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Research Article

Availability of phytotherapics and medicinal plants in primary care in the State of Goiás: results from the PMAQ-AB

Disponibilidade de fitoterápicos e plantas medicinais na atenção básica do estado de Goiás: resultados do PMAQ-AB

Disponibilidad de fitoterapia y plantas medicinales en la atención primaria en el Estado de Goiás: resultados del PMAQ-AB

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Abstract

Introduction: The availability of medicinal plants and phytotherapeutic compounds is already established in Brazil's Unified Health System (SUS) and relies on public policies and programs for its implementation. **Objective:** The aim of this study was to show whether the availability of herbal medicines and medicinal plants actually occurs in the basic health units in the State of Goiás. **Methods:** An ecological study was carried out on the basis of results of the Program for Improving Primary Care Access and Quality (PMAQ-AB), in its three cycles. **Results:** There was low availability of phytotherapeutic medicines in the State of Goiás, in all three cycles (<20) of the municipalities in the State, considering that not all the units in the cities had herbal medicines available. In cycle 1, 53.42% (n=39) were available, while in cycle 2 there was a drop to 26.03% (n=19) and a slight increase in cycle 3 to 41.10% (n=30). **Conclusions:** This study showed that the low availability of herbal medicines and the lack of investment in continuing education for professionals may be a reflection of low government investment in expanding the practice in the state.

Keywords: Phytotherapy; Plants, medicinal; Primary health care; Unified health system.

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Resumo

Introdução: A disponibilidade de plantas medicinais e fitoterápicos já está estabelecida no Sistema Único de Saúde (SUS) e conta com políticas públicas e programas para a sua implementação. **Objetivo:** Neste trabalho intenta-se mostrar se essa disponibilidade dos medicamentos fitoterápicos e de plantas medicinais efetivamente ocorre nas Unidades Básicas de Saúde (UBS) do estado de Goiás. **Métodos:** Para isso, realizou-se um estudo ecológico, utilizando como base os resultados do Programa de Melhoria do Acesso e da Qualidade da Atenção Básica (PMAQ-AB) nos seus três ciclos. **Resultados:** Evidenciou-se baixa disponibilidade de fitoterápicos no estado de Goiás, nos três ciclos (<20%) dos municípios do estado, considerando que nem todas as unidades das cidades possuíam fitoterápicos disponíveis. No ciclo 1, 53,42% (n=39) disponibilizaram, enquanto no ciclo 2 houve uma queda para 26,03% (n=19) e um discreto aumento no ciclo 3 para 41,10% (n=30). **Conclusões:** Neste estudo, percebeu-se que a baixa disponibilidade de fitoterápicos encontrada e a falta de investimentos na educação permanente dos profissionais podem ser reflexo do baixo investimento governamental para a expansão da prática no estado.

Palavras-chave: Fitoterapia; Plantas medicinais; Atenção primária à saúde; Sistema Único de Saúde.

Resumen

Introducción: La disponibilidad de plantas medicinales y fitoterápicos ya está establecida en el Sistema Único de Salud (SUS) y depende de políticas y programas públicos para su implementación. **Objetivo:** El objetivo de este estudio es demostrar si la disponibilidad de hierbas medicinales y plantas medicinales realmente ocurre en las Unidades Básicas de Salud del Estado de Goiás. **Métodos:** Se realizó un estudio ecológico, basado en los resultados del Programa de Mejora del Acceso y la Calidad de la Atención Primaria (PMAQ-AB), en sus tres ciclos. **Resultados:** Hubo baja disponibilidad de medicamentos a base de hierbas en el Estado de Goiás, en los tres ciclos (<20%) de los municipios del Estado, considerando que no todas las unidades de las ciudades tenían medicamentos a base de hierbas disponibles. En el ciclo 1, 53,42% (n=39) estaban disponibles, mientras que en el ciclo 2 hubo una caída a 26,03% (n=19) y un ligero aumento en el ciclo 3 a 41,10% (n=30). **Conclusiones:** En este estudio, nos dimos cuenta de que la baja disponibilidad de fitoterápicos encontrada y la falta de inversión en la formación continua de los profesionales puede ser un reflejo de la baja inversión del gobierno en la expansión de la práctica en el estado.

