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Can socioeconomic factors and the availability of medicinal plant resources influence people's perception of risk in relation to diseases?

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Abstract

Background This study explores how socioeconomic factors and the availability of medicinal plant resources influence the perception of disease risk in a local medical system. It addresses the role of traditional knowledge and the care and prevention practices used by the community, highlighting the interactions between cultural, social and environmental aspects.

Methods The research was conducted in the community of Serra Grande, Lagoa do Ouro, Pernambuco, with 95 participants. Semi-structured interviews were conducted to collect data on socioeconomic factors, perceived risk of disease (using ranking and Likert scale), and perceived availability of medicinal plants. The data were analyzed with Generalized Linear Models using R software.

Results Age was the only socioeconomic factor with a significant influence on the perception of risk of disease, being higher among individuals aged between 51 and 70. In addition, the results indicated that the perception of risk of disease is negatively influenced by the availability of medicinal plant resources, i.e., a lower availability of plants is associated with a higher perception of risk. 117 species of medicinal plants used by the community were identified, with the Fabaceae and Lamiacae families standing out.

Conclusions The study highlights the complexity of risk perception in rural communities, influenced by social, cultural and environmental factors. Effective public health policies must integrate these dynamics, creating adaptive strategies that strengthen community resilience and preserve traditional knowledge and resources essential for health.

Keywords Community health, Community resilience, Culture and health, Risk perception

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Introduction

Throughout human interactions with various environments, different groups have faced adverse events involving risks. Risk can be defined as the probability of a potentially harmful event occurring, such as a danger or a threat [1–3].

While experts assess risks based on probabilities of occurrence, considering factors such as mortality and damage, risk perception relates to the circumstances that influence how individuals see these risks. This perception is shaped by subjective dimensions and influenced by various factors, including the nature of the event, personal experiences, beliefs, attitudes, and social influences associated with a given event [2, 4–7].

In the context of diseases, risk perception is directly linked to how individuals perceive threats in their health. To understand this aspect, it is essential to consider how people interpret health and illness within their sociocultural contexts [8]. Studies in local medical systems have evaluated individuals' risk perception based on specific aspects, such as the severity of the illness, which refers to the intensity of symptoms and their impact on quality of life and potential risk of death [9, 10].

This perception of risk can also be influenced by socioeconomic factors, such as age, education, gender, and income [5, 11]. For instance, it has been observed that the perception of risk regarding certain diseases tends be higher among older adults than among young individuals, particularly in specific conditions, being associated with aging and the higher incidence of diseases in this age group [12–15].

In terms of gender, men, on average, may perceive the risk of diseases as lower than women [16]. In some local communities, women are often responsible for managing the household and caring for the family's health, which may influence their perception of disease-related risks [17]. However, there remains a gap in understanding of how these factors relate to the use of medicinal plants and their implications for risk perception. Another factor that may influence disease risk perception is access to medicinal plants, which can foster a sense of security and control over health, particularly in rural areas or where formal healthcare systems are limited [18, 19]. Nevertheless, it is unclear how this access to medicinal plants may be associated with disease risk perception.

In addition, a low perception of disease risk may be linked to limited access to information and healthcare services [18, 19], as well as unfavorable socioeconomic conditions [20], such as low levels of education and income. Thus, risk perception tends to be influenced by education and access to resources for treating diseases, such as medicinal plants and pharmaceuticals. Therefore, it is crucial to consider socioeconomic and environmental factors that shape this perception of disease-related risk [21].

Moreover, in relation to the availability of resources for disease treatment and the perception of risk, in cases involving diseases considered difficult to treat or cure, the scarcity of therapeutic options can intensify individuals' perception of risk [22]. In such contexts, the lack of adequate resources tends to amplify the perceived risk associated with the disease, directly influencing people's attitudes and behaviors regarding coping strategies and treatment.

This study therefore aims to assess whether socioeconomic factors—gender, age, education level and income—influence the perception of disease risk within a local medical system. Furthermore, it seeks to identify whether this perception of risk is related to the availability of medicinal plant resources, as well as whether it plays a role in differentiating the severity of illnesses.

With this in mind, we tested the following hypotheses: H1. The perceived risk of disease is positively influenced by age; H2. The perceived risk of disease is influenced by gender; H3. The perceived risk of disease is negatively influenced by education level; H4. The perceived risk of disease is negatively influenced by family income; H5. The availability of medicinal plant resources has a negative effect on the perception of disease risk.

Methods

Study area

The study was carried out in the community of Serra Grande, which belongs to the municipality of Lagoa do Ouro/PE, and is situated in the surroundings of the Pedra Talhada Biological Reserve (Fig. 1). The Pedra Talhada Biological Reserve was stablished in 1989, covering an area of 4,382.37 hectares, divided between the states of Alagoas and Pernambuco, by Decree No. 98,524 of December 13, 1989. The region is characterized by a tropical rainy climate with two well-defined seasons: a dry summer (October to April) and a rainy winter (May to September). The average annual rainfall ranges from 1250 to 1500 mm, while the mean annual temperature is approximately 25°C. The area exhibits rugged topography, with 70% of the terrain ranging from undulating to mountainous, although some parts are flat and slightly undulating [23]. The Pedra Talhada Biological Reserve is one of the most important fragments of the Atlantic Forest in northeastern Brazil. Despite being a relatively small conservation unit, covering 4,469 ha, it harbors a great diversity of plant and animal species [23].

The forest within the Pedra Talhada Biological Reserve is classified as an altitude marshland, with a submontane ombrophilous forest formation [23]. Although located 90 km inland from the coast, it remains within the

