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Integration of traditional and Western medicine in the Arara community, Colombian Amazon

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Abstract

Background Traditional medicine plays a central role in the daily lives of many Indigenous peoples in the Amazon, yet its interaction with Western medicine remains poorly documented. Understanding how communities navigate both systems is essential for developing culturally appropriate and equitable health policies. This study analyses the interaction, coexistence, and relationships between Western and traditional medicine in the indigenous community of Arara, located in the Colombian Amazon, as well as community perceptions of both health systems, particularly in the context of the COVID-19 pandemic.

Methodology A concurrent mixed-methods design was employed. A structured household survey was administered in 2022–819 individuals from 161 households, and semi-structured individual and group interviews were conducted with community and institutional informants. Quantitative data were analysed using descriptive statistics and bivariate analyses, while qualitative data were examined through thematic analysis. Findings were integrated during interpretation to examine treatment choices, perceptions, and health-seeking behaviours.

Results A total of 85.8% of participants first sought advice from family members or traditional healers when feeling unwell, whereas 11.5% first turned to health institutions. The remaining responses corresponded to less frequent options, such as seeking care from drugstores or waiting for symptoms to improve without seeking outside care. Interviews showed that community leaders and traditional healers played a central role in the spiritual and physical management of health, reinforcing social cohesion during crises such as the COVID-19 pandemic. During the pandemic, 87.2% of the community received at least one vaccine dose, and 70.8% completed the full vaccination schedule. Among participants who reported having had COVID-19, 40.8% relied exclusively on traditional healers, 36.8% combined traditional medicine with support from family and friends, and only 12.1% used both traditional and Western medicine.

Conclusions Traditional medicine remained the main source of care in Arara, while Western health services were used more selectively and under conditions shaped by distance, service availability, and mistrust. During the COVID-19 pandemic, the community combined biomedical preventive measures with traditional practices,



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showing that healthcare decisions were strongly mediated by local authorities, cultural beliefs, and community-based forms of care.

Article highlights

- This study documents how an Indigenous Amazonian community navigates between traditional and Western medicine through a mixed-methods design.
- The findings show that traditional medicine remains the primary and most trusted source of care, even during public health emergencies such as COVID-19.
- The study demonstrates how cultural beliefs, geographical barriers, and mistrust of institutions shape health-seeking behaviours in remote Indigenous settings.
- The article highlights the need for intercultural and community-centred approaches within public health policy in multicultural regions.

Keywords Traditional medicine, Western medicine, Intercultural health, Amazon, Colombia.

1 Background

The Colombian Amazon region, which includes the Department of Amazonas, is globally recognised for its crucial role as one of the planet's lungs [1]. Leticia, the capital of Amazonas, is one of the main urban centres in this territory. The region holds extraordinary biological richness and remarkable cultural diversity [2]. According to population estimates from the National Administrative Department of Statistics (DANE) [3] over 20% of the population living in the departments that make up Colombian Amazon region self-identify as Indigenous, representing a wide variety of peoples and ancestral traditions. Within this context lies the Arara community, located in the municipality of Leticia in the department of Amazonas. This community belongs to the Magüta (Tikuna) people, one of the most representative Indigenous groups in the Amazon region. The Magüta have a profound cultural identity and their own language, *Tikuna*, which forms a central element of daily life and traditions. Despite the increasing influence of modernisation and globalisation, communities such as Arara have managed to preserve ancestral health practices that remain integral to everyday life, even though these traditional forms of knowledge are often underestimated by external perspectives [4, 5].

In Arara, health is managed through two interrelated yet often contrasting paradigms: Western medicine and *medicina propia* (traditional medicine). Western medicine, supported by Colombia's General System of Social Security in Health (SGSSS), promises access to specialised medical services grounded in scientific principles and advanced technology. However, its implementation in regions such as the Amazon has been inconsistent, hindered by infrastructure limitations, geographical barriers, and limited cultural understanding [6, 7]. These shortcomings have reinforced the central role of traditional medicine as an accessible and essential practice that preserves ancestral wisdom and integrates the care of life within the community [7–9].

Traditional medicine in Arara, rooted in ancestral knowledge passed down through generations, offers a holistic approach encompassing physical, mental, and spiritual well-being [10]. It is not merely an alternative to biomedicine but a comprehensive way of understanding and addressing health that aligns with the Indigenous worldview [11]. Traditional healers not only cure illness but also maintain the spiritual and social balance of the community—an aspect often overlooked or inadequately addressed by the biomedical system [12–14].

The coexistence of these two health systems raises critical questions about decision-making and power dynamics in Arara: How do its inhabitants choose between Western and traditional medicine? What sociocultural, economic, and geographical factors shape these choices? The COVID-19 pandemic, which disproportionately affected vulnerable populations worldwide, underscored the importance of both systems, revealing the strengths of traditional practices and the limitations of Western medicine in meeting the specific needs of culturally diverse communities [15–18].

Although the Colombian government implemented actions to prevent and mitigate the impact of COVID-19 on Indigenous peoples—including the distribution of health resources and public health campaigns—these efforts were often perceived as insufficient or poorly coordinated [19–21]. This perception of inaction fostered a collective resistance within the Arara community, where internal resources were mobilised and traditional medical practices were strengthened to protect collective health and wellbeing [22].

Previous studies have documented the relevance of traditional medicine among Indigenous communities in Latin America [23] and in Colombia [10, 24, 25], demonstrating that its integration into formal health systems can enhance both accessibility and acceptance of treatments [13]. However, this ideal of integration faces significant challenges. In Colombia, although Law 21 of 1991, which ratifies the International Labour Organization's Convention 169 on Indigenous and Tribal Peoples, recognises the right of Indigenous communities to maintain their own medical practices [26], the reality of its implementation tells a different story. Initiatives such as the *Sistema Indígena de Salud Propio Intercultural* (SISPI) aim to strengthen Indigenous health practices and promote their articulation with the national health system. Nonetheless, structural barriers—such as lack of resources, institutional racism, discrimination, and mutual distrust between traditional and Western systems—have limited their scope and effectiveness, particularly in remote regions such as the Amazon [27].

This study aimed to understand how the inhabitants of Arara perceive and use both traditional and Western medicine, exploring the interaction between these systems in the specific context of this community. Using a mixed-methods approach that combined quantitative and qualitative techniques, the research gathered detailed information on health practices, beliefs, and lived experiences within the community.

2 Methods

2.1 Study design

A concurrent mixed-methods design was used to analyse the interaction and coexistence between Western and traditional medicine within the Indigenous community of Arara. This approach combined the collection and analysis of quantitative and qualitative data to provide a comprehensive understanding of the phenomenon under study.

2.2 Study setting, population and sample

The study was conducted in the Arara Indigenous community, located in the municipality of Leticia, Department of Amazonas, in the Colombian Amazon. Arara is part of a remote Amazonian setting where everyday life, mobility, and access to services are shaped by river-based transport, territorial dispersion, and the concentration of most formal healthcare services in urban centres.

The target population comprised all inhabitants of the Arara community—1049 individuals living in 162 households. Of these, 78.1% agreed to participate in the survey, resulting in 819 valid questionnaires across 161 households.

To support the description of the study setting, Fig. 1 presents the geographical location of the Arara Indigenous Community and an overview of its facilities. The map identifies the main community services, residential areas and other points of interest, including the *Chagra* (or *Cheretún*), the community's traditional agricultural plot whose location may shift over time and across seasons. This figure provides a spatial reference for understanding the settlement structure, subsistence areas, and the broader territorial context in which everyday health practices take place.