Palabras clave: Fitoterapia; Plantas medicinales; Atención primaria de salud; Sistema Único de Salud.

INTRODUCTION

The availability of medicinal plants and phytotherapeutic medicines, in the form of fresh, manipulated and/or industrialized plants, is already established in the Unified Health System (SUS), at different levels of complexity, but with an emphasis on primary care (PC).[1]

A medicinal plant is considered to be a plant species, cultivated or not, with therapeutic purposes, and a phytotherapeutic medicine is a medicine obtained from active plant raw materials. Both have known efficacy and risks arising from their use, as well as the reproducibility and constancy of their quality.[1]

Currently, Brazil has public policies aimed at the use of medicinal and phytotherapeutic plants, established through Ordinance 971 and Decree 5.813, of 2006, which published the National Policy for Integrative and Complementary Practices (PNPIC) and the National Policy for Medicinal and Phytotherapeutic Plants (PNPMF), respectively, improving the population's access to medicines and increasing their therapeutic options and health care for SUS users.[2,3] The use of medicinal plants and herbal medicines in the context of SUS also makes it possible for traditional knowledge to dialogue with technical-scientific knowledge, contributing to the reduction of overmedicalization present in PC.[4]

During the years 2011, 2013 and 2017, the Program for Improving Access and Quality of Primary Care (PMAQ-AB) was used to evaluate the national standardization of the quality of care and infrastructure of primary care. The program was organized into four phases, which included adherence to the program, development of actions to improve PC, assessment to verify the conditions of the teams, and recontracting, without community participation in the process. Regarding the evaluation block, questions were raised about the availability and use of herbal medicines and medicinal plants in PC.[5]

In this context, some studies were developed to assess the availability of Integrative and Complementary Health Practices (PICS) or, specifically, of herbal medicines and medicinal plants in PC, based on national[6-9] or state[10-12] data from PMAQ-AB.

Amado et al.,[6] Tesser et al.,[7] Barbosa et al.[8] and Valente et al.[9] analyzed data from the second cycle of PMAQ-AB and showed that 1,854 PC teams from 616 Brazilian municipalities offered medicinal plants and herbal medicines, concentrated in the Southeast (734), Northeast (580) and South (427) regions.

Caccia-Bava et al.[10] analyzed data from the first cycle and identified that approximately 467 PC units in the state of São Paulo offered herbal medicines or medicinal plants. They also demonstrated greater availability in large municipalities with higher socioeconomic indicators (63.9% of those classified in strata 4, 5 and 6).

Lima et al.[11] analyzed data from the third cycle, collected from 1,147 PC teams in the State of Pará. They demonstrated a higher frequency of use of medicinal plants and herbal medicines among the PICS, totaling approximately 79.0% of availability in PC.

Losso and Freitas[12] analyzed data from the second cycle collected in the state of Santa Catarina. Of the 293 municipalities evaluated, approximately 42.1% offered medicinal plants and herbal medicines in PC.

In this context, the present study provides pertinent results on the availability of medicinal plants and herbal medicines in Goiás, being the first in the state to use data from PMAQ-AB. In doing so, it contributes to the literature in the dissemination of results that support the implementation of public policies aimed at making medicinal plants and herbal medicines agents available in PC and with the continuing education and training of PC health professionals.

In view of this, the aim was to describe the availability of herbal medicines and medicinal plants in PC health units in the State of Goiás.

METHODS

Type of study

This is an ecological study,[13] carried out using publicly accessible secondary data from a national database originating from external evaluations, collected by the third phase of the PMAQ census, in cycles 1, 2 and 3, which were carried out in the years 2011, 2013 and 2017, respectively, and provided by the Department of Primary Care of the Health Care Secretariat of the Ministry of Health (DAB/SAS/MS).

Participants

Goiás is geographically divided into 246 municipalities and has a population of 7,056,495 people, according to the latest census carried out by the Brazilian Institute of Geography and Statistics (IBGE) in 2022. In June 2020, Goiás had 2,763 establishments registered as Health Centers and Basic Health Units (UBS), stratified into 6 health regions. The health regions were created with the aim of organizing and sharing the planning of actions and the services provided by health, being a group of neighboring municipalities with shared culture, economy and infrastructure.