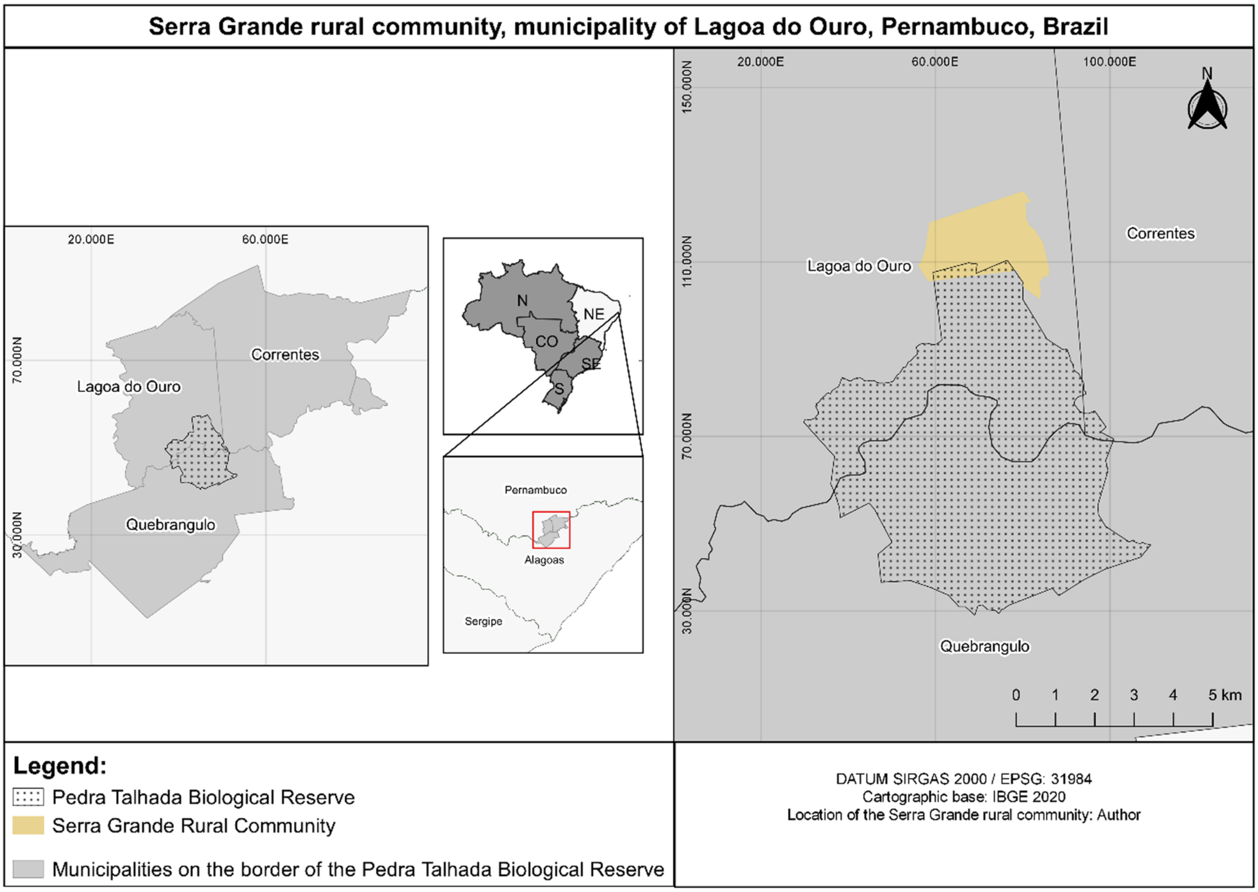

Fig. 1 Representation of the location of the Pedra Talhada Biological Reserve, between the states of Pernambuco and Alagoas, northeastern Brazil

Atlantic Rainforest domain. Its role as a biological refuge is particularly noteworthy, given its high species diversity and the various ecological influences it exhibits. These factors suggest that this biotope serves as a floristic refuge for species subject for human activities [23].

According to the 2021 census, the municipality of Lagoa do Ouro covers an area of 198,762 km^2 and has a population of 13,300 inhabitants. The population density of the community is 61.04 per km^2 [24]. The community of Serra Grande is located 21 km from the municipal headquarters and consists of 58 resident families, totaling 169 individuals. The community has a municipal nursery and primary school, a Catholic church, and a Protestant church. The primary subsistence activity of the families is small-scale farming, with agricultural production including beans, passion fruit, sweet potatoes, coriander and watermelon, among others crops. Other professional occupations are linked to the municipality, including roles such as teachers, school meal assistants, and general service workers. The community depends on surrounding natural resources for subsistence, even in cases where their use is restricted, such as firewood for cooking. This scenario highlights the importance of natural resources in shaping community practices, aligning with the hypothesis that resource availability directly influences social organization and subsistence practices.

One of the factors that motivated the choice of the community was the restricted access to health services, which directly impacts the perception of risk. In the community of Serra Grande, there are no health clinics or hospitals, which forces residents to travel to other locations when they need medical care. The service is offered in the municipal headquarters of Lagoa do Ouro, located 21 km away, or in the municipality of Garanhuns, 55 km away, and the roads are difficult to access.

Primary care is provided by a health agent, who works mainly with children and elderly people with chronic diseases. In Brazil, health agents are part of the Unified Health System and play a fundamental role in primary care, being responsible for providing essential care through actions coordinated by the government. Their duties include scheduling medical appointments and guiding the population about vaccination campaigns.

Data collection

Ethnobotanical survey

The research was approved by the Human Research Ethics Committee of the Federal Rural University of Pernambuco—UFRPE (CAAE 63440721.2.0000.9547), on September 15, 2022. After approval, the first contact was made with the population of the Serra Grande community to obtain the Informed Consent Form (ICF), using census sampling, since all residents were included in the study. The choice of the census was justified by the small number of inhabitants and the objective of obtaining more complete and representative data of the local reality.

However, some people were not found at their homes or chose not to participate in the research. Obtaining the ICF followed the ethical and legal criteria established by Resolution No. 510/2016 (National Health Council) [25], ensuring that sensitive information was not accessed or disclosed without the due authorization of the participants. Once this stage was completed, semi-structured interviews were conducted with all those who agreed to participate in the study, totaling 95 interviewees. The interviews were organized and conducted in three distinct stages.

The first stage involved collecting socioeconomic data, including gender, age, level of education, occupation, and family income (Fig. 2). Information on known medicinal plant resources was also collected using a free list, followed by details regarding the illnesses treated, the plant parts used, and the sources of collection. The second stage focused on collecting data on the perceived risk of diseases, while the third stage aimed to assess the perceived availability of medicinal plant species, as detailed in the following topics.

Table 1 shows the socioeconomic characteristics of the interviewees. Among the final sample of 95 interviewees, the majority were female (73%). The average age was 49.5 years (SD = 16.98), with 37% belonging to the 31–50 age group. In terms of education, most interviewees were either illiterate (28%) or had incomplete primary education (36%). Nearly half of the population (41%) relied on government aid as their primary source of income, reflecting the fact that most interviewees were subsistence farmers without a fixed monthly income. The base amount of government aid is R$ 600.00, with an additional R$ 100.00 provided every two months for gas subsidies.

Disease risk perception survey

The perception of disease risk was assessed using various techniques. Initially, based on the list of illnesses mentioned by each participant during the first stage, they were asked to indicate the illnesses they considered as most and least severe using the ranking technique. This