Figure 2 complements this community overview by showing the location of the Arara settlement within the Department of Amazonas and the broader distribution of public healthcare providers in the department. The map also indicates that the nearest primary care hospital is located in Leticia, approximately 20 km by boat from Arara. This figure is particularly useful for illustrating the territorial concentration of biomedical services outside the community and the geographical conditions that shaped access to institutional care.

Departmental health service information also helps situate Arara within the broader biomedical care context of Amazonas. The network considered for this analysis included two main institutional providers, one public and one Indigenous; however, most installed capacity was concentrated in the public provider. Across the department, available capacity included 12 service sites, 137 beds, 58 stretchers, 46 consultation rooms, 21 treatment and procedure rooms—including 7 delivery rooms, 11 procedure rooms, 2 operating theatres, and 1 surgery room—and 2 mobile units, while no public

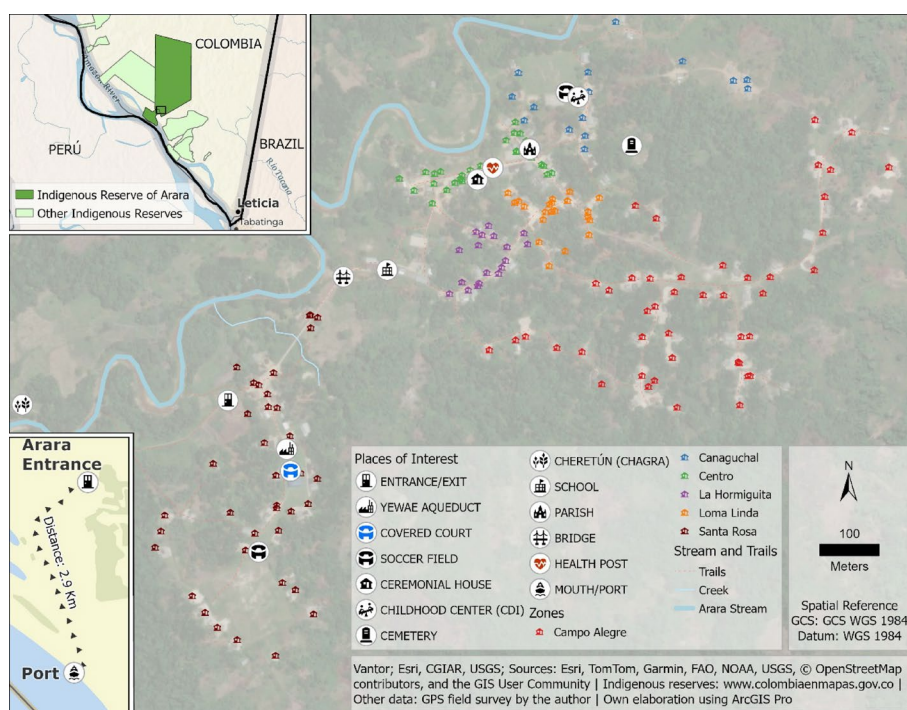


Fig. 1 Geographical location and community infrastructure of the Arara indigenous settlement in the Colombian Amazon. Source: Base map: OpenStreetMap contributors; Indigenous reserves: Colombia en Mapas (www.colombianmapas.gov.co); other data: GPS field survey by the author; map created by the author using ArcGIS Pro.

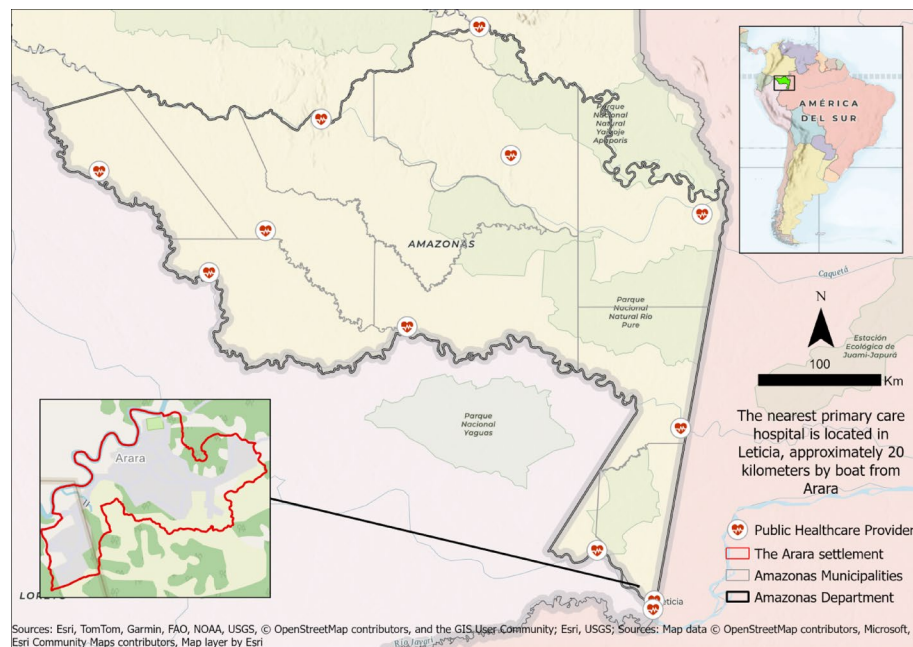


Fig. 2 Spatial distribution of public healthcare providers relevant to access from Arara in the Department of Amazonas. *Source:* Base map: OpenStreetMap contributors; Indigenous reserves: Colombia en Mapas (www.colombiae-nmapas.gov.co); healthcare provider data: Registro Especial de Prestadores de Servicios de Salud (REPS), Colombia; map prepared by the author using ArcGIS Pro.

ambulances were recorded in the dataset. Installed capacity was concentrated mainly in consultation, observation, and general inpatient care, whereas transport support, surgical infrastructure, and some specialised services were more limited [28]. Workforce data also indicated the presence of general professional profiles, including physicians, nurses, dentists, psychologists, and allied health personnel, but a more restricted availability of specialist medical profiles [29]. Although these data describe the departmental context rather than Arara specifically, they help explain why biomedical care was largely concentrated in Leticia and why access to institutional services often required travel outside the community.

No sufficiently robust or standardised administrative database was available on the number or distribution of traditional healers, so comparable statistics could not be reported for the traditional care system. Their presence and central role in healthcare decision-making are therefore documented through the survey findings and qualitative accounts presented in this study.

For the qualitative component, a purposive sample of participants was selected, including both community and institutional informants, to ensure a diversity of perspectives and enrich the understanding of health practices and perceptions in Arara.

2.3 Quantitative component

2.3.1 Survey design and implementation

The structured household survey used in this study was developed by the research team, drawing conceptually on selected modules from previously validated national population surveys in Colombia. These instruments served as structural references; however, the survey was extensively adapted to the cultural, linguistic, and territorial context of

the Arara community, with direct input from a community leader to ensure its relevance and appropriateness.

Although the full survey included a broader set of thematic modules, this study analysed only those aligned with its objectives. Specifically, it examined the chapters on household members' characteristics (Chap. 7), traditional or "own" health practices (Chap. 8), and general health (Chap. 10), as these sections were central to understanding the interaction between traditional and Western medical systems in the community. The full instrument also included modules on housing conditions, food security and sovereignty, knowledge and control of vector-borne and zoonotic diseases, mortality, lifestyle, sexual and reproductive health, maternal and child health and immunisation, and access to information. These additional modules were not analysed in this article because they fell outside the specific focus of the present study.