In 2011 (cycle 1), the State of Goiás had the participation of 1,216 UBS, distributed among 244 municipalities; in cycle 2, carried out in 2013, approximately 975 units participated, from 242 cities; and cycle 3, carried out in 2017, a total of 1,100 units, divided into 246 cities. The cities of Santa Rita do Novo Destino, Morro Agudo de Goiás, Inaciolândia and Barro Alto were not part of cycle 2. The cities of Iporá and Lagoa Santa were only involved in cycles 2 and 3.

The study population consisted of all UBS evaluated in the PMAQ in the three years/cycles. The PMAQ carried out observation in the UBS and interviewed the professional about the team's work process and verification of documents in the UBS.

Variables analyzed

Modules I and II of the three years/cycles presented were used here, specifically analyzing the questions in the section entitled "Component Medications of the Basic Pharmacy", in module I, with the block of questions "Phytotherapeutic Medications". In module II, the section entitled "Integrative and Complementary Practices" was analyzed, especially the question that addressed the activity of health education and the use of medicinal plants and herbal medicines.

The questions analyzed in module I of the first cycle were the following: "Does the municipality provide medications or medicinal plants and/or herbal medicines?", "Fresh plant?", "Dried plant (plant drug)?", "Manipulated plant?", "Processed?", "Holy thorn?", "Guaco?", "Artichoke?", "Sacred bark?", "Devil's claw?", "Soy isoflavone?", "Cat's claw?". The variables related to the distribution of types of herbal medicines in the original database had the categories "Yes", when available, "No", when the unit offered herbal medicines but did not provide that specific one, and "Not applicable" when the unit did not provide herbal medicines. In module II of the first cycle, the variable analyzed was the following: "Does the team carry out health education activities addressing: use of medicinal plants and herbal medicines?" In this sense, the possible answers to the question were "use of medicinal plants and herbal medicines", "use of non-drug therapeutic resources, such as thermal waters, TCM practices and anthroposophic medicine practices" or "none of the above". The questions analyzed in cycles 2 and 3 are repeated in module I, namely: "Does the UBS provide medicines or medicinal plants and/or herbal medicines?", "Natural plant?", "Plant drug (dried plant)?", "Manipulated phytotherapeutic medicine?", "Industrialized phytotherapeutic medicine?", "Holy thorn?", "Guaco?", "Mint?", "Willow?", "Aloe?", "Plantago?", "Artichoke?", "Sacred bark?", "Mastic tree?", "Devil's claw?", "Soy isoflavone?", "Cat's claw?". The answer options maintained the standard of the first cycle (yes or no). In module II of the second cycle, the questions were as follows: "What integrative and complementary practice services are offered: medicinal plants and herbal medicines?" and "Does the team carry out health education activities addressing: use of medicinal plants and herbal medicines?". The possible answers to the first question were: "Traditional Chinese Medicine/Acupuncture"; "Traditional Chinese Medicine/Auriculopuncture"; "Traditional Chinese Medicine/Body Practices (Tai Chi Chuan, Lian Gong, Chi Gong, Tui-Ná), and/or mental practices (Meditation)"; "Medicinal plants and herbal medicine"; "Homeopathy"; "Anthroposophic Medicine"; "Social Thermalism/Crenotherapy"; "None of the above". The possible answers to the second question were: "use of medicinal plants and herbal medicines"; "use of non-drug therapeutic resources, such as thermal waters, Traditional Chinese Medicine practices and anthroposophic medicine practices"; "other(s)"; "does not carry out health education activities addressing integrative and complementary practices".

In the third cycle, also in module II, we analyzed the following variable: "Does the team carry out health education activities addressing: use of medicinal plants and herbal medicines?". The possible answers to the question were: "use of medicinal plants and herbal medicines"; "use of non-drug therapeutic resources, such as thermal waters, TCM (Traditional Chinese Medicine) practices and anthroposophic medicine practices"; "the team does not carry out health education activities"; "none of the above".

Analysis of data

The data were analyzed using R software (R Core Team, Vienna, Austria) version 4.3.3. Initially, deterministic linkage was performed between the databases of the three cycles, with the Basic Health Units (individual variables of the PMAQ-AB databases) serving as the reference for the link between the three databases. The outcome variable of this study was the availability of herbal medicines, created from the questions available in the databases of each cycle, referring to the availability of some type of herbal medicine. Units that provided at least one type of herbal medicine were considered available.

