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Prevalence of self-medication in the adult population of Brazil: a systematic review

Prevalência da automedicação na população adulta do Brasil: revisão sistemática

ABSTRACT

OBJECTIVE: To evaluate the prevalence of self-medication in Brazil's adult population.

METHODS: Systematic review of cross-sectional population-based studies. The following databases were used: Medline, Embase, Scopus, ISI, CINAHL, Cochrane Library, CRD, Lilacs, SciELO, the *Banco de teses brasileiras* (Brazilian theses database) (Capes) and files from the *Portal Domínio Público* (Brazilian Public Domain). In addition, the reference lists from relevant studies were examined to identify potentially eligible articles. There were no applied restrictions in terms of the publication date, language or publication status. Data related to publication, population, methods and prevalence of self-medication were extracted by three independent researchers. Methodological quality was assessed following eight criteria related to sampling, measurement and presentation of results. The prevalences were measured from participants who used at least one medication during the recall period of the studies.

RESULTS: The literature screening identified 2,778 records, from which 12 were included for analysis. Most studies were conducted in the Southeastern region of Brazil, after 2000 and with a 15-day recall period. Only five studies achieved high methodological quality, of which one study had a 7-day recall period, in which the prevalence of self-medication was 22.9% (95%CI 14.6;33.9). The prevalence of self-medication in three studies of high methodological quality with a 15-day recall period was 35.0% (95%CI 29.0;40.0, I² = 83.9%) in the adult Brazilian population.

CONCLUSIONS: Despite differences in the methodologies of the included studies, the results of this systematic review indicate that a significant proportion of the adult Brazilian population self-medicates. It is suggested that future research projects that assess self-medication in Brazil standardize their methods.

DESCRIPTORS: Adult. Self Medication. Prevalence. Cross-Sectional Studies. Review.

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RESUMO

OBJETIVO: Avaliar a prevalência da automedicação na população adulta do Brasil.

MÉTODOS: Revisão sistemática de estudos transversais de base populacional. Foram utilizadas as seguintes bases bibliográficas: Medline, Embase, Scopus, ISI, CINAHL, Cochrane Library, CRD, Lilacs, SciELO, Banco de teses da Capes e Portal Domínio Público. Foram adicionalmente examinadas as listas de referências bibliográficas dos estudos relevantes para identificar artigos potencialmente elegíveis. Não foram aplicadas restrições por data de publicação, idioma ou *status* de publicação. Dados referentes à publicação, população, métodos e prevalência da automedicação foram extraídos por três pesquisadores independentes. Avaliou-se a qualidade metodológica seguindo oito critérios relacionados à amostragem, mensuração e apresentação dos resultados. As prevalências foram obtidas dos participantes que utilizavam pelo menos um medicamento durante o período recordatório dos estudos.

RESULTADOS: A triagem na literatura identificou 2.778 registros, dos quais 12 foram incluídos para análise. A maioria foi realizada na região Sudeste, após o ano 2000 e com período recordatório de 15 dias. Apenas cinco estudos alcançaram alta qualidade metodológica, dos quais um estudo com período recordatório de sete dias mostrou prevalência de automedicação de 22,9% (IC95% 14,6;33,9). A prevalência da automedicação nos três estudos de alta qualidade metodológica com período recordatório de 15 dias foi 35,0% (IC95% 29,0;40,0, $I^2 = 83,9\%$) na população adulta brasileira.

CONCLUSÕES: Apesar das diferenças encontradas nas metodologias dos estudos incluídos, os resultados dessa revisão sistemática indicam que significativa proporção da população adulta brasileira se automedica. Sugere-se padronização entre os métodos dos futuros estudos que avaliem a prática da automedicação no Brasil.

DESCRIPTORIOS: Adulto. Automedicação. Prevalência. Estudos Transversais. Revisão.

