonstrou-se que o tempo de uso superior ao recomendado nos Critérios de Beers independe do sexo ($p = 0,327$), da escolaridade ($p = 0,805$) e da faixa de renda ($p = 0,629$). Evidenciou-se a relação entre polifarmácia e uso do medicamento por períodos prolongados ($p < 0,001$). **CONCLUSÃO:** Os resultados deste estudo apontam para a necessidade de revisão periódica das prescrições de omeprazol, considerando-se a desprescrição quando apropriado. **PALAVRAS-CHAVE:** omeprazol; inibidores da bomba de prótons; idosos; erros de medicação.

^aCuritiba's City Council – Curitiba (PR), Brazil.

^bFaculdades Pequeno Príncipe – Curitiba (PR), Brazil.

Correspondence data

Juliana Sambugaro – Av. Cândido de Abreu, 817 – Centro Cívico – CEP: 80530908 – Curitiba (PR), Brasil. E-mail: juli.sambugaro@gmail.com

Received on: 03/4/2021. Accepted on: 07/22/2021.

How to cite this article: Sambugaro J, Santos HP, Morishita LTK, Czepula AIS. Omeprazole prescriptions for older adults in health care units in Curitiba, Brazil: an analysis based on Beers Criteria. *Geriatr Gerontol Aging*. 2021;15:e0210038. <https://doi.org/10.53886/gga.e0210038>



This article is published in Open Access under the Creative Commons Attribution license, which allows use, distribution, and reproduction in any medium, without restrictions, as long as the original work is correctly cited.

INTRODUCTION

Proton pump inhibitors (PPIs) are prodrugs that, when activated under acid conditions, irreversibly inhibit pump molecules, suppressing up to 95.00% of gastric acid secretion for 24 to 48 hours.¹ They are indicated for cases of gastroesophageal reflux disease (GERD), Zollinger-Ellison syndrome, treatment of *Helicobacter pylori* infection in conjunction with antibiotics, prevention of ulcers induced by nonsteroidal anti-inflammatory drugs (NSAIDs), and treatment of gastric or duodenal ulcers.² Omeprazole is the most prescribed PPI in Brazil, as it has the lowest cost and is included in the Brazilian National List of Essential Medicines.^{3,4}

PPIs are frequently prescribed for prolonged periods because they are considered safe and effective. However, some studies have shown long-term adverse effects,² including hypomagnesemia, vitamin B12 deficiency, fracture risk (possibly related to reduced calcium absorption), cardiovascular risk (due to interaction with clopidogrel), *Clostridioides difficile* infection, pneumonia, fundic gland polyps, gastric cancer, and risk of chronic kidney disease.^{5,6} Also, a study associated regular PPI use for more than two years with an increased risk of type 2 diabetes.⁷ Older adults are particularly vulnerable to these effects.⁸

Older adults in Brazil accounted for 9.30% of the total population in 2019, with a projected increase to 13.60% by 2030 and 22.70% by 2050.⁹ Such demographic changes are accompanied by differences in the epidemiological profile, such as increased mortality from chronic diseases.¹⁰ Multiple drugs are usually prescribed for treating these diseases, which characterizes polypharmacy.¹¹ Because of its complexity, polypharmacy may lead to treatment nonadherence and inappropriate medication use. Such factors, together with the physiological effects of aging, make older adults susceptible to adverse drug reactions and drug interactions.¹²

To assist in prescriptions for the older population, some criteria for potentially inappropriate medication use have been established, including the Beers Criteria, developed by the American Geriatrics Society,¹³ and the STOPP (Screening Tool of Older Persons' Potentially Inappropriate Prescriptions),¹⁴ developed in Ireland.

PPIs are potentially inappropriate medications for older adults. According to the Beers Criteria, their use should be avoided for longer than eight weeks, except in high-risk patients (eg, continuous NSAID use, esophagites, or pathological hypersecretory conditions) or in those with a demonstrated need for maintenance treatment.¹³ When indication is inadequate or when therapy duration exceeds the recommended period, deprescribing, a systematic process of identification and discontinuation of potentially inappropriate medications, should be considered to minimize polypharmacy.¹⁵

Therefore, this study aimed to evaluate omeprazole prescriptions for older adults seen at health care units in Curitiba, Paraná, Brazil, based on the Beers Criteria, with an analysis of indications and duration of use longer than eight weeks.