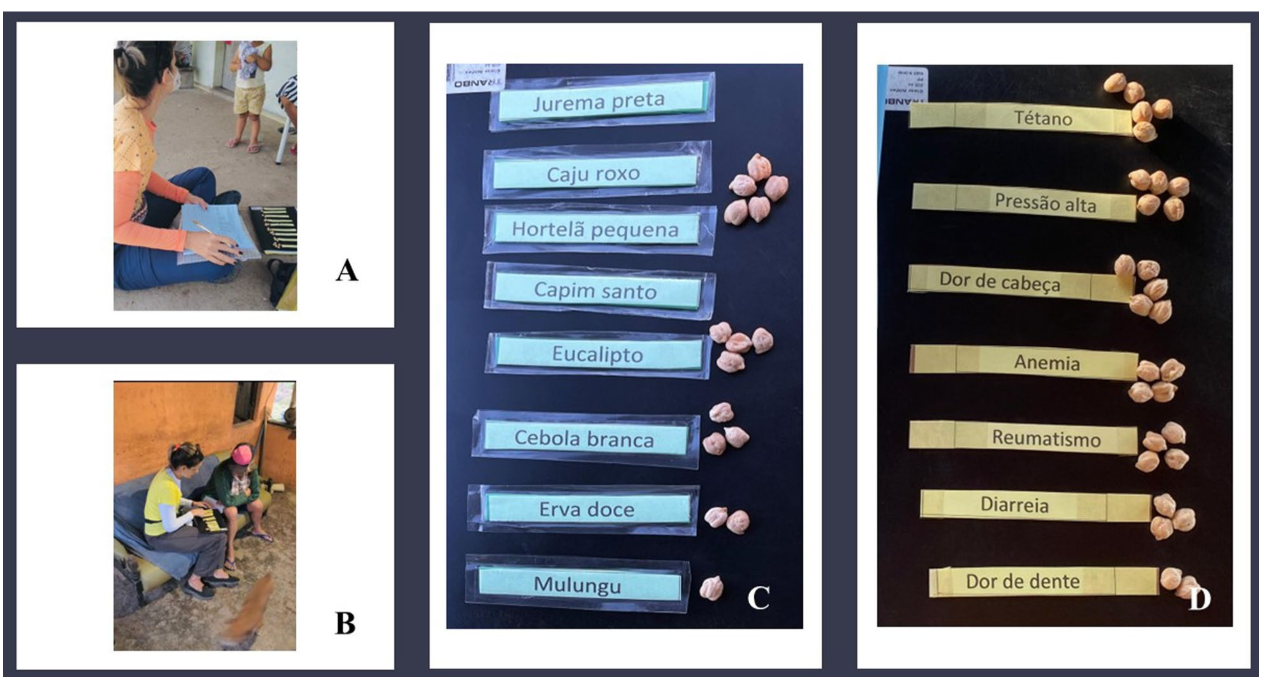

Fig. 2 Images of the moment of the interview with the interviewees (**A** and **B**), example of the application of the ordering technique and likert scale to survey the perceived availability of ethnospecies by the interviewees (**C**), and example of the application of the ordering technique and likert scale to survey the perception of risk of disease (**D**). Photographs taken in 2022 in the community

Table 1 Socioeconomic characteristics of those interviewed in the community of Serra Grande, Lagoa do Ouro, Northeast Brazil

N = 95	Values in %
Gender	
Female	73%
Male	27%
Others	0%
Age (range)	
18–30 years old	16%
31–50 years old	37%
51–70 years old	3%
71–85 years old	11%
Level of education	
Illiterate	28%
Incomplete primary education	36%
Complete primary education	9%
High school incomplete	7%
High School Completed	16%
Higher Education Incomplete	1%
Higher Education Complete	3%
Family income	
Government aid	41%
1 minimum wage	30%
2 minimum wages	27%
No income	2%

technique entails participants classifying the research subject according to predefined criteria established by the investigator [26]. Following the ranking, participants assigned values to each illness using a six-point Likert scale. Seeds were used as markers to indicate the value assigned to each disease (Fig. 2). The severity scale was defined as follows: 0 = not serious, 1 = minimally serious, 2 = slightly serious, 3 = moderately serious, 4 = very serious, 5 = extremely serious) (Fig. 2). Diseases that scored four or five points on the Likert scale were classified as "risk" diseases.

Survey of the perceived availability of medicinal plant species

At this stage, the interviewees' perception of the availability of the medicinal plant species was recorded. Using the list of the medicinal plants mentioned by each participant, they were asked to rank the species in terms of availability using the sorting technique. Subsequently, they assigned values for each species using a six-point Likert scale, again using seeds to indicate the assigned values (Fig. 2). The scale was defined as follows: 0 = not available, 1 = rarely available, 2 = scarcely available, 3 = moderately available, 4 = frequently available, 5 = very available (Fig. 2). Plants that scored four or five points were classified the most available species.

Following this, the plants species were categorized based on the number of medicinal plants perceived as most and least available by each participant. The collection of plant species was carried out with the collaboration of community members, who contributed their traditional knowledge. The identification and storage of the species were carried out with the support of specialists from the Herbariums of the Agronomic Institute of Pernambuco (IPA) and the Environmental Institute of the State of Alagoas (MAC). Of the 117 species registered, 14 could not be collected because they were acquired at fairs and/or markets, and another 30 were not accepted for storage in the herbariums because, at the time of collection, they did not have flowers and/or fruits, a necessary condition for their cataloging, despite there having been periodic sampling efforts to collect these species. However, we believe that this fact does not compromise the work, since our hypotheses were tested at the ethnospecies level.

Data analysis

Generalized linear models (GLM) from the Poisson family were used to analyze the data and test Hypotheses 1, 2, 3, 4 and 5. The best explanatory models were selected from those tested. All the statistical tests were performed using R software version 4.3.3 [27]. The GLM analysis for each hypothesis was conducted based on the following criteria: H1, H2, H3 and H4 examined whether the perception of disease risk in local medical systems is modulated by socioeconomic factors such as gender, age, education level, and income. The response variable was the number of diseases perceived as "risky" by each participant, while the predictor variables were: (1) gender (female and male), (2) age (ranges 18–30; 31–50; 51–70; 71–85 years), (3) education level (number of years of schooling) and (4) income.

To test H1 to H4, Model 1 assessed the combined effect of all predictor variables. Outliers were removed from Model 2. Finally, Model 3 was developed to test the effect of predictor variables, excluding non-significant variables, in accordance with the principle of parsimony ('between two alternative statements for the same phenomenon, and there being no difference between them, the simpler one is more likely to be correct'). The only problem with Model 3 was a reduction in the coefficient of determination by 3% compared to Model 2. Therefore, Model 2 was selected, as it did not exhibit issues of overdispersion, zero inflation, or irregular homoscedasticity.

Hypothesis 5 examined whether the availability of plant resources influences the perception of disease risk in local medical systems. The response variable was the perception of disease risk by each participant, while the predictor variable was the perceived availability of medicinal plant species. To test this hypothesis, generalized linear models (GLM) from the Binomial family were applied, considering the effect of the availability variable on the perception of disease risk. The response variable was obtained from the likert scale of diseases, where the diseases rated "4" or "5" were assigned a value of "1" (indicating a high-risk perception), while those rated "3", "2" or "1" were assigned a value of "0" (indicating no or low-risk perception). The predictor variables followed the same logic: Plants rated "5" or "4" in availability were assigned a value of "1," while those rated lower were assigned a value of "0". The total number of high-availability plants per disease per participant was calculated, with higher values indicating that a given disease was associated with a greater number of available medicinal plants for its treatment.

All the statistical tests were performed using R software version 4.3.3 [27]. All assumptions for performing binomial GLM were met, including normality of the residuals, a non-significant dispersion test (indicating no evidence of overdispersion), absence of outliers compromising the model parameters, and no zero inflation affecting the model's validity.

Results

Medicinal plant resources used by participants

The interviewees reported 117 species of plant resources used for medicinal purposes, belonging to 46 families, with the Fabaceae (12) and Lamiaceae (10) families standing out for having the highest number of species (Table 2). One ethnospecies were not identified.

Nine different parts of the plant resources are used for preparation, including leaves (40%), stem bark (20%) and fruit (13%) (Table 2). Regarding the collection sites, the following were identified: backyard (43%), forest (36%), market (11%) and "ruderal" areas (10%). Medicinal plant resources classified as "ruderal" are those that grow in highly disturbed environments, such as wastelands or roadsides.

The species with the highest number of citations were *Cymbopogon citratus* (DC.) Stapf (64), *Lippia alba* (Mill.) N.E.Br. ex Britton & P. Wilson (52) and *Mentha piperita* L. (50). All are grown in backyards, where they are easily accessible for daily use. Growing these plants at home ensures continuous access to family health care, as they are widely used in the prevention and treatment of common illnesses, such as digestive pain, diarrhea and anxiety.

The influence of socioeconomic factors on the perception of disease risk (H1 to H4)

In the analysis of the influence of respondents' socioeconomic factors on their perception of disease risk (Table 3), the variable "age" had a significant effect ($z = 1.978$, $p = 0.04798$), but only for the subcategory of individuals aged between 51 and 70. This indicates that this age group has a significantly positive effect on the response variable compared to the other age groups. The other variables, including gender, education level, and income, did not have a significant effect on the response variable at the 5% significance level.