A pilot test conducted in a community with similar demographic and cultural characteristics informed the final adjustments to the instrument, ensuring clarity, cultural suitability, and coherence with local understandings of health and illness.

2.3.2 Data collection and analysis

A group of surveyors from the community, specifically trained for this purpose, carried out the data collection. Mobile devices equipped with specialised offline software were used, given the region's limited internet connectivity, and GPS devices were employed to record the exact location of households. The survey was conducted by six community members (one woman and five men) selected by traditional authorities for their recognition and competence in performing this role. They collected the information in Spanish and, when necessary, in Tikuna, the local Indigenous language, to ensure comprehension and build trust. One or two members of the research team accompanied them throughout the process to verify data quality.

Quantitative data were analysed using Stata v.13 (StataCorp LLC, College Station, TX, USA). Descriptive statistics were used to characterise beliefs, practices, and treatment choices across traditional and Western systems of care, while bivariate analyses examined associations between selected outcomes and participants' sociodemographic characteristics using Pearson's chi-squared test.

2.4 Qualitative component

2.4.1 Data collection and analysis

Qualitative data were collected through an ethnographic and phenomenological approach to understand lived experiences and perceptions of the health–illness process from both a local, or own, perspective and the perspective of personnel linked to the health sector, particularly in relation to COVID-19, as well as the care pathways followed by inhabitants of the Arara community.

It is important to note that the community includes people from different backgrounds, including members of other Indigenous peoples and people who have come from Colombian cities. This diversity made it possible to identify forms of dialogue, appropriation, and cultural integration between the medical practices of Indigenous peoples in the Amazon and biomedicine.

To support this process, the research team conducted two field stays during 2022, one in the rainy season and another in the dry season. This allowed the team to observe how

population dynamics, mobility, and healthcare practices varied across seasons, while also gaining a deeper understanding of everyday community life beyond the interview and workshop settings developed in Arara.

The qualitative tools included participant observation, documented through field diaries, semi-structured individual and group interviews, and a social cartography workshop aimed at identifying health assets within the community. These spaces made it possible to engage with a wide range of community and institutional actors, including midwives, traditional healers, health promoters, community leaders, teachers, families, and professionals from health institutions.

In total, fourteen interviews were conducted with key informants selected because of their involvement in health, care, and community decision-making processes. The interviews included both men and women of different ages and social roles in order to capture diverse perspectives on health, illness, and care. In addition, the workshop and participant observation broadened the scope of the qualitative component by incorporating the everyday and collective experiences of different community members, thus preventing the analysis from depending exclusively on a small number of voices. The diversity of participants, together with these complementary qualitative materials, allowed the team to identify recurring patterns across accounts and to reach thematic saturation in relation to experiences of illness, care, and the use of traditional practices during the COVID-19 pandemic.

Although the participation of men and women was relatively balanced, the material also reflected important differences in health-related roles and responsibilities. Women tended to play a central part in accompanying health–illness processes within families, especially in matters related to sexual and reproductive health, childcare, and everyday care. Midwives and other women with traditional knowledge also held an important place in guiding decisions related to pregnancy, childbirth, and the care of newborns.

Men, by contrast, tended to participate more frequently in community-level health matters, such as liaising with institutions, managing external support, or accompanying collective processes. The material also showed that some forms of authority and legitimacy within traditional medicine varied according to gender and age, shaping who was recognised as a holder of knowledge, who made decisions about treatments, and who turned to different systems of care.

These tools were applied concurrently with the surveys, which made it possible to connect broader patterns with specific contextual details. All interviews were conducted with participants' prior consent, audio-recorded, and subsequently transcribed for analysis. The data were processed using NVivo Plus software. Through thematic analysis, the study identified and categorised emerging patterns related to therapeutic decisions, trust in health systems, the relationship between traditional medicine and biomedicine, and cultural and community responses to health situations, including the COVID-19 pandemic.

2.5 Data integration

Quantitative and qualitative data were collected concurrently and initially analysed separately. The research team integrated both strands during the analytical and interpretive phase by comparing findings across shared thematic domains, including treatment-seeking decisions, trust in traditional and Western health systems, responses to COVID-19,

and the sociocultural factors shaping these practices. Quantitative analyses identified general patterns and associations, while qualitative findings illuminated the meanings, experiences, and contextual processes underlying those patterns. Together, these strands allowed a more comprehensive analysis of how community members perceive, use, and navigate traditional and Western health systems within the Arara community.

2.6 Ethical considerations

The project adhered to the ethical principles outlined in the Declaration of Helsinki (1964) and its subsequent amendments [30, 31], as well as Resolution 8430 of 1993 issued by the Colombian Ministry of Health [32]. Ethical approval was granted by the Research and Ethics Committee of the Institute of Public Health at Pontificia Universidad Javeriana.

Community leaders participated throughout the study to ensure that the information collected was relevant and that data collection and management were culturally appropriate, respectful, and acceptable to the community. Before data collection, information sessions were held to explain the objectives of the study, and written informed consent was obtained from all participants. Surveys and interviews were anonymised to safeguard participants' privacy and the confidentiality of the information gathered for this research. All interviews were recorded with prior authorisation and later transcribed for analysis.

As part of the ethical commitment, the study's findings were shared with the Arara community in an accessible and comprehensible format (infographics), respecting their right to information and contributing to the strengthening of their traditional health system.

3 Results

3.1 The social importance of traditional medicine within the community

Traditional medicine in Arara has remained a fundamental pillar for sustaining community life, playing a central role in wellbeing, the preservation of cultural identity, and social cohesion.

For the analysis of health-related perceptions, a subsample of individuals aged 14 years and older was considered ($n = 479$), with a balanced sex distribution (49.9% women and 50.1% men).

Within this group, no statistically significant differences were observed between men and women in the overall valuation of traditional medicine. The proportion of participants who attributed some importance to traditional healers and midwives—particularly in relation to their roles in spiritual protection, health care, and guidance—was similar across both sexes (94.0%), while the proportion who did not attribute importance was low among both women and men (6.3% and 3.8%, respectively), with no statistically significant differences ($p = 0.21$) (Table 1).

Regarding participation within the traditional medicine system, differences by sex were observed in the distribution of roles. Women more frequently identified as midwives (12.1% among women and 2.1% among men; $p < 0.001$) and apprentice midwives (8.4% and 2.1%, respectively; $p = 0.002$), with statistically significant differences. A higher proportion of men was observed in the role of prayer healer (1.7% and 6.7%, respectively; $p = 0.006$).