METHODS

In this retrospective cross-sectional study, data were collected from the electronic medical records of older adults with omeprazole prescriptions who were seen in June, July, and August 2019 at two randomly chosen municipal health care units in Curitiba. The sample was obtained from omeprazole activity reports available for the period. An electronic health management system (e-governança Saúde) was used to access reports and medical records.

Those aged 60 years or over, in accordance with the Brazilian Senior Citizen Statute,¹⁶ fully registered with the health care units, whose omeprazole prescriptions had been issued internally were included in the study. Data were collected by consulting electronic medical records and completing specific forms. The following were extracted:

1. sociodemographic data (sex, age, education, and income level);
2. indications for omeprazole use recorded in medical appointments;
3. duration of omeprazole use based on the history of drug prescription and dispensing in the past six years; and
4. presence of polypharmacy (yes or no) based on the history of prescribed drugs. Polypharmacy was defined as prescription of at least five drugs, a criterion adopted in the state of Paraná.¹⁰

Information collected from the medical records was entered in a Microsoft Office Excel 16 database. The data were tabulated with Sphinx Léxica, a quantitative/qualitative data analysis software, version 5.1.0.8. TIBCO Statistica, version 13.5.0.17, was used for statistical tests.

Descriptive analysis was used to characterize the sample, based on calculations of mean and frequency (absolute and relative). The Student t-test was used to ascertain whether there was a statistically significant difference between the mean ages of men and women. The χ^2 test and, when applicable, Yates correction were used to assess associations between duration of omeprazole use and polypharmacy, sex, education, and income level. Significance level for all tests was set at 5%.

This study was approved by the Research Ethics Committee of Curitiba's Municipal Health Department (CAAE certificate number 28680720.3.0000.0101).

RESULTS

The medical records of 456 patients seen at the two health care units were consulted, and 70 were excluded because registration was lost after death or because omeprazole prescription was issued externally. Thus, the final sample consisted of 386 medical

records. In this sample, 270 (69.95%) patients were female and 116 (30.05%) were male. The age ranged from 60 to 100 years, with a mean age of 71 (SD, 8.15) years. No statistically significant difference was found between the means regarding sex ($p = 0.70$).

In this study, as described in Table 1, there was a predominance of patients with incomplete primary education (50.52%) and income level ranging from one to two Brazilian minimum monthly wages (39.90%). Polypharmacy was found in 61.14% of medical records. The χ^2 test with Yates correction showed that the presence of polypharmacy was sex-independent ($\chi^2 = 2.14$; $p = 0.14$).

Regarding duration of omeprazole use, most patients (49.74%) were taking the drug for five years or over. The percentage was 54.81% in the female group versus 37.93% in the male group, which shows a statistically significant difference ($\chi^2 = 13.63$; $p = 0.01$).

In indications for use, the option “others” was the most described in the medical records (34.20%). Upper gastrointestinal (GI) endoscopy reports, the most frequent findings being hiatal hernia and gastritis, as well as symptoms (dyspepsia, epigastric pain, pyrosis) that warranted an omeprazole prescription were included in this option. There was no indication for omeprazole prescription in 23.83% of medical records. The indication for gastric mucosal protection by NSAID use can be inferred in 21.24% of medical records with a prescription of acetylsalicylic acid (ASA) 100 mg for prevention of cardiovascular events.

The Beers Criteria were used to assess duration of omeprazole use and indications. As shown in Table 2, use longer than eight weeks was predominantly identified for all indications in 96.60% of medical records.

Table 1. Distribution of sociodemographic and clinical variables in the older adult sample according to sex.