The descriptive analysis of the availability of herbal medicines was presented through absolute and relative frequencies of the number of health units that provide such medicines, aggregated by Health Region of the State of Goiás, form of distribution and type of herbal medicine provided. To analyze the temporal evolution of the availability of herbal medicines in the period between the Health Regions and the type of herbal medicine, the χ^2 linear trend test was used.

Additionally, a multilevel Poisson regression analysis was performed, considering the following variables: availability of herbal medicines (outcome variable); municipalities (random effect variable); PMAQ-AB assessment cycle (1, 2 and 3) and the municipal Human Development Index (HDI) (fixed effect variables dichotomized into tertiles). The lme4 statistical package was used for this analysis.[14] Three regression models were created to test the association of availability with the established variables. The first included only the cycle, while the second model included both the cycle and the municipal HDI. The third model added the relationship between the cycle and the HDI to verify whether, at any time during the PMAQ-AB assessment, the municipality's HDI was a determining factor for the availability of herbal medicines. All models included the random effects variable related to the municipalities, used to capture variations within grouped units (clusters), which represent samples of a larger population (UBS). For the multilevel regression analysis, the units that did not have data regarding the availability or not of herbal medicines were imputed as "No". The likelihood ratio (likelihood test) was used to test the adequacy of the model, using the null model as a parameter. In all regression models, missing values were excluded. Values of $p<0.05$ were considered significant.

Ethical aspects

The study presented data with publicly accessible information, without restrictions on access by researchers and citizens in general and with unidentified participants, thus respecting the guidelines and standards recommended in Resolution No. 510, of April 7, 2016.[15]

RESULTS

The PMAQ assessed 244 cities in cycle 1, 242 in cycle 2 and 246 in cycle 3. It was evident that most cities in the state do not have herbal medicines in PC. In 2011, cycle 1 had the largest number of cities offering this type of therapy (16.39%; n=40). The χ^2 test for linear trend showed that there was no relationship between the years, suggesting no difference in availability ($p=0.156$) (Figure 1).