The influence of the availability of medicinal plant resources on the perception of disease risk (H5)

The results suggest that the perceived risk of diseases is influenced by the availability of medicinal plant resources, with a negative effect as proposed in the hypothesis (Table 4). Specifically, a lower availability of medicinal plant resources increases the likelihood of a disease being perceived as posing a greater risk ($z = -6.315$, $p = 0.0000000027$). Figure 3 illustrates that as the number of highly available medicinal plant resources increases, the number of diseases recognized as a high-risk by the participants decreases, thereby corroborating our hypothesis.

Discussion

Medicinal plant resources used by interviewees

The data revealed by the research provide a valuable perspective on the use of medicinal plant resources in the community of Serra Grande, Lagoa do Ouro, Pernambuco. The identification of 117 species distributed among four botanical families underscores the diversity and richness of local traditional knowledge, highlighting a consolidated and varied practice of medicinal plant use. The inclusion of three unidentified ethnospecies suggests the existence of local knowledge that has not yet been fully documented or recognized by Western science. This presents opportunities for future ethnobotanical and pharmacological research, which could integrate this knowledge into modern medicine.

The Fabaceae and Lamiaceae families stand out in terms of the number of species mentioned, reflecting their importance in the community's traditional medicine. The predominance of the Lamiaceae family in ethnobotanical studies is linked to its high diversity of bioactive compounds [28–30], with numerous therapeutic properties, frequently used in traditional cultures to treat a range of conditions.

The predominant use of leaves (40%) and stem bark (20%) highlights the ease of access and abundance of these plant parts in the local environment. Leaves and stem bark are widely used in traditional practices [31]. The diversity of plant parts used also suggests in-depth knowledge among local residents regarding the specific properties of different parts of the plant.

Table 2 List of medicinal species mentioned by interviewees from the community of Serra Grande, Lagoa do Ouro, Pernambuco. (*) Ethnospecies that could not be collected because they were acquired at fairs and/or markets

Common name	Scientific name (Voucher)	Family	Collection location	Used part	Number of times of mentioned use	Medicinal use
Abacate	*Persea americana* Mill. (IPA77711)	Lauraceae	Backyard_of_house	Leaf, seed	15	General pain, kidney pain, back pain, headache, liver
Acafrão_da_terra	*Curcuma longa* L.*	Zingiberaceae	Free_market	Seed	1	Inflammation in general
Acerola	*Malpighia emarginata* DC. (IPA77714)	Malpighiaceae	Backyard_of_house	Leaf, fruit	3	Cough, flu, diarrhea
Alecrim	*Rosmarinus officinalis* L	Lamiaceae	Backyard_of_house	Leaf	10	Nervousness, flu, headache, bone pain, indigestion, cough
Alface	*Lactuca sativa* L.*	Asteraceae	Free_market	Leaf	2	Anxiety, high blood pressure
Alfavaca	*Ocimum campechianum* Mill. (IPA77660)	Lamiaceae	Backyard_of_house	Leaf	9	Indigestion, general pain, fever, sinusitis, tiredness, flu, covid, menstrual cramps
Alfavaca_miúda	*Ocimum gratissimum* L. (IPA77653)	Lamiaceae	Backyard_of_house	Seed	1	Eye cyst
Algaroba	*Prosopis juliflora* (Sw.) DC. (IPA77640)	Fabaceae	Ruderal	Stem bark	2	Diarrhea
Alho	*Allium sativum* L.*	Liliaceae	Free_market	Stem	7	Diabetes, high blood pressure, flu, cough, insect bite, cold, stroke
Amescla_de_cheiro	*Protium heptaphyllum* (Aubl.) Marchand	Burseraceae	Forest	Latex	3	Tooth inflammation, headache, tetanus, sinusitis
Amora_miúra	*Morus nigra* L	Moraceae	Backyard_of_house	Leaf	1	Diabetes
Anador	*Solidago chilensis* Meyen (MAC0034766)	Asteraceae	Backyard_of_house	Leaf	2	Diarrhea, headache
Angico	*Anadenanthera colubrina* (Vell.) Brenan. (IPA77625)	Fabaceae	Forest	Stem bark	2	Inflammation in the wound, inflammation in the uterus, blow
Araticum	*Annona cacans* Warm. (MAC0051103)	Annonaceae	Forest	Fruit	1	Weakness
Aroeira	*Schinus terebinthifolia* Raddi. (IPA77716)	Anacardiaceae	Forest	Stem bark	22	General inflammation, inflammation in the uterus, healing, blow, ovarian cyst
Arruda	*Ruta graveolens* L	Rutaceae	Backyard_of_house	Leaf	12	Headache, earache, fever
Aveloz	*Euphorbia insulana* Vell. (MAC0056646)	Euphorbiaceae	Backyard_of_house	Latex	2	Cancer, insomnia
Azeitona_preta	*Syzygium cumini* (L.) Skeels (IPA77715)	Myrtaceae	Backyard_of_house	Leaf	1	High cholesterol, high blood pressure
Babosa	*Aloe vera* (L.) Berm. f. (IPA77719)	Asphodelaceae	Backyard_of_house	Leaf	8	Cancer, diabetes, hemorrhoids, healing, general inflammation, worm, cough
Banana	*Musa x paradisiaca* L	Musaceae	backyard_of_house	fruit	1	Diabetes, gastritis

Table 2 (continued)

Common name	Scientific name (Voucher)	Family	Collection location	Used part	Number of times of mentioned use	Medicinal use
Barbatenom	*Pithecellobium saman* var *acutifoilum* Benth	Fabaceae	Forest	Stem bark	9	Cancer, healing, gastritis, general inflammation, urinary inflammation, ovarian cyst
Barriguda	*Ceiba glaziovii* (Kuntze) K.Schum. (MAC0058428)	Malvaceae	Forest	Stem bark	5	Inflammation of the prostate, inflammation of the legs
Batata_de_pulgar	*Operculina* sp.	Convolvulaceae	Forest	Stem	1	Urinary tract infection
Beladona	*Atropa belladonna* L	Solanaceae	Backyard_of_house	Leaf	1	Headache, flu, tooth inflammation
Beterraba	*Beta vulgaris* L.*	Amaranthaceae	Free_market	Stem	1	Anemia
Boldo	*Peumus boldus* Mol	Monimiaceae	Backyard_of_house	Leaf	11	Bloated belly, diarrhea, indigestion, stomach pain
Bom_nome	*Maytenus rigida* Mart.*	Celastraceae	Free_market	Stem bark	1	Inflammation in general
Cabacinha	*Luffa operculata* Cong	Cucurbitaceae	Forest	Fruit	1	Sinusitis
Cajueiro_roxo	*Anacardium occidentale* L. (IPA77694)	Anacardiaceae	Forest	Stem bark	2	Gastritis, stomach ulcer, healing, general inflammation
Camomila	*Matricaria camomila* L.*	Asteraceae	Free_market	Flower	3	Nervousness
Cana	*Saccharum officinarum* L	Poaceae	Backyard_of_house	Leaf	2	High blood pressure
Canela	*Nectandra cuspidata* Ness & Mart.*	Lauraceae	Free_market	Stem bark	9	Diarrhea, indigestion, cough, nervousness, high blood pressure
Capim_santo	*Cymbopogon citratus* (DC.) Stapf	Poaceae	Backyard_of_house	Leaf	64	Nervousness, swollen belly, high blood pressure
Carqueja	*Baccharis trimera* L.*	Amaranthaceae	Free_market	Leaf	1	Diabetes
Catingueira_rasteira	*Caesalpinia pyramidalis* Tul	Fabaceae	Forest	Stem bark	2	Weakness, blow
Cebola_branca	*Allium cepa* L.*	Amaryllidaceae	Free_market	Stem	14	Diarrhea, menstrual cramps, cough, flu, swollen belly
Cebola_roxa	*Allium cepa* L.*	Amaryllidaceae	Free_market	Stem	1	Thyroid problem
Chuchu	*Sechium edule* (Jacq.) Sw	Cucurbitaceae	Backyard_of_house	Leaf, fruit peel	17	High blood pressure
Chumbinho	*Lantana camara* L. (IPA77666)	Verbenaceae	Forest	Flower	1	Covid, throat inflammation
Cipo_de_cesto	*Coccoloba* parimensis Benth. (MAC0002941)	Polygonaceae	Forest	Root	1	Back pain
Coité	*Crescentia cujete* L	Bignoniaceae	Forest	Leaf	2	Kidney pain
Colônia	*Alpinia zerumbet* B.L. Burtt & R.M. Sm. (MAC0057305)	Zingiberaceae	Backyard_of_house	Flower	4	Heart problem, high blood pressure
Couve	*Brassica* sp.*	Brassicaceae	Free_market	Leaf	2	Anemia, high cholesterol, gastritis
Cravo	*Tagetes erecta* L. (MAC0000296)	Asteraceae	Backyard_of_house	Flower	3	Heart problem, high blood pressure