INTRODUCTION

Brazil is one of the world's main consumers of medications, with its medicines market reaching US\$22,1 billion annually.¹⁵ Brazil's pharmaceutical sector is made up of approximately 480 companies that work directly with the medicine production, distribution and sale.^a Brazil has more than 65,000 pharmacies and drugstores, which is a proportion of 3.3 pharmacies for every 10,000 inhabitants, a number that is three times greater than what is recommended by the World Health Organization (WHO), which recommends one pharmacy for every 10,000 inhabitants.^b

There is a greater possibility of irrational use of medicines as a result of their wide availability. According to the WHO,^c more than 50.0% of all medicines are incorrectly prescribed, dispensed and sold, along with half of all patients incorrectly using them. One of the contributing factors towards drug misuse is the inadequate self-medication practice.²¹

Approximately one-third of hospitalizations in Brazil are due to incorrect drug use.¹ In 2011, drug poisoning made up 29.5% of all cases of poisonings recorded in Brazil and 16.9% of all cases of death by poisoning were related to medicines.^d

^a Ministério da Saúde. Secretaria de Políticas de Saúde. Departamento de Atenção Básica. Política nacional de medicamentos. Brasília (DF); 2001.

^b Federação Brasileira das Redes Associativistas de Farmácias. Quem somos. São Paulo; 2013 [cited 2014 May 26]. Available from: [http://febrafar.com.br/a-febrafar/\(rodap%E9\)](http://febrafar.com.br/a-febrafar/(rodap%E9))

^c World Health Organization. Medicines: rational use of medicines [Internet]. Geneva; 2013 [cited 2014 Apr 13]. Available from: <http://www.who.int/mediacentre/factsheets/fs338/en/>

^d Sistema Nacional de Informações Tóxico-Farmacológicas. Óbitos registrados de intoxicação humana por agente tóxico e circunstância. Rio de Janeiro (RJ): Fundação Oswaldo Cruz; 2011.

Self-medication is practiced due to multiple factors, including the population's difficulty to reach health services, the belief in the benefits provided by disease treatment/prevention and the need to relieve symptoms.² On the other hand, Brazil lacks data regarding the prevalence of self-medication, despite it being an issue of concern for government authorities.³

The objective of this study was to evaluate the prevalence of self-medication in Brazil's adult population.

METHODS

The protocol for this systematic review was registered based on the International Prospective Register of Systematic Reviews (PROSPERO – registration CRD42013006652).

Population-based cross-sectional studies were eligible when performed in Brazil and along with the evaluation of self-medication prevalence in adult individuals. Studies limited to self-medication for any disease or other conditions were excluded, as were those that did not report the recall period for self-medication, those that included only older adults (> 65 years) and those conducted with specific population groups, such as indigenous ones. These exclusions were intended to ensure that all studies included in the review were populational, since they reflect the prevalence of self-medication with greater accuracy.

The following databases were used to search for studies: Medline (via PubMed), Embase, Scopus, Institute for Scientific Information (ISI), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Library, Centre for Reviews and Dissemination (CRD), *Literatura Latino-Americana em Ciências da Saúde* (LILACS – Latin American literature in Health Sciences), Scientific Electronic Library Online (SciELO), *Banco de teses brasileiras* (CAPES – Brazilian theses database) and files from *Portal Domínio Público* (Brazilian Public Domain). There were no language, date of publication or publication status constraints applied.

The following search strategy was used to perform the search in Medline, with it being adapted for other databases: (“Self Medication” [Mesh] OR “Self Medication” [TIAB] OR “Self Medications” [TIAB] OR “Self Medications” [TIAB] OR “Self Medication” [TIAB]) OR (“Health Surveys” [Mesh] OR “Surveys” [TIAB] OR “Survey” [TIAB] OR “Cross-Sectional Studies” [Mesh] OR “Prevalence” [TIAB] OR “Frequency” [TIAB]) AND (“Pharmacology” [TIAB] OR “Drug” [TIAB] OR “Drugs” [TIAB] OR “Medicine” [TIAB] OR “Remedy” [TIAB] OR “Medication” [TIAB]) AND (“Brazil” [Mesh] OR “Brazil” [TIAB] OR “Brazil” [TIAB]) AND (“Population” [Mesh] OR “Population” [TIAB] OR “Populations” [TIAB] OR “population-based study” [TIAB]).