Table 1 Health-seeking behaviour, perceived importance of traditional medicine, and participation in traditional medicine by sex. Source: own elaboration based on data from the Tikuna–Arara community survey, 2022

Variable	Women (n = 239)	Men (n = 240)	Total (n = 479)	p-value
<i>Perceived importance of traditional medicine*</i>				0.21
Any importance	224 (93.7%)	231 (96.2%)	455 (95.0%)	
No importance	15 (6.3%)	9 (3.8%)	24 (5.0%)	
<i>Role in traditional medicine*</i>				
Midwife	29 (12.1%)	5 (2.1%)	34 (7.1%)	< 0.001
Apprentice midwife	20 (8.4%)	5 (2.1%)	25 (5.2%)	0.002
Prayer healer	4 (1.7%)	16 (6.7%)	20 (4.2%)	0.006
Bonesetter	19 (7.9%)	32 (13.3%)	51 (10.6%)	0.06
Variable	Women (n = 397)	Men (n = 422)	Total (n = 819)	p-value
<i>First source of care**</i>				0.11
Health institution	39 (9.8%)	55 (13.0%)	94 (11.5%)	
Traditional healer	160 (40.3%)	175 (41.5%)	335 (40.9%)	
Pharmacy or self-management	7 (1.8%)	15 (3.6%)	22 (2.7%)	
Home-based care	191 (48.1%)	177 (41.9%)	368 (44.9%)	

Variables marked with * were measured in a subsample of individuals aged ≥ 14 years

Variables marked with ** were measured in the total study population

Percentages are calculated within each sex

p-values correspond to chi-square tests

In contrast, men showed greater participation in roles such as bonesetter (13.3% among men and 7.9% among women), although this difference was not statistically significant ($p = 0.06$). No statistically significant differences were observed in the remaining roles evaluated (Table 1).

This essential place of traditional medicine in both the practical and symbolic life of Arara's inhabitants is reinforced by testimonies that reveal the role of traditional leaders in the community's daily life and in times of crisis. As one of them explained:

As leaders, we play an important role in informing the community about the situation, its causes and consequences, because as Indigenous authorities, we are the first to receive information to share with everyone.

This role goes beyond what Western perspectives typically include within healthcare, as it promotes wellbeing and the integral care of the community.

Traditional healers provide treatments that may involve the use of medicinal plants for infusions and baths, prayers, smoke rituals, dietary restrictions, spiritual dances, and cleansing of the external environment, among other essential practices for maintaining and restoring balance between the territory, spirits, communities, and individuals. This contrasts with the fragmented view of the biomedical model, which focuses exclusively on the physical aspect of illness. In this context, a former *Curaca*¹ of the Magüta people—that is, a traditional Indigenous authority who had previously held this leadership role within the community—stated:

We carried out spiritual protection almost throughout 2020 and 2021. [...] Entry to the communities was completely restricted for outsiders — not even neighbours from nearby communities were allowed to come in [...].

¹ The *Curacas* form part of the Indigenous authorities who hold traditional leadership roles within the community.

When illness occurs, initial responses to care are primarily managed within the household, often with the support of family members. However, traditional medicine continues to play a central role in the community's health practices. This is reflected in the survey results, where 85.8% of participants reported managing illness at home or seeking care from traditional healers as a first option.

When disaggregated by sex, no statistically significant differences were observed in the first source of care ($p = 0.11$). In both groups, home-based care with family support was the most common response (48.1% among women and 41.9% among men), followed by the use of traditional healers (40.3% among women and 41.5% among men). Descriptive differences were observed in the use of health institutions, with a slightly higher proportion among men (13.0%) compared to women (9.8%), while other options were reported less frequently in both groups (Table 1). As a former *Curaca* explained:

The elders used to say that we must take care of ourselves. [...] Most of all, our remedy was here with us; the remedy was not in the city. [...] When illness struck, the cure was right here.

This testimony highlights how the community's health approach centres on self-reliance and the ability to find solutions within their own territory and ancestral knowledge before turning to the biomedical model.

Given the absence of differences by sex, additional analyses were conducted to explore whether variations in health-seeking behaviour could be explained by the type of care chosen as the first option. Statistically significant differences were observed in the perceived importance of traditional medicine according to the type of care ($p = 0.01$). Participants who reported seeking care from traditional healers showed the highest proportion attributing importance to traditional medicine (97.1%), followed by those relying on home-based care (94.6%) and health institutions (86.3%).

Similarly, participation in traditional medicine varied according to the type of care sought ($p = 0.03$). Individuals who reported seeking care from traditional healers or resorting to pharmacies or self-care practices were more likely to report participation in traditional medicine, particularly among those who used pharmacies or self-care (52.6%) and those who consulted traditional healers (36.6%), compared to those who relied primarily on health institutions (21.6%).

In addition, statistically significant differences in educational level were observed according to the first source of care ($p < 0.001$). Individuals with higher levels of education were more likely to resort to pharmacies or adopt self-care practices (35.0%) compared to those with lower levels of education (25.0%). In contrast, the use of health institutions and traditional healers was more frequent among individuals with lower educational attainment (Table 2).

These analyses were conducted using variables measured in different subpopulations according to age, as detailed in Table 2, and participation in traditional medicine was operationalised as a binary variable based on reported roles within the traditional system.

The importance of traditional medicine is further reinforced by the cultural and geographical distance from health institutions, most of which are located in Leticia. This situation entails long journeys that limit access to Western medicine. Indeed, 97.3% of respondents who received institutional care did so in Leticia, whereas only 25.2% were

Table 2 First source of care by perceived importance of traditional medicine, participation in traditional medicine, and sociodemographic characteristics. *Source:* own elaboration based on data from the Tikuna–Arara community survey, 2022

Variable	Health institution (n = 51)	Traditional healer (n = 205)	Pharmacy or self-management (n = 19)	Home-based care (n = 204)	Total (n = 479)	p-value
<i>Perceived importance of traditional medicine*</i>						0.01
Any importance	44 (86.3%)	199 (97.1%)	19 (100.0%)	193 (94.6%)	455 (95.0%)	
No importance	7 (13.7%)	6 (2.9%)	0 (0.0%)	11 (5.4%)	24 (5.0%)	
<i>Role in traditional medicine*</i>						0.03
Any role in traditional medicine	11 (21.6%)	75 (36.6%)	10 (52.6%)	59 (28.9%)	155 (32.4%)	
No role in traditional medicine	40 (78.4%)	130 (63.4%)	9 (47.4%)	145 (71.1%)	324 (67.6%)	
Variable	Health institution (n = 94)	Traditional healer (n = 335)	Pharmacy or self-management (n = 22)	Home-based care (n = 368)	Total (n = 819)	p-value
<i>Age**</i>						< 0.001
Under 14 years	43 (45.7%)	130 (38.8%)	3 (13.6%)	164 (44.6%)	340 (41.5%)	
14–26 years	15 (16.0%)	53 (15.8%)	3 (13.6%)	88 (23.9%)	159 (19.4%)	
27–59 years	30 (31.9%)	132 (39.4%)	12 (54.5%)	98 (26.6%)	272 (33.2%)	
60 years and over	6 (6.4%)	20 (6.0%)	4 (18.2%)	18 (4.9%)	48 (5.9%)	
Variable	Health institution (n = 59)	Traditional healer (n = 237)	Pharmacy or self-management (n = 20)	Home-based care (n = 265)	Total (n = 581)	p-value
<i>Education***</i>						< 0.001
None / Primary	19 (32.2%)	95 (40.1%)	5 (25.0%)	106 (40.0%)	225 (38.7%)	
Secondary	35 (59.3%)	128 (54.0%)	8 (40.0%)	144 (54.3%)	315 (54.2%)	
Higher education	5 (8.5%)	14 (5.9%)	7 (35.0%)	15 (5.7%)	41 (7.1%)	

Variables marked with * were measured in a subsample of individuals aged ≥ 14 years

Variables marked with ** were measured in the total study population

Variables marked with *** were measured in a subsample of individuals aged ≥ 10 years

Participation in traditional medicine was defined as reporting any role within the traditional system

Percentages are calculated within each column

p-values correspond to chi-square tests

attended in Arara, and a smaller percentage sought services in other cities such as Bogotá (Colombia) or Puerto Alegre (Peru).