Table 2 (continued)

Common name	Scientific name (Voucher)	Family	Collection location	Used part	Number of times of mentioned use	Medicinal use
Cravo_da_índia	*Syzygium aromaticum* (L.) Merr. & L.M. Perry*	Myrtaceae	Free_market	Flower bud	1	Sinusitis
Endro	*Anethum graveolens* L. (IPA77672)	Apiaceae	Backyard_of_house	Seed	16	Menstrual cramps, nervousness, headache, diarrhea, dizziness, worms
Erva_cidreira	*Lippia alba* (Mill.) N.E.Br. ex Britton & P. Wilson (IPA77707)	Verbenaceae	Backyard_of_house	Leaf	52	Swollen belly, flu, indigestion, diarrhea, nervousness
Erva_doce	*Pimpinella anisum* L	Apiaceae	Backyard_of_house	Seed	15	Diarrhea, indigestion, cough, general pain, headache
Espinheira_santa	*Maytenus ilicifolia* Mart. Ex Reissek	Celastraceae	Forest	Leaf	2	General pain, gastritis
Eucalipto	*Corymbia citriodora* (Hook.) K.D. Hill & L.A.S. Johnson	Myrtaceae	Backyard_of_house	Leaf	24	Flu, fever
Federação	*Acanthospermum hispidum* DC. (IPA77705)	Asteraceae	Ruderal	Root	3	Lung inflammation, cough
Gengibre	*Zingiber officinale* Roscoe*	Zingiberaceae	Free_market	Stem	6	Flu, cough, sinusitis, headache, hoarseness
Goiaba_branca	*Psidium guajava* L. (IPA77718)	Myrtaceae	Backyard_of_house	Leaf, stem bark	13	Diarrhea, indigestion, cough, fever, urinary tract infection
Graviola	*Annona muricata* L. (IPA77712)	Annonaceae	Backyard_of_house	Leaf	3	Cancer, kidney pain, diabetes
Guabiraba	*Campomanesia aromatica* (Aubl.) Griseb. (MAC0057213)	Myrtaceae	Forest	Leaf	1	Headache
Hortelã_grande	*Plectranthus amboinicus* (Lour.) Spreng	Lamiaceae	Backyard_of_house	Leaf	31	Diabetes, high blood pressure, flu, cough, swollen belly
Hortelã_gripã	*Plectranthus* sp.	Lamiaceae	Backyard_of_house	Leaf	1	Swollen belly
Hortelã_pequena	*Mentha piperita* L	Lamiaceae	Backyard_of_house	Leaf	50	Infantile colic, diarrhea, skin allergy, food poisoning
Hotelã_pimenta	*Mentha* sp.	Lamiaceae	Backyard_of_house	Leaf	2	Flu, sore throat
Imburana	*Commiphora leptophloeos* (Mart.) J.B. Gillet	Burseraceae	Forest	Stem bark	2	Diarrhea
Insulina	*Cissus sicyoides* L	Vitaceae	Backyard_of_house	Leaf	1	Diabetes
Ipê_amarelo	*Handroanthus vellosoi* (Toledo) Mattos	Bignoniaceae	Forest	Stem bark	1	Cancer
Ipê_roxo	*Handroanthus avellanedae* (Lorentz ex Griseb.) Mattos	Bignoniaceae	Forest	Stem bark	2	Cancer
Jaboticaba	*Myrciaria cauliflora* (Mart.) O.Berg. (IPA77679)	Myrtaceae	Forest	Leaf, stem bark, fruit	3	Diarrhea
Jatobá	*Hymenaea courbaril* L. (IPA77631)	Fabaceae	Forest	Stem bark, fruit	9	Flu, cough, phlegm, high blood pressure
Juá	*Ziziphus joazeiro* Mart. (IPA77713)	Rhamnaceae	Forest	Stem bark	1	Clean your teeth

Table 2 (continued)

Common name	Scientific name (Voucher)	Family	Collection location	Used part	Number of times of mentioned use	Medicinal use
Jucá	*Libidibia ferrea* var. *ferrea* (Mart ex Tul.) L.P.Queiroz (IPA77646)	Fabaceae	Forest	Stem bark	1	Skin disease
Jurema_preta	*Mimosa tenuiflora* (willd.) Poir. (IPA77633)	Fabaceae	Backyard_of_house	Stem bark	10	Flu, healing, general inflammation, tooth inflammation
Jurubeba	*Solanum paniculatum* L. (IPA77650)	Solanaceae	Ruderal	Fruit, root	5	Flu, cough, tuberculosis, gastritis, diabetes
Lacre	*Vismia guianensis* (Aubl.) Pers. (MAC0003869)	Clusiaceae	Forest	Leaf, stem bark	2	Stomach pain, kidney pain
Laranja	*Citrus cf. latifolia* L. (IPA77722)	Rutaceae	Backyard_of_house	Fruit	19	Nervousness, insomnia, cold, hangover
Laranja_cravo	*Citrus* sp.	Rutaceae	Backyard_of_house	Fruit	2	High blood pressure
Limão	*Citrus cf. aurantium* L. (IPA77723)	Rutaceae	Backyard_of_house	Fruit	10	Covid, flu, cough, lose weight
Macela	*Egletes* viscosa (L.) Less. (MAC0000017)	Asteraceae	Forest	Flower	1	Headache
Mamão	*Carica papaya* L. (MAC0046275)	Caricaceae	Backyard_of_house	Flower	1	Cough
Manga_espada	*Mangifera indica* L. (IPA77690)	Anacardiaceae	Backyard_of_house	Leaf	6	Constipation, diabetes, kidney pain, hoarseness
Manjericão	*Ocimum basilicum* L	Lamiaceae	Backyard_of_house	Leaf	5	Headache, flu, cough
Manjericão_miúdo	*Ocimum* sp.	Lamiaceae	Backyard_of_house	Leaf	1	Flu, fever
Maracujá	*Passiflora edulis* Sims. (IPA77677)	Passifloraceae	Backyard_of_house	Leaf, fruit	10	Nervousness, high blood pressure, insomnia, anxiety
Mastruz	*Chenopodium ambrosioides* L. (IPA77726)	Amaranthaceae	Ruderal	Leaf, root, whole plant	16	Rheumatism, worm, flu, cough, diarrhea
Melância	*Citrullus lanatus* (Thunb.) Matsum. & Nakai (IPA77676)	Cucurbitaceae	Backyard_of_house	Seed	1	Fever
Milapresto	Sem identificação	Sem identificação	Forest	Seed	1	Kidney stone
Mulungu	*Erythrina velutina* Willd. (IPA77648)	Fabaceae	Forest	Stem bark	1	Diabetes
Mussambê	*Cleome* sp. (MAC0056678)	Cleomaceae	Ruderal	Leaf, flower	3	Cough, flu
Noni	*Morinda citrifolia* L	Rubiaceae	Backyard_of_house	Fruit	2	Cancer, inflammation in the uterus
Oliveira	*Nicotiana glauca* Graham*	Solanaceae	Free_market	Leaf	1	High blood pressure
Ora_pro_nobis	*Pereskia aculeata* Mill	Cactaceae	Backyard_of_house	Leaf	1	Osteoporosis
Paineira	*Ceiba speciosa* (A. St.-Hil.) Ravenna	Malvaceae	Forest	Leaf	2	Cough, fever
Papaconha	*Hybanthus* sp.	Violaceae	Ruderal	Root	3	Fever, skin allergy
Parreira	*Vitis* sp.	Vitaceae	Backyard_of_house	Leaf	1	Diarrhea
Pata_de_vaca	*Bauhinia* sp (IPA77724)	Fabaceae	Backyard_of_house	Leaf	5	Diabetes
Pau_ferro	*Inga* sp.	Fabaceae	Forest	Stem bark	1	Swollen belly