The research was performed from July 2012 to August 2013. The lists of relevant bibliographical references from the studies were examined to identify other potentially eligible publications.

Three reviewers who were experienced in preparing systematic reviews, independently selected studies and evaluated their titles and abstracts; this was done in such a fashion that no one reviewer knew the choices made by the other reviewers during this process. Decisions regarding whether to include or exclude articles were made jointly by all researchers.

The three reviewers independently extracted data from the selected studies, and entered them into an online spreadsheet that had been designed for this purpose. A decision was made by consensus in the event of disagreement. The following data were extracted: author's name, publication year, research completion year, city and state, primary objective, age group of the population under study, sampling type, mean participant age, recall period, means for measuring self-medication, sample size, gender, prevalence of self-medication and comorbidities. The authors of the included studies were contacted in cases where the data were not available in the article.

Assessing the methodological quality of the studies was done independently by two reviewers. The methodological quality assessment was performed based on eight criteria that had been adapted from Loney et al,¹¹ with each one obtaining a score of zero or one. The studies received a score when they presented the following criteria:

- Sample: suitable if the study was performed on the entire population or if performed using probability sampling.
- Sampling source: censitary.
- Sample size: suitable if statistically calculated.
- Outcome measurement: self-medication recall period ≤ 15 days, not restricted to people who kept their medicine prescription, label or packaging.
- Impartial interviewer: results researched by trained interviewers.
- Response rate: considered suitable if ≥ 70.0%.
- Prevalence with 95%CI: self-medication prevalence analysis of people who consumed medicines and of the subgroup (gender).
- Similar participants: description of the subject under study – adults from 18 to 65 years of age.

The total score obtained could vary from zero (low quality) to eight (high quality). The surveys were considered to be high quality when a score of ≥ 6 was reached. No study was excluded due to low methodological quality.

The description of the studies and their self-medication prevalence results in each group were prioritized. The prevalences were recorded from participants who used at least one medicinal product during the recall period of each study.

A sensitivity analysis was performed to ascertain the possible causes of heterogeneity, investigating the studies grouped by the following variables: 15-day recall period, survey conducted after 2000, high methodological quality, and high methodological quality with a 15-day recall period.

The Chi-square and inconsistency test, estimated by the I-squared (I^2), were calculated to evaluate heterogeneity among the studies. All analyses were performed using Stata[®] statistical software (version 11.2).

RESULTS

From the literature search, 2,778 records were recovered and 61 articles were selected to have their full texts analyzed following the evaluation of the titles

and their abstracts. Articles that were potentially eligible ($n = 7$), whose texts could not be obtained, even after attempts were made to contact the authors, were excluded. A total of 12 articles met all the eligibility criteria (Figure 1).

The main characteristics of the studies included are presented in Table 1. Surveys that were applied after 2000, in most cases, had a 15-day recall period, a higher proportion of female participants and were performed in Brazil's Southeastern region, with Sao Paulo being the state with the most studies. Only one study covered several Brazilian states.⁷ Eight studies were designed to evaluate drug consumption,^{7,17,18,20,e,f,g,h} whose subanalyses presented a prevalence of self-medication.

Based on the methodological quality assessment using the eight criteria, five studies had a high quality according to the adopted criterion (≥ 6 points). Table 2 presents the results from this evaluation. The overall quality mean was 5.2 points. No study reached the maximum score. The items referring to sampling and