Among the most frequently reported illnesses within the community were headaches (35.3%), respiratory infections (19.8%), and body pain (18.4%), followed by dizziness, vomiting, or diarrhoea (6.3%). In addition, several conditions were described as having spiritual origins, including *spiritual harm or bewitchment* (7.1%), *open chest* (*pecho abierto*², 5.8%), and *loss of the cigarette* (*pérdida del cigarrillo*³, 5.2%) (Fig. 3).

As part of disease management, both individual and collective practices emerged, including prayers, herbal baths, vapour treatments, and smoke rituals. One participant explained:

² A person is said to “open the chest” (*pecho abierto*) after carrying heavy objects or receiving a physical blow. Treatment is provided by a traditional healer and involves following specific dietary restrictions, avoiding the use of sharp tools such as knives or machetes, and refraining from work.

³ This occurs when a baby loses the spiritual protection received during treatment for *susto* (fright) or *quebranto* (weakness). It usually happens after another fall or physical shock.

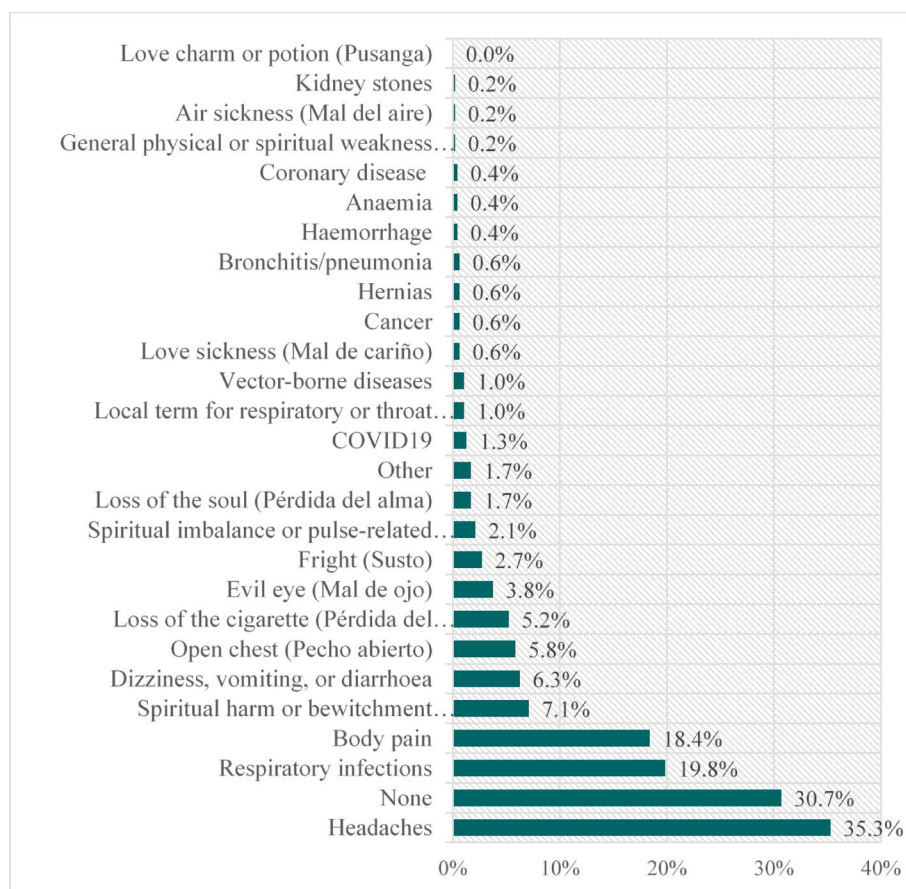


Fig. 3 Common illnesses reported within the Arara community. Note: the terms in parentheses reflect the traditional expressions used by the community within their own cultural and linguistic context to describe these illnesses. Source: own elaboration based on data from the Tikuna–Arara community survey, 2022.

The smoke must stay lit all the time; that smoke drives away the bad spirits carried by the illness.

This protective practice, based on the use of smoke, illustrates how the connection with spirits and the various beings inhabiting the forest is fundamental for maintaining overall wellbeing and treating different ailments that may arise.

During the pandemic, sharing information and treatments among traditional healers, families, and other community members—both through daily interactions and community media—became an essential strategy for protecting life. A story from a female community leader illustrates these processes:

The departmental hospital was overwhelmed, [...] so I decided to record a video on social media recommending herbal infusions and medicinal plant baths or vapour treatments to prevent and cure the virus.

Regarding the transmission and continuity of traditional medical knowledge, the survey revealed that 66.8% of respondents aged 14 years and over did not play an active role in traditional medicine. However, 14% identified as apprentices to traditional healers, 10.6% as bone setters (sobanderos), 7.1% as midwives, and 5.2% as midwife apprentices. Because respondents could select more than one role, these percentages do not sum to 100%.

3.2 The Dilemma of Trust and Accessibility in Western Healthcare

Although 97.9% of respondents were affiliated with the General System of Social Security in Health (SGSSS)—including the subsidised, contributory, and special schemes—the use of Western health services remains limited. According to the survey data, the main reasons for seeking care in these services, expressed as percentages of total respondents, were lower respiratory tract infections (17.6%), fever of unknown origin (18.4%), gastrointestinal infections (14.8%), and vector-borne diseases such as dengue and malaria (10.6%) (Fig. 4).

A total of 16.0% of respondents reported that they did not seek care from any Western health service, even when facing significant health problems, preferring instead to manage illness at home or with the support of traditional medicine. Additionally, only 10.6% stated that they attended medical appointments or check-ups (Fig. 4), reflecting the low use of these services for continuous health management.

This view was expressed by several participants and is illustrated by the account of one former Curaca of the Magüta people:

The remedy was not in the city. When you go there, you die. We must stay here in the community; when illness attacked us, the cure was right here, that's what the elders said.