Age	Female		Male		Total	
	mean	SD	mean	SD	mean	SD
	71.00	8.3	70.60	7.8	70.90	8.2
	n	%	n	%	n	%
Education						
Illiterate	17	6.30	5	4.31	22	5.70
Incomplete primary school	140	51.85	55	47.41	195	50.52
Complete primary school	53	19.63	31	26.72	84	21.76
Incomplete secondary school	20	7.41	8	6.90	28	7.25
Complete secondary school	24	8.89	8	6.90	32	8.29
Incomplete tertiary school	7	2.59	4	3.45	11	2.85
Complete tertiary school	9	3.33	5	4.31	14	3.63
Total	270	100	116	100	386	100
Income level						
No income	90	33.33	8	6.90	98	25.39
Up to 1 minimum monthly wage	0	0	0	0	0	0
1 – 2 minimum monthly wages	111	41.11	43	37.07	154	39.90
2 – 3 minimum monthly wages	24	8.89	30	25.86	54	13.99
3 – 5 minimum monthly wages	13	4.81	17	14.66	30	7.77
5 – 10 minimum monthly wages	2	0.74	8	6.90	10	2.59
No information	30	11.11	10	8.62	40	10.36
Total	270	100	116	100	386	100
Polypharmacy						
Yes	172	63.70	64	55.17	236	61.14
No	98	36.30	52	44.83	150	38.86
Total	270	100	116	100	386	100
Duration of omeprazole use						
0 – 2 months	7	2.59	6	5.17	13	3.37
2 – 6 months	8	2.96	3	2.59	11	2.85
6 months – 1 year	11	4.07	9	7.76	20	5.18
1 – 2 years	37	13.70	14	12.07	51	13.21
2 – 5 years	59	21.85	40	34.48	99	25.65
5 years or over	148	54.81	44	37.93	192	49.74
Total	270	100	116	100	386	100

Continue...

Table 1. Continuation.

Age	Female		Male		Total	
	mean	SD	mean	SD	mean	SD
	71.00	8.3	70.60	7.8	70.90	8.2
	n	%	n	%	n	%
Indications for omeprazole use						
Gastroesophageal reflux disease	38	14.07	17	14.66	55	14.25
Gastric/duodenal ulcer	2	0.74	5	4.31	7	1.81
Erosive esophagitis	9	3.33	6	5.17	15	3.89
<i>Helicobacter pylori</i> infection	2	0.74	1	0.86	3	0.78
Gastric mucosal protection (NSAID use)*	50	18.52	32	27.59	82	21.24
Others [†]	93	34.44	39	33.62	132	34.20
No indication in the medical record	76	28.15	16	13.79	92	23.83
Total	270	100	116	100	386	100

SD, standard deviation; NSAID, nonsteroidal anti-inflammatory drug; *patients with an acetylsalicylic acid 100 mg prescription; [†]other indications, such as reporting of symptoms and/or tests that warranted an omeprazole prescription.

Table 2. Duration of omeprazole use among older adults according to indications.

Indication for use	Up to eight weeks of use		Over eight weeks of use		Total	
	n	%	n	%	n	%
Gastroesophageal reflux disease	1	7.70	54	14.50	55	14.20
Gastric/duodenal ulcer	0	0	7	1.90	7	1.80
Erosive esophagitis	1	7.70	14	3.80	15	3.90
<i>Helicobacter pylori</i> infection	0	0	3	0.80	3	0.80
Gastric mucosal protection (NSAID use)*	1	7.70	81	21.70	82	21.20
Others [†]	8	61.50	124	33.20	132	34.20
No indication in the medical record	2	15.40	90	24.10	92	23.80
Total	13	100	373	100	386	100

NSAID, nonsteroidal anti-inflammatory drug; *patients with an acetylsalicylic acid 100 mg prescription; [†]other indications, such as reporting of symptoms and/or tests that warranted an omeprazole prescription.

Table 3. Association between sociodemographic variables and duration of omeprazole use.