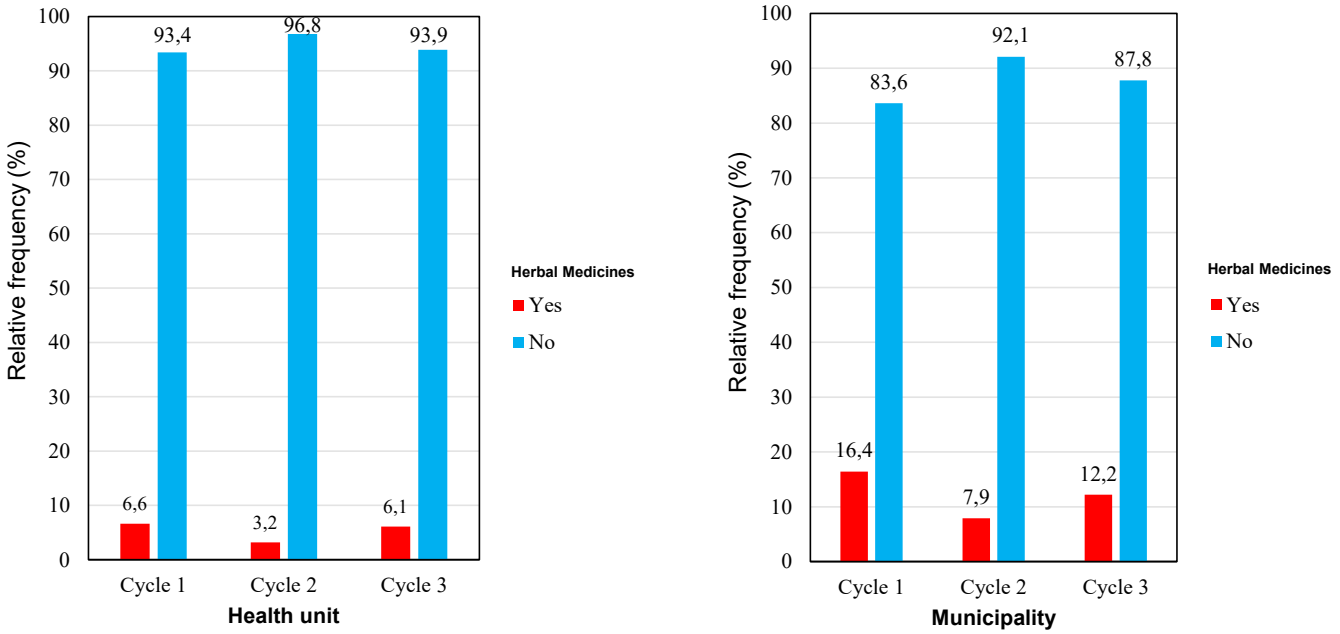

Figure 1. Availability of herbal medicines according to health regions in the State of Goiás, Brazil, 2022.

The PMAQ evaluated 1,216 PC units in cycle 1, 975 in cycle 2 and 1,100 in cycle 3. The χ^2 test for linear trend showed that there was no difference in the number of units offering herbal medicines agents during the years evaluated in the State of Goiás (p=0.536), as shown in Figure 1.

In the evaluation by the Family Health Team (eSF), 4.4% (n=30) carried out health education activities addressing the use of medicinal plants and herbal medicines, in contrast to the second (4.5%; n=54) and third cycles (6.6%; n=90), a result that represents a tendency for an increase in health education actions (p=0.02). When assessing the availability of herbal medicines according to the health regions of the State of Goiás, it was identified that only the Serra da Mesa and Southeast I regions showed a downward trend in the availability of herbal medicines (Table 1).

In addition to the low availability evidenced, not all cities had units with availability of herbal medicines in all years/cycles, evidencing discontinuity in the supply, especially in cycle 2, except in the cities of Goiás and Santa Isabel, which had availability in the three cycles evaluated.

In general, the herbal medicines made available in the PC were predominantly industrialized, and, over the years, the availability of raw plant was the only one with an increasing trend (p<0.001). Regarding the herbal medicines available in sufficient quantity, guaco was the only one that showed an increasing trend (p<0.001), as seen in Table 2.

Logistic regression assessed the availability of herbal medicines and whether this was associated with the HDI of the municipalities participating in each cycle, showing that this relationship was significant in the model, when associated with the cycle. The model used for regression was the multilevel one, adjusted for the cycle. In cycles 2 and 3, the relationship in the model was positive, indicating that the higher the HDI of the municipality, the greater the chance of it making herbal medicines available in its health units (Table 3).

Table 1. Availability of herbal medicines according to health regions in the State of Goiás, Brazil, 2022.

Health region	Cycle 1		Cycle 2		Cycle 3		p-value*
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	
Central	1 (7.7)	24 (92.3)	2 (11.5)	23 (88.5)	2 (7.7)	24 (92.3)	1.000
Central-South	7 (28.0)	18 (72.0)	1 (4.0)	24 (96.0)	3 (12.0)	22 (88.0)	0.109
North surroundings	1 (12.5)	7 (87.5)	-	8 (100.0)	1 (12.5)	7 (87.5)	1.000
South surroundings	1 (28.6)	5 (71.4)	1 (14.3)	6 (85.7)	2 (28.6)	5 (71.4)	1.000
Railway	-	18(100.0)	1 (5.6)	17 (94.4)	2 (11.1)	16 (88.9)	0.145
Northeast I	1 (20.0)	4 (80.0)	-	5 (100.0)	-	5 (100.0)	0.204
Northeast II	1 (9.1)	10 (90.9)	-	11 (100.0)	1 (9.1)	10 (90.9)	1.000
North	1 (7.7)	12 (92.3)	2 (15.4)	11 (84.6)	2 (15.4)	11 (84.6)	0.557
West I	2 (13.3)	13 (86.7)	3 (18.7)	13 (81.3)	2 (12.5)	14 (87.5)	0.940
West II	-	13(100.0)	1 (7.69)	13 (92.3)	-	13 (100.0)	1.000
Pirineus	1 (10.0)	9 (90.0)	-	10 (100.0)	2 (20.0)	8 (80.0)	0.456
Rio Vermelho	1 (5.9)	16 (94.1)	2 (11.8)	15 (88.2)	3 (17.6)	14 (82.4)	0.287
São Patrício I	4 (20.0)	16 (80.0)	1 (5.3)	18 (94.7)	5 (25.0)	15 (75.0)	0.673
São Patrício II	1 (12.5)	7 (87.5)	2 (33.3)	4 (66.7)	-	8 (100.0)	0.466
Serra da Mesa	4 (44.4)	5 (55.6)	-	9 (100.0)	-	9 (100.0)	**0.007**
Southeast I	7 (41.2)	10 (58.8)	1 (5.6)	17 (94.4)	1 (5.6)	17 (94.4)	**0.005**
Southeast II	4 (40.0)	6 (60.0)	-	10 (100.0)	1 (10.0)	9 (90.0)	0.071
South	1 (8.3)	11 (91.7)	1 (9.1)	10 (90.9)	2 (25.0)	9 (75.0)	0.243