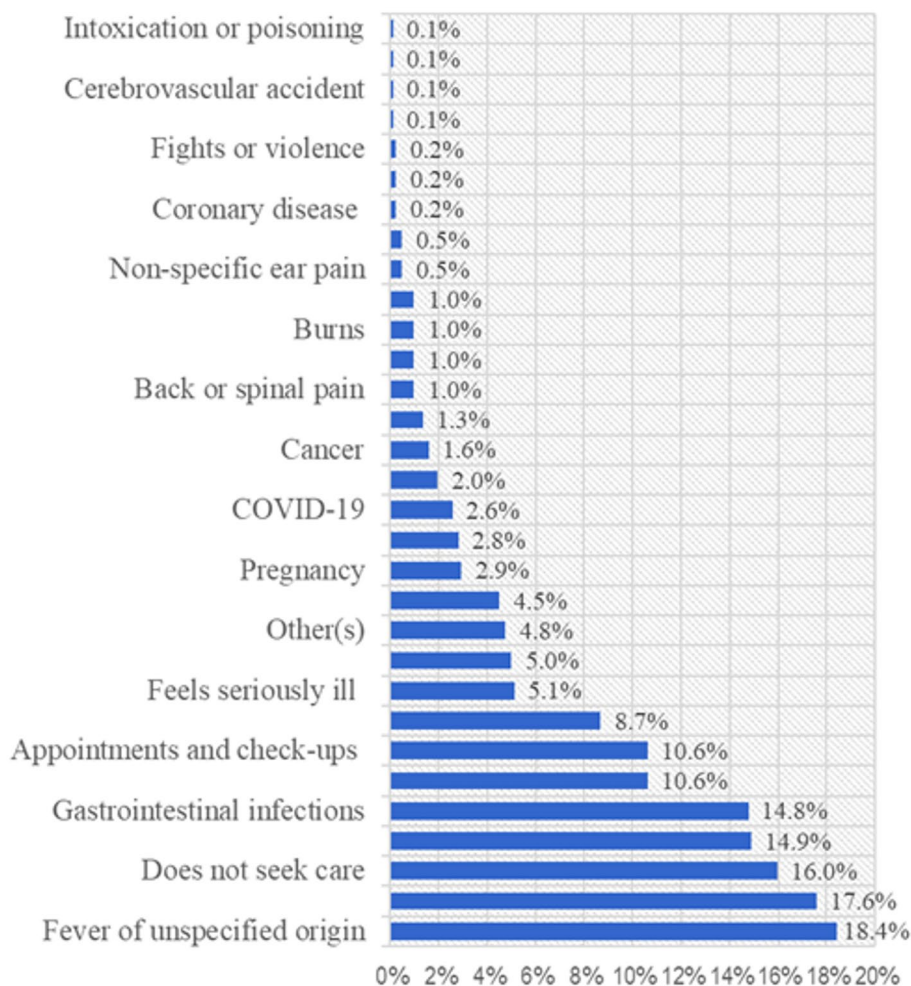


Fig. 4 Health problems leading to the use of western medicine within the Arara community.

This testimony highlights the community's mistrust of the effectiveness and accessibility of Western health services, while underscoring their deep knowledge of the environment and confidence in their own capacity to find healing solutions through traditional practices and knowledge.

The data suggest that Western health services are perceived by the community as a last resort, used mainly in severe or complicated cases that exceed the capacity of traditional medicine. This pattern reflects limited engagement with these services, likely influenced by geographical, economic, and cultural factors, alongside a collective pursuit of autonomy in healthcare—even under complex conditions such as during the pandemic. This was evident in the account of a community leader:

There were certain specialists who liked to intubate patients; for them it meant more power and a way to charge more money... We, as Indigenous organisations and peoples, filed complaints and decided not to send any more patients from our communities. Every seriously ill patient was treated here, and we didn't even report it.

3.3 Resistance and integration between traditional and western medicine in the community response to COVID-19

The Arara community's first encounter with COVID-19 was interpreted through the dreams of traditional healers, who received a vision that the virus was mainly destined for “whites” or settlers and would not seriously affect Indigenous peoples. This interpretation shaped how the community understood the virus, perceiving it as an external threat rather than one specifically directed towards Indigenous groups. As one traditional healer explained:

This virus, if we take good care of ourselves, is not for us; it is for the ‘whites’.

These interpretations, deeply rooted in the Indigenous worldview, not only guided preventive strategies within the community but also strengthened trust in ancestral medicine as a key tool for facing the pandemic.

Survey data indicated that most community members aged 12 years and over reported adopting conventional preventive measures, such as wearing face masks in public spaces (76.9%), regular hand washing (63.5%), and following quarantine measures (47.8%). However, these were complemented by traditional practices, including the use of herbal remedies (23.5%), vapour treatments with medicinal plants (19.7%), and *community diets* (14.9%)—collective restrictions that limited interaction between neighbours and led to the suspension of community activities such as dances and football matches (Table 3). No statistically significant differences by sex were observed in the adoption of these preventive measures. This broader pattern also emerged in the account of a community leader, who noted:

We carried out community diets and completely closed all entries and exits. Visits from neighbours or relatives from other communities were not allowed.

These practices reflected a combination of Western and traditional measures, where *humeo* or vapour treatments with medicinal plants, together with spiritual protection, played a central role in defending against the virus. A traditional medical leader described this experience as follows:

Table 3 Preventive measures against COVID-19 among individuals aged 12 years and over in the Arara community. *Source:* own elaboration based on data from the Tikuna–Arara community survey, 2022

Actions to Avoid Infection	People	Percentage
Use of face masks in public spaces	383	76.9%
Regular handwashing and/or use of hand sanitiser or alcohol	316	63.5%
Quarantine	238	47.8%
Traditional remedies	117	23.5%
Vapour treatments at home and on the body	98	19.7%
Maintaining a two-metre distance from others	89	17.9%
Preventive isolation (community diet)	74	14.9%
Airing or ventilating the home for at least 10 min, three times a day	73	14.7%
Avoiding touching the face	30	6.0%
Avoiding greeting with hugs or kisses	21	4.2%
Other	12	2.4%
Did nothing	7	1.4%

Respondents were allowed to select more than one preventive measure

You could see the whole community filled with incense smoke; it smelled like perfume—natural perfume. It smelled because it protected you; one also received protection.

This hybrid approach demonstrates how the community integrated its own knowledge with public health recommendations, adapting them to its worldview and reinforcing a shared sense of identity and collective protection.

Among the 223 people who reported having contracted COVID-19, 80.3% identified the illness exclusively through symptoms, without resorting to laboratory testing. The most common symptoms included headache (85.7%), fever (76.7%), general body pain (74.0%), and cough (55.2%). These findings highlight the use of direct observation for diagnosis and initial management of the disease within the community.

Mistrust of testing was also evident, as many believed that the tests themselves could make people ill. A community leader explained:

We also entered a kind of limbo because people said, ‘With that COVID-19 test you’ll make us sicker, because that’s how you bring the virus to us, right?’ We went house to house to do the tests, with their consent, and they told us, ‘No, you’re the one bringing the virus.’ About 80% refused to take the test.

Regarding treatment, 40.8% of those infected relied exclusively on traditional medicine, while 36.8% combined it with support from family and friends. Only 5.4% used treatments based solely on Western medicine (Table 4). This confirms a clear tendency to rely primarily on traditional healing, while Western medicine appeared mainly as complementary—and, in some cases, as less trustworthy.

Within this context, hospitals were perceived as high-risk places associated with death, which contributed to this reluctance. A community leader illustrated this perception by stating:

Because if they take someone to the hospital, that’s the end of them—the tube kills you; being intubated, that’s what kills you. How they do it, right? When they take you there... They kill you because you’ve got COVID, that’s where it ends. That’s why no one went there.

Table 4 Type of treatment used to address COVID-19 within the Arara community. Source: own elaboration based on data from the Tikuna–Arara community survey, 2022.

Type of Treatment	People	Percentage
Traditional medicine	91	40.8%
Traditional medicine and support networks	82	36.8%
Western medicine, traditional medicine, and support networks	18	8.1%
Western medicine	12	5.4%
Support from family and/or friends	9	4.0%
Western and traditional medicine	9	4.0%
Western medicine and support networks	2	0.9%
Total	223	100.0%

Vaccination against COVID-19 revealed tensions between traditional conceptions and biomedical recommendations. Although 87.2% of the population received at least one vaccine dose, only 70.8% completed the full vaccination schedule. Deeply rooted fears led traditional authorities to recommend limiting the number of doses, reflecting an underlying mistrust towards external interventions. Among these beliefs was the idea that vaccination could trigger transformations into animals:

That people would, I don't know, turn into animals," or into creatures such as alligators or bats: "If they get vaccinated, they'll turn into an alligator or a bat.

There was also fear that vaccination formed part of a strategy to reduce the Indigenous population and facilitate the exploitation of their natural resources:

They were controlling the population; they could reduce the Indigenous peoples.