Variable	Up to eight weeks of use	Over eight weeks of use	Total	p-value
	n (%)	n (%)	n (%)	
Sex				
Female	7 (2.59)	263 (97.41)	270 (100)	0.32
Male	6 (5.17)	110 (94.83)	116 (100)	
Total	13	373	386	
Education*				
Illiterate to primary education	10 (3.32)	291 (96.68)	301 (100)	0.80
Secondary education to tertiary education	3 (3.53)	82 (96.47)	85 (100)	
Total	13	373	386	
Income level*				
< 5 minimum monthly wages	9 (2.68)	327 (97.32)	336 (100)	0.62
5 – 10 minimum monthly wages	0 (0.00)	10 (100)	10 (100)	
Total	9	337	346	

*Variables were grouped into two categories to enable the application of the χ^2 test with Yates correction; accepted significance level was $p < 0.05$.

Table 3 shows associations between duration of omeprazole use and sociodemographic variables. Duration of use longer than eight weeks, ie, exceeding the recommendation in the Beers Criteria, was independent

of sex ($p = 0,32$), education ($p = 0.80$), and income level ($p = 0.62$).

The relationship between polypharmacy and duration of omeprazole use is shown in Table 4. Most patients (91.90%)

Table 4. Relationship between polypharmacy and duration of omeprazole use.

Duration of omeprazole use	Polypharmacy (yes)		p-value
	n	%	
Up to 1 year	19	8.10	< 0.001*
Over 1 year	217	91.90	
Total	236	100	

*Accepted significance level was $p < 0.05$.

who were taking omeprazole for more than one year had prescriptions for at least five medications. There is a clear relationship between polypharmacy and long-term use of omeprazole ($p < 0.001$).

DISCUSSION

The reported results show a higher prevalence of omeprazole prescriptions for female patients, similar to the results of previous studies.¹⁷⁻¹⁹ Long-term drug use was also significantly higher among women, as 54.81% took omeprazole for five years or over, which may be related to the higher prevalence of dyspepsia and greater demand for health care services by women compared with men.^{20,21}

Income level ranging from one to two Brazilian minimum monthly wages and incomplete primary education were the most frequently reported data in medical records. This follows the pattern of Brazilian Institute of Geography and Statistics estimates for the state of Paraná.²²

This study suggests a relationship between polypharmacy and long-term omeprazole use (over one year). The drug is commonly prescribed for gastric protection when the patient is taking multiple medications, regardless of its harmful potential. However, this indication is not approved, since not all drugs cause adverse effects on the gastric mucosa.²³

Gastric protection is warranted when NSAIDs such as ASA are administered. The indication of low-dose ASA for secondary prevention of cardiovascular diseases is well established. However, it is associated with adverse GI effects, which may compromise treatment adherence. Therefore, co-therapy with a PPI, such as omeprazole, is the most accepted strategy to reduce ASA-related damage to the upper GI tract.²⁴ In this study, co-therapy was found in 21.24% of medical records.

Similar to the findings of other studies, some omeprazole prescriptions had no reason described in the medical records and covered prolonged periods.^{18,19} Garrido and Hernández¹⁸ analyzed long-term PPI use in patients with a mean age

of 70.9 years in a health care center in Spain. Omeprazole was the most used PPI (83.50%). Over a third of patients (35.80%) had no indication for use and 75.00% took it for more than five years.

A study in Brazil conducted by Hipólito et al.¹⁹ showed a relationship between longer omeprazole use, older age, and number of prescribed drugs. Most patients (84.30%) took omeprazole for over six months, and 29.50% had no reason for use in the medical record.

In this study, the medical records in which no indication for omeprazole use was found were defined as failing to meet the Beers Criteria, especially because in 97.80% of the cases the drug was taken for more than eight weeks. Appropriately prescribed indications for a short period (GERD, *Helicobacter pylori* infection, and others) but extending for long periods, exceeding eight weeks, were also defined as failing to meet the criteria, as their value was potentially low.⁸

The assessment of risks and benefits of PPIs should be performed periodically, and deprescribing should be considered in the event of symptom remission or when therapy duration exceeds the recommended period.²⁵ Some deprescribing strategies have been shown to be effective, including:

- gradual dose reduction before discontinuation to avoid a rebound effect;
- on-demand use, in which patients take a PPI once a day, if necessary, until symptoms disappear; and
- prescription of other drug classes (antacids, H₂ receptor antagonists, and alginates) for managing occasional symptoms.²⁶

In addition, lifestyle changes should be discussed individually in an attempt to reduce or fully discontinue PPIs.²⁵

This study has some limitations, including the difficulty in finding complete information in the medical records, such as indications for omeprazole use. The lack of indication for use in the medical records does not exclude the possibility that the indication was based on unrecorded evidence. Also, there was a lack of up-to-date reports of upper GI endoscopy and other tests that warranted omeprazole use, as most results dated back to over two years.