*χ^2 test for linear trend.

DISCUSSION

Based on the analysis of the PMAQ-AB database, in cycles 1, 2 and 3, in the State of Goiás, the results are lower than the national and regional results investigated by the National Survey on Access, Use and Promotion of Rational Use of Medicines in 2015, which showed the availability of these medicines in 8.5% (6.6–10.7%) of the units investigated in the country and 12.4% (0.5–24.3%) in the units in the Central-West Region.[16]

Regarding the use and availability of herbal medicines and medicinal plants in PC health units, it was identified that most cities in the state do not offer herbal medicines. Guaco was described in a literature review on aspects of the use of herbal medicines as one of the most widely used in clinical practice in SUS health units.[17] The widespread traditional use of guaco, due to its expectorant and bronchodilator action, may be one of the possible explanations for the upward trend found in this study.[10]

Corroborating the results regarding availability, the number of eSFs that carry out health education activities on the use of medicinal plants and herbal medicines is still incipient. Despite this, an increase in the number of teams that carried out such action was observed each year/cycle, reinforcing the role of health education in promoting health and preventing diseases in the population.[11,18]

When compared to other states in Brazil, the results were lower than those of São Paulo, with availability of herbal medicines in 11% of the state's units,[10] and Rio Grande do Norte, with availability >25% in all PMAQ cycles. Furthermore, similar to the State of Rio Grande do Norte, there were no significant changes in the increase in availability over the years investigated by PMAQ.[19]

Table 2. Herbal medicines available in primary care in the State of Goiás, Brazil, 2022.

Herbal medicines available	Cycle 1			Cycle 2			Cycle 3			p-value
	Yes (%)	No (%)	NA (%)	Yes (%)	No (%)	NA (%)	Yes (%)	No (%)	NA (%)	
Distribution form of herbal medicine										
Fresh plant	6 (0.5)	0 (0.0)	1210 (99.5)	0 (0.0)	1 (0.1)	974 (99.9)	19 (1.7)	48 (4.3)	1,033 (93.9)	**<0.001**
Herbal drug (dried plant)	2 (0.2)	0 (0.0)	1214 (99.8)	2 (0.2)	0 (0.0)	973 (99.8)	6 (0.5)	61 (5.5)	1,033 (94.0)	0.100
Manipulated herbal medicine	5 (0.4)	0 (0.0)	1211 (99.6)	12 (1.2)	0 (0.0)	963 (98.8)	11 (1.0)	56 (5.1)	1,033 (93.9)	0.113
Industrialized herbal medicine	30 (2.5)	20 (1.6)	1166 (95.8)	14 (1.4)	3 (0.3)	958 (98.2)	38 (3.4)	29 (2.6)	1,033 (93.9)	0.146
Available herbal medicine										
Holy thorn	0 (0.0)	0 (0.0)	1216 (100.0)	0 (0.0)	0 (0.0)	975 (100.0)	0 (0.0)	38 (3.5)	1,062 (96.5)	-
Guaco	5 (0.4)	0 (0.0)	1211 (99.6)	2 (0.2)	0 (0.0)	973 (99.8)	27 (2.5)	11 (1.0)	1,062 (96.5)	**<0.001**
Mint	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	975 (100.0)	1 (0.1)	37 (3.4)	1,062 (96.5)	-
Willow	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	975 (100.0)	0 (0.0)	38 (3.5)	1,062 (96.5)	-
Aloe vera	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	975 (100.0)	0 (0.0)	38 (3.5)	1,062 (96.5)	-
Plantago	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)	0 (0.0)	974 (99.9)	1 (0.1)	37 (3.4)	1,062 (96.5)	0.932
Artichoke	0 (0.0)	0 (0.0)	1216 (100.0)	1 (0.1)	0 (0.0)	974 (99.9)	3 (0.3)	35 (3.2)	1,062 (96.5)	0.06
Sacred bark	0 (0.0)	0 (0.0)	1216 (100.0)	0 (0.0)	0 (0.0)	975 (100.0)	0 (0.0)	38 (3.5)	1,062 (96.5)	-
Mastic tree	0 (0.0)	0 (0.0)	1216 (100.0)	1 (0.1)	0 (0.0)	974 (99.9)	1 (0.1)	37 (3.4)	1,062 (96.5)	0.366
Devil's claw	0 (0.0)	0 (0.0)	1216 (100.0)	0 (0.0)	0 (0.0)	975 (100.0)	0 (0.0)	38 (3.5)	1,062 (96.5)	-
Soy isoflavone	0 (0.0)	0 (0.0)	1216 (100.0)	0 (0.0)	0 (0.0)	975 (100.0)	1 (0.1)	37 (3.4)	1,062 (96.5)	0.216
Cat's claw	0 (0.0)	50 (4.1)	1166 (95.9)	0 (0.0)	0 (0.0)	975 (100.0)	1 (0.1)	37 (3.4)	1,062 (96.5)	0.216