In this context, the role of Indigenous authorities was crucial in helping people make decisions about vaccination. A Magüta leader explained:

So I began asking and guiding the institution about how and when we could enter. Some Curacas wouldn't allow us in, so in the communities that did, those who wanted to get vaccinated did so, and that's how we entered some of them, acting as an intermediary myself.

Another leader added:

I always told the people, the community: 'Let's get vaccinated,' but it wasn't compulsory. Whoever wanted to, fine; whoever didn't, fine too. Most followed me and got vaccinated, although some refused simply because they didn't want to.

However, misinformation generated negative feelings towards vaccination, as expressed by an interviewee from the Departmental Health Secretariat:

You wouldn't think those things would reach here, but they did, and there was a disinformation campaign on WhatsApp saying that the vaccine had a chip, that we were trying to exterminate the Indigenous people with it.

This account aligns with what the former *Curaca* shared, noting that both the authorities and the wider community were sceptical and fearful of the potential consequences of vaccination.

4 Discussion

The findings show how members of the Arara community perceive, navigate, and combine traditional and Western medicine when making healthcare decisions. Rather than documenting a fully developed interaction between both systems at the service-delivery level, the study highlights the meanings, preferences, and constraints that shape care-seeking practices in this context [33–35]. Although affiliation with the SGSSS is high, traditional medicine continues to serve as the primary strategy for healthcare, even in critical situations such as the COVID-19 pandemic. This pattern reflects the tensions that arise when formal affiliation to biomedical services does not necessarily translate into trust in, or regular use of, those services.

The predominance of traditional medicine as the first line of care in Arara reflects a pattern widely documented among Indigenous communities in Colombia and across Latin America [9, 10]. Traditional practices serve not only as therapeutic resources, but also as mechanisms for preserving cultural identity and reinforcing social cohesion [9, 10]. In Arara, practices such as *humeo* or vapour treatment reflect an understanding of wellbeing and care that encompasses multiple dimensions of life and territory. This perspective differs from the narrower clinical focus that often characterises the biomedical model.

The findings also show that community members used Western health services selectively and often as a last resort. This pattern reflects a combination of geographical, infrastructural, relational, and cultural barriers that help explain the community's preference for traditional medicine in Arara. Distance to Leticia, the absence of adequate local infrastructure, and the practical difficulties involved in reaching health institutions restricted access to Western healthcare services and reinforced the relevance of traditional care. At the same time, biomedical services were perceived as disconnected from local ways of understanding illness and care, which appears to have deepened mistrust and weakened dialogue with health institutions. Comparable barriers have been reported in other Amazonian settings, particularly those related to travel time, cost, and culturally unsafe services [36, 37]. In Arara, however, these barriers appear to do more than limit access: they also shape how Western healthcare is perceived and valued in everyday life. This helps explain why high formal affiliation to the health system does not necessarily translate into trust in, or routine use of, biomedical services.

The persistence of traditional medicine in Arara should also be understood in light of its broader legal and institutional position in Colombia. National regulations have progressively recognised Indigenous peoples' right to maintain their own health practices and have promoted intercultural approaches to care. Yet effective articulation between the biomedical system and Indigenous health systems remains limited and uneven in practice. In this sense, traditional medicine is formally recognised, but it has not been fully incorporated into regional health services or into routine mechanisms of care. In Arara, this gap appears to reinforce the continued centrality of traditional medicine, not only as a response to practical barriers, but also as a system of care that continues to hold social, cultural, and practical relevance within the community.

Some policy initiatives have sought to promote intercultural models of care and strengthen the participation of Indigenous authorities in the organisation of health services. However, these efforts have tended to remain at the level of normative recognition or isolated local experiences, rather than producing sustained mechanisms of

coordination between traditional healers, community leaders, and health institutions. In Arara, this institutional gap became especially clear during the COVID-19 pandemic, when official recommendations were implemented mainly through a biomedical logic, while the community reinterpreted and adapted those measures through its own cultural, ontological, and governance frameworks.

Within this institutional context, the COVID-19 pandemic provided a particularly revealing context for understanding how Indigenous communities reinterpret biomedical recommendations through their own worldviews. In Arara, measures such as mask use, handwashing, and quarantine were adopted, but they were mediated by traditional leaders and incorporated into broader community and spiritual practices. This suggests that biomedical and traditional measures were not necessarily perceived as incompatible. Rather, community authorities and local meanings shaped how these recommendations were accepted, adapted, and put into practice. Studies on Indigenous responses to COVID-19 in Latin America have similarly shown that preventive measures were often incorporated through local cultural and collective frameworks rather than adopted as purely external biomedical prescriptions [15, 16, 18]. In Arara, however, the findings suggest something more specific: this process depended not only on cultural reinterpretation, but also on the active role of Indigenous authority and local governance in defining the conditions under which public health measures became acceptable in everyday life.

Mistrust towards Western medicine was also evident in relation to testing, treatment, and vaccination. Community members often relied on symptoms, family networks, and traditional healers when interpreting and managing COVID-19, while they accepted biomedical interventions more selectively. The relatively high uptake of at least one vaccine dose suggests that the community did not entirely reject biomedical measures. However, incomplete vaccination schedules, fears surrounding vaccination, and mistrust of testing indicate that acceptance remained conditional and negotiated. Comparable patterns have been documented in other Indigenous settings, where vaccine hesitancy has been linked to perceived risks and the absence of culturally appropriate information [38]. The Arara case, however, suggests that this hesitancy cannot be understood only as a matter of information or misinformation. It was also shaped by concerns about cultural autonomy, external control, and the legitimacy of outside interventions in Indigenous territory. In this context, Indigenous authorities played a key mediating role between the community and health institutions, enabling some degree of engagement with vaccination while preserving local autonomy over decision-making [39].

These tensions should also be understood through a broader historical lens. The current hierarchy between biomedical and traditional medicine in many Amazonian settings does not arise only from practical differences or barriers to access, but also from longer processes of colonisation and institutional ordering. Across much of the republican and postcolonial period, official health systems tended to privilege biomedicine as the legitimate, modern, and scientific model of care, while Indigenous knowledge was often portrayed as backward, informal, or lacking validity [37, 40–45]. In many contexts, traditional healers, shamans, midwives, and other Indigenous specialists were stigmatised, marginalised, or excluded from formal spaces of care. Although recent decades have brought greater recognition of cultural diversity and of the legitimacy of Indigenous

knowledge, these historical hierarchies continue to shape contemporary perceptions of traditional medicine and its place within healthcare systems.

In Arara, this historical background helps explain why the selective acceptance of biomedical interventions and the persistence of mistrust towards certain procedures can be understood, at least in part, as responses to a longer history of asymmetrical relations between external institutions and Indigenous communities. Likewise, the defence of traditional medicine seems to reflect not only therapeutic preferences, but also the protection of cultural autonomy, collective identity, and community authority to define which forms of care are regarded as legitimate. Read in this way, resistance to some biomedical practices does not simply express reluctance towards particular procedures; it also reflects historical disputes over knowledge, power, and the right to govern health within Indigenous territories.