Table 2 (continued)

Common name	Scientific name (Voucher)	Family	Collection location	Used part	Number of times of mentioned use	Medicinal use
Pau_tiu	*Sorocea hilarii* Gaudich	Moraceae	Forest	Stem bark	1	Inflammation of the vagina, inflammation of the prostate
Pimenta	*Capsicum chinense* Jacq	Solanaceae	Backyard_of_house	Fruit	1	Pain in general
Pimenta_de_macaco	*Coccoloba mollis* Casar. (MAC0004337)	Annonaceae	Forest	Flower	2	General pain, poor digestion
Pindaíba	*Xylopia sericea* A. St.Hil. (MAC0058369)	Annonaceae	Forest	Fruit, seed	6	General pain, body pain, diarrhea, menstrual cramps
Pinhão_roxo	*Jatropha gossypiifolia* (Pohl) Mull.Arg. (IPA77686)	Euphorbiaceae	Ruderal	Latex	1	Healing
Piranha	*Guapira darwinii* E.C.O.Chagas & Costa-Lima (IPA77681)	Nyctaginaceae	Forest	Stem bark	1	Clean birth
Pitanga	*Eugenia uniflora* L. (IPA77673)	Myrtaceae	Backyard_of_house	Leaf	7	Diarrhea, poor digestion
Pitomba	*Talisia retusa* R.S. Cowan	Sapindaceae	Forest	Leaf	1	General pain, flu
Quebra_pedra	*Phyllanthus ninuri* L	Phyllanthaceae	Ruderal	Whole plant	5	Kidney stone
Quiabo	*Abelmoschus esculentus* (L.) Moench	Malvaceae	Backyard_of_house	Fruit	1	Diabetes
Quidingue	*Tanacetum vulgare* L. (IPA77725)	Asteraceae	Backyard_of_house	Leaf	2	Headache, rheumatism
Quixaba	*Sideroxylon obtusifolium* (roem. & Schult.) T.D. Penn. (IPA77717)	Sapotaceae	Forest	Stem bark	8	General inflammation, healing, gastritis, blow
Romã	*Punica granatum* L. (IPA77698)	Lythraceae	Backyard_of_house	Fruit peel	8	Inflammation of the throat
Sabugueiro	*Sambucus nigra* L. (IPA77721)	Adoxaceae	Forest	Flower	10	Flu, fever, swollen belly
Sambacaitá	*Hyptis pectinata* (L.) Poit. (IPA77651)	Lamiaceae	Ruderal	Leaf	11	Healing, inflammation in the wound, inflammation in the uterus
Sapé	*Imperata brasiliensis* Trin	Poaceae	Forest	Root	9	Headache
Siriguela	*Spondias purpurea* L. (IPA77700)	Anacardiaceae	Forest	Fruit	2	Diarrhea, weakness
Sucupira	*Bowdichia virgilioides* Kunth (IPA77626)	Fabaceae	Forest	Stem bark	3	Kidney pain, bronchitis, general inflammation
Tatajuba	*Chlorophora tintoria* Gaudich. (IPA77664)	Moraceae	Forest	Root	1	Extract tooth
Terramicina	*Alternanthera brasiliana* (L.) Kuntze (IPA77652)	Amaranthaceae	Backyard_of_house	Leaf	1	Fever
Tipim	*Petiveria alliacea* L. (IPA77720)	Phytolaccaceae	Forest	Leaf	1	Earache
Uvaia	*Eugenia viridiflora* Cambess. (MAC0057693)	Myrtaceae	Forest	Fruit	1	Inflammation of the uterus

Table 2 (continued)

Common name	Scientific name (Voucher)	Family	Collection location	Used part	Number of times of mentioned use	Medicinal use
Unha_de_gato	*Senegalia tenuiflora* (L.) Britton & Rose (IPA77634)	Fabaceae	Forest	Stem bark	1	Ovarian cyst, myoma
Vassorinha_de_botão	*Borreria verticillata* (L.) G. Mey (IPA77661)	Rubiaceae	Ruderal	Root	2	Diarrhea, general pain, hemorrhoids
Velame_branco	*Croton heliotropiifoliu* Kunth (IPA77665)	Euphorbiaceae	Ruderal	Leaf	1	Anemia

Table 3 Statistical factors from the GLM analysis of socioeconomic variables on the number of diseases perceived as risky by respondents from the community of Serra Grande, Lagoa do Ouro, Pernambuco, Northeast Brazil

Sources of variation	Estimate	Error	*z* value	*p*-value
Intercept	1.29286	0.41692	3.101	0.00193**
Man[1]	−0.10391	0.12959	−0.802	0.42266
Age 31–50[2]	0.26484	0.19570	1.353	0.17596
Age 51–70[2]	0.42594	0.21539	1.978	0.04798*
Age 71–90[2]	0.30075	0.27705	1.086	0.27768
Incomplete primary education[3]	0.06609	0.16231	0.407	0.68389
Incomplete high school[3]	−0.21191	0.30.890	−0.686	0.49272
Complete primary education[3]	0.04385	0.24287	0.181	0.85673
Complete high school[3]	0.26614	0.20913	1.273	0.20316
Complete higher education[3]	0.51930	0.30904	1.680	0.09288
Government aid[4]	−0.19965	0.33009	−0.605	0.54528
Onde basic salary[4]	−0.26970	0.32168	−0.838	0.40180
Two basic_salaries[4]	−0.37032	0.33272	−1.113	0.26571

*0.05 **0.001

[1] Reference for the woman gender

[2] Reference for the age 18–30

[3] Reference for the illiterate level of education

[4] Reference for the no income

Table 4 Statistical factors from the GLM analysis of the variables of availability of medicinal plant resources on the number of diseases perceived as risky by the interviewees in the community of Serra Grande, Lagoa do Ouro, Pernambuco, Northeast Brazil

	Intercept	Availability of medicinal plant resources	NULL
Estimative	0.66007	−0.60359	
Std	0.10621	0.09558	
Error z value	6.215	−6.315	
P(>{z])	5.13e−10***	2.70e−10 ***	
Df		1	
Deviance resid		45.003	
Df resid		760	761
Dev		1005.6	1050.6
Pr(<Chi)		1.967e−11	

***0.000000001

The predominance of plant collection in backyards (43%) indicates a practice of home cultivation of medicinal plants, reflecting the integration of traditional practices with everyday life. The collection of plants in forested areas (36%) reinforces dependence on native natural resources and suggests a close relationship with the local ecosystem. The lower use of plants obtained from markets (11%) and "ruderal" areas (10%) may indicate a preference for more accessible and reliable sources of medicinal plants. According to Voeks [32], plants that are often abundant in easily accessible places are rich in bioactive compounds, leading to the widespread use of tropical medicinal flora.