*χ^2 test for linear trend.

The low availability of herbal medicines in primary care in the State of Goiás may indicate a lack of investment, evidenced by the difficulty in implementing PICS policies in the country,[16,20] which can be corroborated by a study that indicated that, in the mapping of municipalities that offered PICS, only 22% had at least one unit with some offer related to the policy.[9] The weaknesses in the implementation of these are related to the processes of training health professionals in relation to the theme; the engagement of managers, collaborative practices between professionals and institutions; and the development of new studies on the acceptance and knowledge of the practices by the population, professionals and health managers.[10]

Table 3. Logistic regression evaluating the relationship between the availability of herbal medicines and the Human Development Index of municipalities in the State of Goiás, Brazil, 2022.

Variables	Prevalence (n)	Model 1			Model 2			Model 3		
		PRadjust	95%CI	p-value	PRadjust	95%CI	p-value	PRadjust	95%CI	p-value
Cycle										
1	6.58 (80)	Ref.			Ref.			Ref.		
2	3.18 (31)	0.48	0.31–0.72	<0.001	0.48	0.31–0.72	<0.001	0.01	0.00–0.27	0.006
3	6.09 (67)	0.94	0.67–1.30	0.689	0.93	0.67–1.30	0.689	0.61	0.37–1.00	0.050
HDI										
≤0.689	4.49 (73)				1.75	0.15–19.92	0.650	6.55	0.52–82.57	0.146
Between 0.690 and 0.711	3.26 (27)				3.20	0.36–28.31	0.296	1.35	0.12–15.71	0.809
≥0.733	9.30 (78)				Ref.			Ref.		
Relation Cycle*HDI										
Cycle 1								Ref.		
≤0.689	8.54 (52)									
Between 0.690 and 0.711	6.04 (18)									
≥0.733	3.24 (10)									
Cycle 2										
≤0.689	0.21 (1)							18.25	0.51–657.72	0.112
Between 0.690 and 0.711	1.21 (3)							0.49	0.17–1.40	0.186
≥0.733	10.89 (27)							Ref.		
Cycle 3										
≤0.689	3.72 (20)							455.44	14.16–14,652.40	0.001
Between 0.690 and 0.711	2.14 (6)							8.67	3.58–20.96	<0.001
≥0.733	14.54 (41)							Ref.		
Fixed effects										
Coefficients			-8.98			-9.48			-9.49	
Standard error			0.88			1.14			1.39	
Random effects										
Variance (standard deviation)			46.96 (6.85)			44.51 (6.67)			38.68 (6.21)	
LR test (p-value)			15.08 (<0.001)			16.18 (0.002)			88.48 (<0.001)	

The lack of investment is emphasized in this study by the stationary trend in the distribution of herbal medicines in the three PMAQ cycles, which did not demonstrate a significant difference between the years evaluated. This data may also show that, in addition to the low availability, there were no incentives for the expansion of herbal medicine in PC in the State of Goiás, especially when considering that cities with units offering this therapy in the initial cycles did not maintain it in the following cycles, with the exception of two cities.