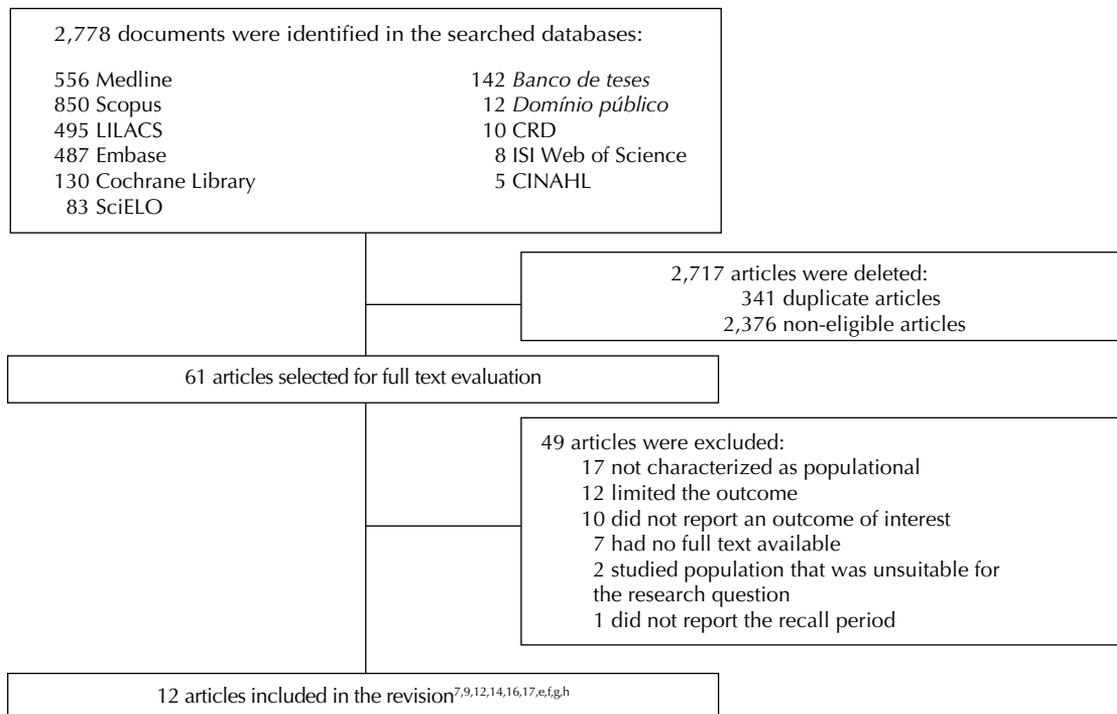


Figure 1. Flowchart of the search result, selection and inclusion of studies.

^o Arrais PSD. Epidemiologia do consumo de medicamentos e eventos adversos no município de Fortaleza-CE [doctoral thesis]. Salvador (BA): Universidade Federal da Bahia; 2004 [cited 2014 Jun 24]. Available from: <https://repositorio.ufba.br/ri/bitstream/ri/10905/1/22222222.pdf>

^f Barros MBA. Saúde e classe social: um estudo sobre morbidade e consumo de medicamentos [doctoral thesis]. Ribeirão Preto (SP): Universidade de São Paulo; 1983.

^g Mendes CMM. Perfil da automedicação em duas populações do município de Teresina [master dissertation]. Fortaleza (CE): Universidade Federal do Ceará; 2010. [cited 2014 Jun 26]. Available from: http://www.repositorio.ufc.br/bitstream/riufc/2268/1/2010_dis_cmmendes.pdf

^h Pelicioni AF. Padrão de consumo de medicamentos em duas áreas da Região Metropolitana de São Paulo 2001-2002 [master dissertation]. São Paulo (SP): Universidade de São Paulo; 2005.

Table 1. Characteristics of studies included.

Author, publication year	Collection year	City, State	Age group (years)	Recall period (days)	Sample size	Proportion of women (%)	Quality score
Barros, ⁸ 1983	1978	Ribeirao Preto, SP	< 5 a ≥ 70	15	1,682	61.5	4
Simões, ¹⁷ 1988	1985	Araraquara, SP	0 to ≥ 50	15	848	59.7	4
Simões, ¹⁸ 1991	1987	Humaitá, AM	< 5 to > 50	15	620	63.5	4
Vilarino, ²⁰ 1998	1995	Santa Maria, RS	0 to 89	30	289	62.6	5
Loyola Filho, ¹² 2002	1997	BambuÍ, MG	≥ 18	90	775	63.2	5
Pelicioni, ⁱ 2005	2002	Sao Paulo, SP	12 to ≥ 60	3	926	60.5	6
Arrais, ^f 2004	2003	Fortaleza, CE	0 to 98	15	679	61.7	7
Carvalho, ⁷ 2005	2003	Brazil, various states	≥ 18	15	2.429	63.5	5
Schimid, ¹⁶ 2010	2005	Sao Paulo, SP	40 to 95	15	1.973	66.2	6
Giroto, ⁹ 2010	2009	Arapongas, PR	20 to 87	7	197	65.5	6
Mendes, ^h 2010	2009	Teresina, PI	18 to 65	15	511	61.8	6
Pinto, ¹⁴ 2012*	–	Diamantina, MG	≥ 18	No limit**	423	72.3	4

* Author did not describe the period in which the date was collected.