At the same time, the coexistence of traditional and Western medicine points not only to tensions, but also to possible opportunities for more inclusive forms of care. Previous studies have shown that more respectful forms of coordination between traditional and biomedical systems can improve the acceptability of institutional care while preserving local medical traditions [39, 46]. The Arara case can also be understood in light of broader debates on medical pluralism [40] and intermedicity [44, 47–50], which draw attention to the coexistence, interaction, and selective use of multiple therapeutic systems within the same social setting. In this sense, the findings show that community members did not treat biomedical care, home-based remedies, ritual practices, and Indigenous knowledge as mutually exclusive options. Instead, they combined and negotiated these forms of care in practice, according to the meanings attributed to illness, the type of response considered appropriate, and the conditions that shaped access and trust during the pandemic.

These negotiated forms of care were not experienced uniformly within the community. Rather, patterns of participation in traditional medicine and care-seeking varied according to social roles and selected sociodemographic characteristics. Although no statistically significant differences were observed by sex in the perceived importance of traditional medicine or in general health-seeking behaviour, the distribution of roles suggests gendered patterns of participation within the traditional health system. Women more often assumed caregiving and spiritually oriented roles, such as midwifery and prayer healing, whereas men participated more frequently in roles such as bonesetters. These findings suggest that gender shapes responsibilities, forms of participation, and positions of authority within traditional healthcare practices.

Although sex was not significantly associated with the first source of care, the perceived importance of traditional medicine and active participation in the traditional system were associated with differences in the type of care sought. This suggests that care-seeking decisions were shaped less by sex alone than by cultural meanings, practical involvement in traditional medicine, and the social legitimacy attributed to different healthcare options. Differences by age and educational level reinforce this interpretation, as they point to unequal distributions in the use of institutional, traditional, and self-care options. Taken together, these findings support an understanding of healthcare-seeking as a socially differentiated process in which gender intersects with cultural valuation, experience within traditional systems, and other characteristics such as age and educational level.

Yet this coexistence unfolded within a healthcare landscape marked by epistemic asymmetries, in which biomedical knowledge continues to hold greater institutional legitimacy than Indigenous knowledge. From this perspective, the Arara case reveals not only the persistence and everyday relevance of traditional medicine, but also the tensions produced by its partial, subordinate, and often conditional recognition within formal healthcare structures. These findings also contribute to wider debates on intercultural health, which call for more horizontal models of care that take local knowledge seriously and promote more respectful forms of coordination between medical systems, particularly in Indigenous territories and in contexts of high health vulnerability [41, 51–53].

Viewed in this way, intercultural health should not be understood as an abstract principle, but as a lived practice grounded in respect, negotiation, and the recognition of Indigenous knowledge [11, 13, 46]. In settings such as Arara, this would require health services that are not only geographically accessible, but also able to engage with local understandings of illness, healing, and community authority. The findings therefore point to the importance of strengthening local primary healthcare capacity, improving communication between community authorities and health institutions, and promoting forms of training that enable health professionals to engage more respectfully and effectively with Indigenous realities [34, 54, 55].

This study has several limitations that should be considered when interpreting the findings. First, the survey instrument was adapted from tools originally designed for a mestizo-Western population, and some sections did not fit the local context well enough to be included in this article. This highlights the need to develop instruments that better capture Indigenous understandings of health, wellbeing, and care. Second, although the study employed a mixed-methods design, the quantitative strand was used to characterise general patterns in care-seeking, health practices, and responses to COVID-19 across the surveyed households, as well as to explore selected associations with participants' sociodemographic characteristics. However, it was not designed to provide a fully explanatory account of how these patterns varied across population subgroups. The qualitative component, in turn, provided interpretive and contextual depth through a smaller number of interviews. As a result, the study offers a stronger account of overall patterns and selected differences than of the more complex social processes shaping variation across participants. Third, the study captured community perspectives in much greater depth than the views of Western health providers or institutional actors. The discussion therefore offers a more robust interpretation of community experiences, perceptions, and decisions than of the formal relationship between both systems as viewed from the biomedical side. Future research could examine these institutional perspectives more fully, compare similar dynamics across Indigenous communities in other regions, and further explore how local authority shapes the practical coordination between traditional and biomedical care.

Finally, the case of Arara extends current knowledge by showing that the coexistence of traditional and Western medicine does not in itself produce a fully integrated intercultural system of care. Instead, health decisions emerge through a selective, negotiated, and community-mediated relationship between both systems. The findings add nuance to existing literature by showing that high formal affiliation to the Colombian health system does not necessarily translate into trust in, or routine use of, biomedical services.

They also highlight the central role of Indigenous authorities and traditional healers in interpreting illness, guiding care-seeking, and mediating the acceptance of public health measures during the COVID-19 pandemic. In this sense, the Arara case suggests that intercultural health cannot rely on formal policy recognition alone, but must also engage seriously with local authority, Indigenous knowledge, and the practical conditions that shape access, trust, and everyday care decisions.

5 Conclusions

The findings show that traditional medicine remains central to healthcare decision-making in the Arara community, not only as a therapeutic resource but also as a source of cultural continuity, social cohesion, and spiritual protection. Although most participants were formally affiliated with the Colombian health system, Western health services were used more selectively and often as a last resort, reflecting not only geographical and infrastructural barriers, but also limited trust and weak alignment with local understandings of illness and care.

The experience of the COVID-19 pandemic further illustrates how biomedical recommendations were not simply accepted or rejected, but selectively interpreted and negotiated through community authority, cultural beliefs, and traditional knowledge. Rather than documenting a fully developed interaction between two integrated health systems, the study shows how community members navigate, combine, and evaluate both forms of care in practice. These findings highlight the importance of intercultural approaches that recognise traditional medicine as a legitimate and central component of care in Indigenous communities.

Abbreviations

COICA	Coordinator of Indigenous Organisations of the Amazon Basin
COVID-19	Coronavirus Disease 2019
DANE	National Administrative Department of Statistics
GPS	Global Positioning System
NVivo	NVivo qualitative data analysis software
PAHO	Pan American Health Organization
SGSSS	General System of Social Security in Health
SISPI	Indigenous and Intercultural Health System
WHO	World Health Organization

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions

Y.F. and J.A. led the conceptualisation, quantitative analysis, and manuscript writing. K.A. and P.V. guided the analysis of the qualitative component and conducted the field data collection. D.B. provided essential support in refining the text and improving the overall clarity and coherence of the manuscript. M.M. developed the data capture programme used during the survey and produced the geographical map included in the manuscript. All authors contributed to

the interpretation of the results, participated in the review and final adjustments, and approved the final version of the manuscript.

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Data availability

The datasets and interview transcripts generated and analysed during this study are not publicly available in order to protect the confidentiality and privacy of participants. However, the English versions of the survey instrument and the semi-structured interview guide used in this study are provided as supplementary materials, as they do not contain identifiable information.

Declarations

Ethics approval and consent to participate

The study "Participatory Design of the Territorial Health Observatory of the Amazon with an Emphasis on COVID-19" was approved by the Research and Ethics Committee of the Institute of Public Health at Pontificia Universidad Javeriana during its session on 28 August 2021 (Approval Act No. 0008). All participants provided written informed consent. All procedures were carried out in accordance with relevant guidelines and regulations, including the Declaration of Helsinki (1964) and its subsequent amendments [30, 31]. The study was classified as minimal risk in accordance with Resolution 8430 of 1993 issued by the Colombian Ministry of Health [32].

Consent for publication

This study did not include any images, videos, or other personally identifiable information. Sociodemographic data such as age and sex were collected and are presented only in aggregate form, ensuring that no participant can be individually identified. Therefore, consent for publication is not applicable.

Clinical trial number

Not applicable.

Competing interests

The authors declare no competing interests.

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