When evaluated according to the Health Regions of the State of Goiás, it was possible to show that, like the results for the state, most regions did not obtain a difference in availability between the years/cycles, therefore highlighting the lack of investment in this therapeutic approach.

The results give rise to the need to provide opportunities for PC professionals to learn and discuss, as well as to implement the prescription of herbal medicines in clinical practice,[20] an action that can be enhanced with the implementation of living pharmacies[21] and with the aforementioned continuing education for health professionals.

Industrialized medicines predominated, in line with the growing national expansion of phytotherapy programs in primary care between 2004 and 2012, boosted by the mass production of industrialized herbal medicines.[22] Although beneficial, such mass production goes against phytotherapy, which uses local biodiversity and the cultural knowledge of each region.[23,24] On the other hand, there was a significant increase in the availability of herbal medicines in the form of raw plants, highlighting the importance of local biodiversity.[23]

It is worth mentioning that, in the case of industrialized herbal medicines, the drug packaging states the concentration of the active ingredient, which is not the case with the natural plant, which can make it difficult to monitor the effectiveness and safety of pharmacological therapy based on the raw plant.[25]

Similar to other studies,[10,26] the results here showed greater availability, in sufficient quantities of guaco, plantago, artichoke, mastic tree, soy isoflavone and cat's claw, with guaco being the only one with an increasing trend. Although other studies[24,27] identify the prescription of other herbal medicines not presented in this research, it is essential to understand that herbal medicines must be prescribed in accordance with the recommendations of the current National List of Essential Medicines (Rename).[28]

Finally, logistic regression indicated that the relationship between the Human Development Index (HDI) and the cycle was a predictor of availability, showing that cities with a higher HDI were more likely to make herbal medicines available in their health units, especially in cycles 2 (2013) and 3 (2017), results corroborated by another study.[10] Nevertheless, the municipalities that offer such medicines have a higher population density, as well as socioeconomic development, factors that may favor the existence of more infrastructure for PC.

A low availability of herbal medicines in health units in Brazil was evidenced (5.6%); however, this availability is generally conditioned by population density and a more organized pharmaceutical support network, highlighting the importance of matrix support.[1]

These results show that the PNPIC is not yet a consolidated policy and that it requires government efforts, so that, when implemented, it is conditioned by the knowledge of professionals about herbal medicine.[16,29]

This study has limitations common to studies with secondary databases. It is worth noting that the PMAQ-AB results are based on responses provided by coordinators or those responsible for primary health care units, and not on public policies and municipal programs. Thus, in this study, the identification of a municipality where herbal medicines are used may be a reflection of isolated practices by health teams and therefore does not describe official policies and programs.

On the other hand, the robustness of the database with data from almost all municipalities in the State of Goiás (244 cities in cycle 1, 242 in cycle 2, and 246 in cycle 3) and its innovative nature are highlighted, as it was the first study in the State of Goiás to use PMAQ-AB data on the availability of medicinal plants and herbal medicines in PC.

CONCLUSION

The study presents pertinent results on the availability of herbal medicines in the State of Goiás, and it is the first to use data from the PMAQ. The research contributes to the literature by disseminating results that support the implementation of public policies aimed at making herbal medicines available in PC, as well as training professionals to offer this service in health units. Considering that no other studies with such a scope have been conducted previously, this research is noteworthy for being a pioneer.

This is a robust and nationally recognized database, with important information for decision-making in health. It is recommended that future studies be conducted to assess the current situation of health units, since the study includes data up to 2017. In addition, future studies can identify the impact of implementing herbal medicine in PC from both the perspective of the population and professionals, seeking cause-and-effect relationships.

CONFLICT OF INTERESTS

Nothing to declare.

AUTHORS' CONTRIBUTIONS:

BCS: Conceptualization, Formal analysis, Writing – original draft, Writing – editing & review. FRS: Conceptualization, Formal analysis, Writing – original draft, Writing – editing & review. TRA: Supervision. CMS: Supervision.

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