** There was no time limit for measuring self-medication.

Table 2. Result of the methodological quality evaluation of the studies included.

Author, publication year	Sample	Sampling source	Sample size	Measurement of outcome	Impartial interviewer	Response rate	Prevalence 95%CI	Similar participants	Total
Barros, ⁸ 1983	1	0	1	1	0	0	1	0	4
Simões, ¹⁷ 1988	1	1	0	1	0	0	1	0	4
Simões, ¹⁸ 1991	1	0	0	1	0	1	1	0	4
Vilarino, ²⁰ 1998	1	1	1	0	0	1	1	0	5
Loyola Filho, ¹² 2002	1	1	1	0	1	0	1	0	5
Pelicioni, ⁱ 2005	1	1	1	1	1	0	1	0	6
Arrais, ^f 2004	1	1	1	1	1	1	1	0	7
Carvalho, ⁷ 2005	1	1	0	1	1	0	1	0	5
Schimid, ¹⁶ 2010	1	0*	1	1	1	1	1	0	6
Giroto, ⁹ 2010	1	1	1	0	1	1	1	0	6
Mendes, ^h 2010	1	0	1	1	1	0	1	1	6
Pinto, ¹⁴ 2012	1	1	1	0	0	0	1	0	4
Overall result	12 (100%)	8 (66.7%)	9 (75.0%)	8 (66.7%)	7 (75.0%)	5 (41.7%)	12 (100%)	1 (8.3%)	Mean = 5.2

0: criterion not met by the study

1: criterion met by the study

* Official census was used, but with the sample restricted to a limited population.

to prevalence with 95%CI were the only ones in which all studies scored, while only one survey met the similar participants criterion.⁸

A qualitative evaluation on the prevalence of the included self-medication articles suggests a high heterogeneity among the results, because the difference between the proportions found in the studies was statistically significant in the heterogeneity test (Chi-square test $p > 0.0001$; I^2 : 98.8%) (Table 3). Studies with a low

prevalence (22.9%)⁹ and high prevalence (75.3%) of self-medication were included in this review.^f Despite the difference between the sexes having not been statistically significant, numerically, men practiced self-medication to a greater extent than women, except for one survey in which the prevalence was higher among women.¹⁸ Among the studies with high methodological quality, the prevalence was below 43.8%. Studies carried out before 2000 presented a greater prevalence than those performed more recently, with

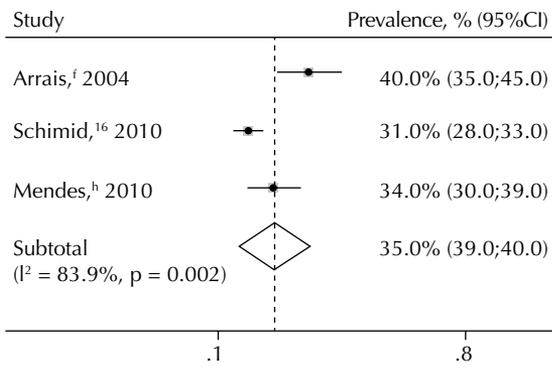


Figure 2. Self-medication prevalence from three studies of high methodological quality with a 15-day recall period.

the exception of one study,¹⁴ which presented a low methodological quality.

The subgroup analysis, performed in the studies with high methodological quality and that used a 15-day recall period, indicated a 35.0% self-medication prevalence (95%CI 29.0;40.0; I² = 83.9%), which was less than in most of the other included surveys. The heterogeneity remained high, albeit less when evaluated in all studies (Figure 2). While this result might not indicate the cause for the differences found between the prevalences, it suggests that the results in these studies are less variable when compared to the effect estimate.