The influence of socioeconomic factors on the perception of disease risk

According to the data obtained, among the socioeconomic factors studied (gender, education, income and age) only the "age" variable in the 51–70 subcategory ($z = 1.978$, $p = 0.04798$) was associated with a higher perception of disease risk. Although economic and demographic factors such as age, education, gender and income are important variables influencing individuals' perception of risk [11], many studies on the perception of disease risk that have assessed socioeconomic factors have not reached a consensus on their influence [12, 16, 33–35]. Our study is no exception.

The results indicated that men and women had similar risk perceptions regarding diseases, contrasting with previous studies that report significant differences between genders [16, 33, 34]. In other contexts, women tend to have a higher perception of risk, attributed to their traditional role as caregivers and family responsibilities.

However, in the scientific community, the uniformity of risk perception can be attributed to the effective performance of health agents, who are responsible for

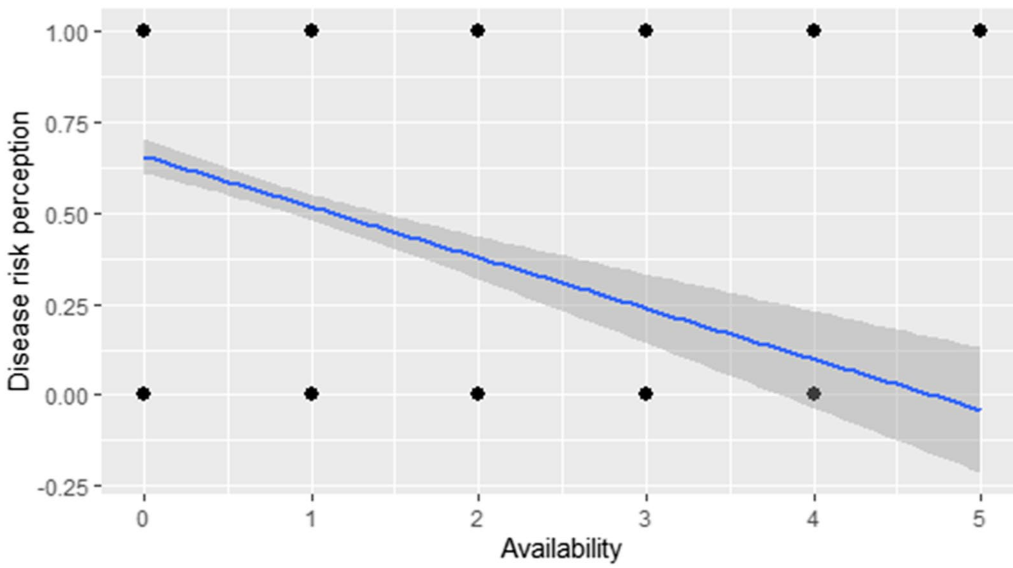

Fig. 3 Graph of the model on the effect of the number of plants available in relation to the diseases perceived as risky

disseminating health information in an accessible and inclusive manner, promoting equality in the understanding of risks, shaping the way in which individuals understand the risks associated with diseases, their severity and the possibilities of treatment.

It is worth noting health agents in Brazil who are part of the Unified Health System are responsible for basic health care promoted by the public authorities, for bringing formal health services to communities far from urban centers. In this sense, health agents act to strengthen the Brazilian Unified Health System, as they become a link between formal health services and the community (Ministry of Health, 2009), as well as facilitators of the preservation and dissemination of this knowledge or, conversely, as agents of its erosion, depending on their approaches and attitudes.

However, in the community studied, the uniformity of perception may be attributed to the effective work of health workers, who disseminate information in an accessible and inclusive manner, promoting an equal understanding of risks. These professionals can act to strengthen the SUS, serving as a link between health services and the community [25], as well as facilitators of the preservation and dissemination of traditional knowledge or, conversely, as agents of its erosion, depending on their approaches and attitudes. To ensure that traditional knowledge is respected and preserved, it is essential that these professionals recognize the value of local practices, promote responsible use, and help bridge the gap between traditional medicine and modern science.

Additionally, the equitable division of agricultural and domestic tasks between men and women may contribute to the shared perception, contrasting with studies that associate the role of mothers with the transmission of medicinal knowledge and the preservation of family health [36, 37]. These findings highlight the importance of considering the socio-cultural context when interpreting the results.

The “age” variable was the only one to show a significant association, with individuals aged between 51 and 70 demonstrating a higher perception of risk compared to younger individuals (18–30 years old). This result contrasts with studies indicating a reduced perception of risk among older individuals, despite this age group being biologically more susceptible to diseases. Some authors attributed such findings to cognitive decline associated with aging [20, 38–40]. However, in our study area, the higher perception among older individuals may be linked to the previous experience with chronic diseases and awareness of their high risks. Although young people are often depicted as more aware of emerging risks, such as climate change and pandemics [41], possible social homogeneity in the studied community may balance out these differences. The experience accumulated by older individuals and their role as knowledge transmitters may also explain these results.

The authors of this study suggest that, when assessing the “age” variable in risk perception, multiple factors may influence this dynamic. For example, risk perception may be higher among older individuals concerning specific diseases due to the greater risks posed to this group and their personal experiences with such conditions [41]. In our study area, within the subcategory indicating a higher perception of risk, it is possible that diseases perceived as high-risk, such as chronic diseases, are less common among younger individuals, which may explain the difference in risk perception between age groups. In this sense, Bichuetti et al. [14] suggest that older age may, in fact, be an independent factor in the perception of disease risk.

Despite the expectation that low levels of education and income would reduce risk perception, no significant relationship was observed between these variables and risk perception. Approximately 64% of participants had incomplete primary education or were illiterate, and a considerable proportion depended on government assistance. Nevertheless, risk perception remained homogeneous. This pattern suggests that individuals with lower levels of education and income may have an inadequate understanding of treatments and may underestimate the severity of diseases, potentially in greater morbidity and mortality [11, 20, 42, 43], suggest that people with lower purchasing power tend to have less access to information and are less proactive in seeking it.

However, this does not appear to be directly applicable to our study. In addition to the information provided by health workers, participants exhibited a significant interest in certain new technologies, particularly online resources. A common trend in studies on local medical systems is the coexistence of two different systems, called hybridization [44], where traditional consciousness, practices and beliefs merge with new forms of knowledge, resulting in an innovative system [45].

In the context of the community studied, the interest in virtual space reflects this transition, where the internet serves as a bridge between traditional knowledge and global information. The increasing use of digital technology can be interpreted as a process of cultural hybridization, in which modern elements are integrated in the light of local practices. Access to information is not necessarily linked to formal education, as knowledge about health risks can be acquired through other channels, such as television and the internet [46]. Many participants reported that they learnt about diseases and treatments through social networks.