CONCLUSION

This study evaluated omeprazole prescriptions in older adults and found that most of them do not meet the Beers Criteria, as they do not have an evidence-based indication or exceed the recommended treatment duration, which is

consistent with previous studies. An association between polypharmacy and long-term omeprazole use was also demonstrated. Although more studies are required, the results suggest the need for periodic review of these prescriptions considering deprescribing when they are inappropriate.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

FUNDING

None.

AUTHORS' CONTRIBUTIONS

JS: Conceptualization, Investigation, Methodology, Writing – original draft. HPS: Methodology, Data curation, Formal Analysis, Software. LTKM: Supervision. AISC: Supervision, Writing – review & editing

REFERENCES

- Wallace JL, Sharkey KA. Farmacoterapia da acidez gástrica, úlceras pépticas e doença do refluxo gastroesofágico. In: Brunton LL, Chabner BA, Knollmann BC. *As bases farmacológicas da terapêutica de Goodman & Gilman*. 12th. ed. Porto Alegre: AMGH; 2012. p. 1310-1311.
- Nehra AK, Alexander JA, Loftus CG, Nehra V. Proton pump inhibitors: review of emerging concerns. *Mayo Clin Proc*. 2018;93(2):240-6. <https://doi.org/10.1016/j.mayocp.2017.10.022>
- Brasil. Ministério da Saúde. Secretaria de Ciência, Tecnologia e Insumos Estratégicos. *Uso racional de medicamentos: temas selecionados*. Brasília: Ministério da Saúde; 2012.
- Brasil. Ministério da Saúde. *Relação Nacional de Medicamentos Essenciais: RENAME 2020*. Brasília: Ministério da Saúde; 2020.
- Eusebi HL, Rabitti S, Artesani ML, Gelli D, Montagnani M, Zagari RM, et al. Proton pump inhibitors: risks of long-term use. *J Gastroenterol Hepatol*. 2017;32(7):1295-302. <https://doi.org/10.1111/jgh.13737>
- Lazarus B, Chen Y, Wilson FP, Sang Y, Chang AR, Coresh J, et al. Proton pump inhibitor use and the risk of chronic kidney disease. *JAMA Intern Med*. 2016;176(2):238-46. <https://doi.org/10.1001/jamainternmed.2015.7193>
- Yuan J, He Q, Nguyen LH, Wong MCS, Huang J, Yu I, et al. Regular use of proton pump inhibitors and risk of type 2 diabetes: results from three prospective cohort studies. *Gut*. 2021;70(6):1070-7. <https://doi.org/10.1136/gutjnl-2020-322557>
- Mafi JN, May FP, Kahn KL, Chong M, Corona E, Yang L, et al. Low-value proton pump inhibitor prescriptions among older adults at a large academic health system. *J Am Geriatr Soc*. 2019;67(12):2600-4. <https://doi.org/10.1111/jgs.16117>
- United Nations. Department of Economic and Social Affairs. *World population prospects 2019: Volume II: demographic profiles*. New York: United Nations; 2019.
- Paraná. Secretaria de Estado da Saúde do Paraná. Superintendência de Atenção à Saúde. *Linha guia da saúde do idoso*. Curitiba: SESA; 2018.
- Hayes BD, Klein-Schwartz W, Barrueto Júnior F. Polypharmacy and the geriatric patient. *Clin Geriatr Med*. 2007;23(2):371-90. <https://doi.org/10.1016/j.cger.2007.01.002>
- Simonson W, Feinberg JL. Medication-related problems in the elderly: defining the issues and identifying solutions. *Drugs Aging*. 2005;22(7):559-69. <https://doi.org/10.2165/00002512-200522070-00002>