Some of the extracted data, such as mean age of the participants and comorbidity prevalence, were not used in this systematic review, as not all studies reported such information, even after attempts were made to contact the responsible authors.

DISCUSSION

Self-medication is practiced by about one-third of the adult population in studies, with the highest methodological quality, which analyzed the use of medicines over the previous 15 days.

Findings from studies performed in Spain show self-medication prevalence varying from 12.7% to 20.2% in a population aged over 16 years who consumed drugs in the two weeks to the study,^{5,6,8} which are below the prevalence results in this review.

The prevalence of self-medication is greater in developing countries than the results from the studies performed in Spain, and closer to the results of this systematic review. In a study conducted in

Bogota, Colombia, the prevalence of self-medication was 27.3%.¹³ In Asia, in the adult population of Hong Kong, the prevalence was 32.5%.¹⁰ In Africa, during studies conducted in Ethiopia and Sudan, the prevalence was found to be 39.2%¹⁹ and 28.3%,³ respectively. Only one study in Brazil with a high methodological quality⁹ had a result close to that reached in Spain.^{5,6,8} However, this difference can be explained due to the shorter recall period used in the Brazilian study.

Unlike the results from this review, the aforementioned studies show that women are the group who most practice self-medication. In only one study included in this review,¹⁷ which was undertaken before 2000 and presented a low methodological quality, the prevalence of self-medication was greater among women. However, this does not seem to reflect the current scenario of medicine use by the Brazilian population. While analyzing the research, a great variation was noted in the prevalence of this practice in terms of gender on a national level. This finding is consistent with the negative association found in studies among the greatest number of surveys and exclusive self-medication use, in which women had more frequent medical appointments than men.¹²

The studies included in this review were performed in different time periods. Brazil went through major economic and social transformations during the 20th century. The 2010 demographic census depicted a Brazil that was more urban, with more women, more mixed race, older and with a larger middle class.ⁱ Brazilians are living longer and look for ways to insure against risks that are inherent with a longer lifespan,^j such as medicines, with self-medicating being an important tool in this context. Viewing medicine as a consumer commodity and changes in the new consumer playing field, along with the growth of classes A, B and C,^j affects the way Brazilians use medicines. Certain differences related to time may be one of the explanations for the different prevalences seen in this review.

The prevalence of self-medication was determined from cross-sectional studies applied in population samples. However, a large number of studies conducted in Brazil assessed self-medication in participants who had used a health service, these people belonged to a specific group of individuals such as health professionals or students, and the elderly. Studies based on such restricted populations were not considered in this review, because they would have had a negative effect in terms of population representation.

ⁱ Instituto Brasileiro de Geografia e Estatística. Resultados divulgados no Diário Oficial da União em 4.11.2010. Brasília (DF); 2010 [cited 2014 Apr 19]. Available from: http://www.ibge.gov.br/home/estatistica/populacao/censo2010/resultados_dou/default_resultados_dou.shtm

^j Alves JED, Cavenaghi S. Tendências demográficas, dos domicílios e das famílias no Brasil. Rio de Janeiro (RJ): Universidade Federal do Rio de Janeiro; 2012 [cited 2014 Jun 16]. Available from: http://www.ie.ufrj.br/aparte/pdfs/tendencias_demograficas_e_de_familia_24ago12.pdf

Table 3. Self-medication prevalence in Brazilian adult populations.