It is important to note that, while other studies generally focus on specific diseases, ours was conducted in a local rural community, covering all the diseases known to individuals in the community. We assumed that all participants had equal access to information and treatment, resulting in possible social homogeneity. The literature defines social homogeneity as the similarity in perceptions and attitudes among individuals in relation to the environment, influenced by the relational context in which they are inserted [47]. In this context, a homogeneous population is one in which individuals share values, norms and behaviors [47]. In our study, this homogeneity may have influenced the results, as the residents exhibited a uniform perception of risk and similar attitudes toward diseases.

The influence of the availability of medicinal plant resources on the perception of disease risk

Several factors influence how people perceive and respond to risks, including the availability of resources to address them. Research indicates that the presence of environmental resources is crucial in shaping individual risk perception [7, 48, 49]. In communities where the use of plants is a traditional practice, risk perception and treatment choices are largely shaped by the familiarity and accessibility of these plant resources, which are often regarded as natural and safe alternatives for health care [50].

The availability of medicinal plants not only facilitates access to treatments but also influences the perception of risk associated with diseases, as argued by Ferrer and Klein [22]. For Kühn and Bobeth [51], the way people perceive and respond to illness is directly linked to their interaction with the environment. Blancas et al. [52] emphasize that human interactions with natural resources are shaped by subsistence needs.

In this scenario, the availability of medicinal plants plays a central role in assessing and coping with diseases. As such, the availability of these resources tends to reduce the perception of risk, fostering a sense of security and control over health, especially in rural areas or where access to the formal health system is limited or non-existent [18, 19]. This context supports Kühn and Bobeth [51] argument that people's perception of and response to illness is closely linked to the way they interact with their environment.

The unavailability of therapeutic resources, such as medicinal plants, exemplifies how deforestation compromises essential ecosystem services, negatively affecting communities' ability to cope with illness. As Ferrer and Klein [22] highlight, the perception of risk concerning illness increases when the resources needed for treatment are scarce. Our findings corroborate this view, indicating that the lack of access to medicinal plants intensifies the perceived risk.

Deforestation, by reducing biodiversity and limiting access to traditionally used medicinal plants, threatens both the health of populations and the resilience of socio-ecological systems. This interdependence demonstrates how environmental degradation not only compromises ecosystems but also exacerbates social vulnerabilities, making it difficult to maintain local health practices [53], increasing the perception of risk of disease. Thus, preserving forests is essential not only for environmental stability, but also to ensure access to vital therapeutic resources, promoting the health and safety of the communities that depend on these systems.

Thus, the availability of medicinal plant resources is an important factor to be considered in the treatment of diseases in certain communities, and this availability may progressively decrease due to landscape changes such as urbanization [54], and climate change [55]. These transformations have a profound impact on the perception of disease risk. In regions with a high dependence on medicinal plants, the lack of access to these resources can generate an increasing sense of vulnerability [56]. In this context, understanding vulnerability is essential for developing and evaluating adaptive strategies that reduce health risks [55].

The resilience of local medical systems, understood as the capacity of a traditional medical system to adapt and continue functioning under pressure or in adverse situations [57], is fundamental. A resilient medical system tends to sustain and strengthen the community's trust in its treatments [57, 58]. This trust directly influences risk perception, as studies indicate that the stronger people's belief in the efficacy of measures to address a threat, the lower their perception of vulnerability or risk severity tends to be [7, 22].

Although medicinal plants can reduce the perception of risk in relation to various diseases, their effectiveness may be limited in cases of serious illnesses that require more complex medical treatments. In such cases, people may consider these illnesses to be serious and seek allopathic treatments or combine different approaches, using both traditional and modern medicine [59]. This reflects a hybridization of health systems, integrating traditional and biomedical medicine [44, 59, 60]. This convergence of knowledge shows how medical practices evolve in response to emerging challenges, shaped by social, cultural and scientific factors [22].

Conclusion

The data obtained in this study reveal important insights into the perception of risk in rural communities and the critical role that socioeconomic and environmental variables play in this context. The analysis of the results highlights several fundamental considerations:

1. Influence of Age on Risk Perception: The "age" variable was the only one of the socioeconomic factors that showed a significant association with disease risk perception, especially in the 51–70 age group. This suggests that accumulated experience with chronic diseases and awareness of their risks contribute to a higher perception among the elderly. This finding highlights the need for public health policies that consider the experience and health challenges specific to this age group, providing adequate support and ongoing education to mitigate high risk perception.
2. *Social Homogeneity and Risk Perception:* The social homogeneity observed in the community studied suggests that the uniformity in risk perceptions may be related to a shared relational and cultural context. Equal access to information and treatment, facilitated by the work of health workers, contributes to a similar perception of risk between the sexes, in contrast to other studies which indicate significant differences between men and women. This finding emphasizes the importance of inclusive and accessible health communication that promotes equity in understanding and responding to health risks.
3. *Importance of Medicinal Plant Resources:* The availability of medicinal plants as a therapeutic resource plays a central role in the perception of disease risk. The lack of access to these resources, aggravated by deforestation and climate change, increases the vulnerability of communities, highlighting the need for environmental preservation to ensure the continuity of traditional health practices. Conservation policies and the strengthening of local health systems must be integrated to sustain the health and resilience of communities.
4. *Hybridization of Health Systems:* The combination of traditional and modern health practices reflects an adaptation to contemporary realities, where traditional medicine continues to play a vital role, especially in areas with limited access to formal health services. This integration suggests a more holistic health approach, which values local knowledge and promotes the responsible use of natural resources.
5. *Education and Access to Information:* The absence of a significant relationship between schooling, income and risk perception highlights the importance of other means of disseminating information, such as the internet and social networks. This finding underlines the need for health education programs that use digital platforms to reach a wider audience, ensuring that information reaches different segments of the population effectively.

In short, the study reinforces the complexity of risk perception in rural communities, influenced by a confluence of social, cultural and environmental factors. Effective public health policies must consider these dynamics in order to develop adaptive strategies that not only improve the resilience of communities, but also preserve traditional knowledge and resources that are essential for health and well-being.

Limitations

A significant limitation identified in this study refers to the strong social cohesion and homogeneity in risk perception within the community. While this uniformity can facilitate the dissemination of information, it can also restrict the diversity of perspectives and inhibit innovative strategies in tackling health challenges. Furthermore, the influence of health workers on traditional knowledge, while essential to guaranteeing access to information and care, can inadvertently contribute to the erosion of this local knowledge.

If health practices are not culturally sensitive and do not consider the social and cultural particularities of the community, integration between traditional and modern medicine can face significant obstacles. This can reduce the effectiveness of health interventions, as the devaluation of traditional medical practices can emerge as barriers to the success of public health strategies. However, this does not invalidate the findings of our study, which is a pioneer in addressing this specific issue.

Abbreviations

GLM Generalized Linear Models
UFRPE Federal Rural University of Pernambuco

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Author contributions

CFCBRA led the collective construction of the text and the writing of the first draft. MLS, WSFJ and TCS contributed with ideas, arguments, and in writing the text. All authors read and approved the final manuscript.

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Availability of data and materials

All data used or developed are contained within the paper. No datasets were generated or analyzed during the current study.

Declarations

Human ethics and consent to participate

The research was approved by the Human Research Ethics Committee of the Federal Rural University of Pernambuco—UFRPE (CAAE 63440721.2.0000.9547), on September 15, 2022.

Consent for publication

Not applicable.

Competing of interest

The authors declare no competing interests.

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