- By the 2019 American Geriatrics Society Beers Criteria® Update Expert Panel. American Geriatrics Society 2019 Updated AGS Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults. *J Am Geriatr Soc*. 2019;67(4):674-94. <https://doi.org/10.1111/jgs.15767>
- Gallagher P, O'Mahony D. STOPP (Screening Tool of Older Persons' potentially inappropriate Prescriptions): application to acutely ill elderly patients and comparison with Beers' criteria. *Age Ageing*. 2008;37(6):673-9. <https://doi.org/10.1093/ageing/afn197>
- Scott IA, Hilmer SN, Reeve E, Potter K, Le Couteur D, Rigby D, et al. Reducing inappropriate polypharmacy: the process of deprescribing. *JAMA Intern Med*. 2015;175(5):827-34. <https://doi.org/10.1001/jamainternmed.2015.0324>
- Brasil. Lei nº 10.741, de 1 de outubro de 2003. *Dispõe sobre o Estatuto do Idoso e dá outras providências*. Brasília: Diário Oficial da União; 2003.
- Emura-Vélez MH, Aguirre-Cardona M, Cardona-Echeverri DM, García-Maurno MA, García-Ospina DA, Gutiérrez-Osorio EA, et al. Prescripción-indicación de los inhibidores de la bomba de protones: costo de la prescripción inadecuada en un primer nivel en Colombia. *Acta Med Colomb [Internet]* 2018 [Accessed in 2020 Oct 10];43(4). Available in: <https://pesquisa.bvsalud.org/portal/resource/pt/biblio-983704>
- Garrido MA, Hernández ISM. Adecuación y seguridad en el consumo crónico de inhibidores de la bomba de protones. *Rev Clin Med Fam [Internet]* 2017 [Accessed in 2020 Oct 10];10(2). Available in: https://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1699-695X2017000200070
- Hipólito P, Rocha BS, Oliveira FJAQ. Perfil de usuários com prescrição de omeprazol em uma Unidade Básica de Saúde do Sul do Brasil: considerações sobre seu uso racional. *Rev Bras Med Fam Comunidade*. 2016;11(38):1-10. [https://doi.org/10.5712/rbmfc11\(38\)1153](https://doi.org/10.5712/rbmfc11(38)1153)
- Levorato CD, Mello LM, Silva AS, Nunes AA. Fatores associados à procura por serviços de saúde numa perspectiva relacional de gênero. *Cien Saude Colet*. 2014;19(4):1263-74. <https://doi.org/10.1590/1413-81232014194.01242013>
- Ford AC, Marwaha A, Sood R, Moayyedi P. Global prevalence of, and risk factors for, uninvestigated dyspepsia: a meta-analysis. *Gut*. 2015;64(7):1049-57. <https://doi.org/10.1136/gutjnl-2014-307843>
- Instituto Brasileiro de Geografia e Estatística. *Síntese de indicadores sociais (SIS) 2019*. Available from: <https://www.ibge.gov.br/estatisticas/sociais/saude/9221-sintese-de-indicadores-sociais.html>. Accessed in Nov 14, 2020.
- Gorostiaga JM, Orella EE, Hernández BC. Análisis de la utilización de antiulcerosos inhibidores de la bomba de protones en el área de atención primaria de la comarca Araba. *Rev Esp Salud Publica*. 2018;92:e201808047. PMID: 30100604
- García-Rayado G, Sostres C, Lanás A. Aspirin and omeprazole for secondary prevention of cardiovascular disease in patients at risk for aspirin-associated gastric ulcers. *Expert Rev Clin Pharmacol*. 2017;10(8):875-88. <https://doi.org/10.1080/17512433.2017.1324782>
- Pezeshkian S, Conway SE. Proton pump inhibitor use in older adults: long-term risks and steps for deprescribing. *Consult Pharm*. 2018;33(9):497-503. <https://doi.org/10.4140/TCPh.2018.497>
- Kim J, Blackett JW, Jodorkovsky D. Strategies for effective discontinuation of proton pump inhibitors. *Curr Gastroenterol Rep*. 2018;20(6):27. <https://doi.org/10.1007/s11894-018-0632-y>