Recall period, author and publication year	Age group (years)	n	Prevalence in the sample, % (95%CI)	Prevalence in men, % (95%CI)	Prevalence in women, % (95%CI)
3-day recall period					
Pelicioni, ⁱ 2005*	20 to 59	849	43.8 (40.5;47.2)	51.2 (46.4;55.8)	36.2 (31.7;40.9)
7-day recall period					
Giroto, ⁹ 2010*	20 to 39	70	22.9 (14.6;33.9)	ND	ND
15-day recall period					
Barros, ⁸ 1983	20 to 49	675	75.3 (71.9;78.4)	76.9 (70.4;82.1)	74.5 (70.4;78.3)
Simões, ¹⁷ 1988	20 to 49	282	53.2 (47.4;58.9)	47.6 (37.3;58.2)	55.6 (48.6;62.3)
Simões, ¹⁸ 1991	20 to 49	178	53.9 (46.6;61.1)	64.1 (48.4;77.3)	51.1 (42.8;59.2)
Arrais, ^f 2004*	20 to 64	382	39.8 (35.0;44.8)	ND	ND
Carvalho, ⁷ 2005	18 to 59	1.887	29.2 (27.2;31.3)	ND	ND
Schimid, ¹⁶ 2010*,**	40 to 65	1.639	30.5 (28.3;32.8)	32.9 (29.1;36.9)	29.3 (26.7;32.1)
Mendes, ^h 2010*	18 to 65	511	34.4 (30.4;38.7)	38.5 (31.9;45.4)	32.0 (27.1;37.3)
90-day recall period					
Loyola Filho, ¹² 2002	18 to 59	619	33.6 (30.0;37.4)	ND	ND
Self-medication during lifetime					
Pinto, ¹⁴ 2012***	18 to 59	332	66.6 (61.3;71.4)	ND	ND

ND: no data available

* Studies with high methodological quality.

** Data provided after contacting the author.

*** Prevalence of self-medication retrieved from all study participants who did not present information regarding medicine consumption by individual and gender.

Notes: the study by Veena²⁰ (1998), present in the previous tables, was excluded from the analysis because it did not only present data on the adult population who were self-medicating.

The WHO published a manual that included a report saying that the recall period for studies regarding diseases and medicine should be one week.^k The lack of methodological standardization among Brazilian studies might be one of the factors that could explain the high heterogeneity found. In this review, the recall period varied from three days to there being no time limit for self-medication. A low methodological quality among the studies and the non-uniform distribution throughout the population's age groups are factors that may also explain the observed variation in the prevalence of self-medication. The included population was not only made up of adults within the 18 to 65 years age group, because not all eligible studies contained data on the number of adults in this age group that self-medicate, with this age group therefore being considered as closest to population of interest. The results show great heterogeneity, which in turn means that caution has to be taken when extrapolating the results. Due to this fact, the choice was to not perform a meta-analysis, thereby avoiding presenting results of low external validity. In systematic reviews, the results constantly differ among themselves when they

are put together.⁴ It is the researcher's responsibility to identify and evaluate possible causes for high levels of heterogeneity.

In addition to the methodological causes, high heterogeneity among the results may be due to natural differences among subjects included in each investigation, which is reasonable based on the knowledge that each state and municipality have differing socioeconomic and cultural situations.

This article uses a method that is in accordance with current recommendations for preparing systematic reviews: sensitive search of the literature, with no restrictions for language or publication date, research studies on Grey Literature, paired selection and extraction of data and evaluation of the quality of the studies.^{l,m} Such measures are important to prevent biases and achieve transparency in the results.

The national prevalence among adults has been estimated to include large variations, which is often due to the lack of homogeneity among the methods used in

^k Hardon A, Hodgkin C, Fresle DA. How to investigate the use of medicines by consumers. Amsterdam: World Health Organization; 2004 [cited 2014 Jun 24]. Available from: http://www.who.int/medicines/areas/rational_use/Manual1_HowtoInvestigate.pdf

^l University of York (UK). CRD's guidance for undertaking reviews in health care. North Yorkshire: Centre for Reviews and Dissemination, University of York; 2008.

^m Higgins J, Green S. Cochrane handbook for systematic reviews of interventions Version 5.1.0 [Internet]. Washington (DC); 2011 [cited 2014 May 27]. Available from: www.cochrane-handbook.org

studies conducted in Brazil. Nevertheless, this review's results show the practice of self-medication in the Brazilian population.

It is suggested that future research projects standardize their methods, especially in terms of the length of the recall period, and that they provide

information regarding the prevalence by age group and sex.

This systematic review provided a profile of the self-medication practice among the Brazilian adult population, which can serve as a tool to encourage the population to use medicines in a rational way.

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