

# Dialogue and respect: the basis for constructing an intercultural health system for indigenous communities in Puerto Nariño, Amazonas, Colombia

Diálogo y respeto: bases para la construcción de un sistema de salud intercultural para las comunidades indígenas de Puerto Nariño, Amazonas, Colombia

Patiño Suaza, Ana Eugenia<sup>1</sup>; Sandín Vásquez, María<sup>2</sup>

Veterinarian. Ph.D in Public Health. Academic support and postdoctoral researcher, Universidad de Chile, Chile. sangps@gmail.com

<sup>2</sup>Bachelor of Environmental and Sanitary Biology. Ph.D in Health and Medical-Social Sciences. Associate Professor at Universidad de Alcalá, Spain. maria.sandin@uah.es **ABSTRACT** This paper presents the ideas on health and disease as well as proposals regarding the health care system voiced by indigenous communities belonging to the Tikunas, Cocama and Yagua ethnicities of the Puerto Nariño municipality in the department of Amazonas, Colombia. The study was conducted between 2010 and 2013. The tools used to obtain the data were participant observation, interviews and discussion groups. The study evidenced a profound lack of information and understanding on the part of state health agencies. As a principal demand, indigenous communities ask to be heard when decisions affecting their health or their way of understanding health are made. These results should be taken into account in the development of future health programs and provide a basis for the construction of an adequate intercultural health system for the town of Port Nariño.

**KEY WORDS** Indigenous Population; Medicine, Traditional; Complementary Medicine; Multiculturalism; Colombia.

**RESUMEN** Este artículo presenta las concepciones sobre salud-enfermedad y las propuestas en torno al sistema sanitario planteadas por las comunidades indígenas pertenecientes a las etnias Tikuna, Cocama y Yagua del municipio de Puerto Nariño en el departamento del Amazonas, Colombia. El estudio se realizó entre los años 2010 y 2013. Las herramientas utilizadas para obtener los datos fueron la observación participante, la entrevista y los grupos de discusión. La investigación evidenció falta de información y entendimiento muy profundos por parte de los organismos estatales de salud. Como demanda principal, las comunidades indígenas piden ser escuchadas cuando se tomen decisiones que afectan a su salud o a su manera de entenderla. Se espera que los resultados obtenidos sean tenidos en cuenta en la elaboración de futuros programas de salud y aporten una base para la construcción de un sistema de salud intercultural adecuado para el municipio de Puerto Nariño.

**PALABRAS CLAVES** Población Indígena; Medicina Tradicional; Medicina Complementaria; Multiculturalismo; Colombia.

### **INTRODUCTION**

# **Background**

In the United Nations Declaration on the Rights of Indigenous Peoples, (1) passed on September 13th, 2007, the General Assembly of the United Nations acknowledges the indigenous peoples' rights "...to be actively involved in developing and determining health [...] programs" (Article 23), and "...to the enjoyment of the highest attainable standard of physical and mental health. States shall take the necessary steps with a view to achieving progressively the full realization of this right" (Article 24). In addition to this Declaration, other positive steps are the advances in the acknowledgement of multiculturalism in almost all Latin American countries, and in the process of creation of their own health systems. (2)

In Colombia, the indigenous communities do not enjoy the right to healthcare, as it is established in international instruments. (3 p.154) Their access to state health services is restricted by certain factors, such as location, costs, language, and cultural values. In such cases, traditional medical systems may play a highly important role in disease prevention and healing, given that such systems may be better adapted to the principles of ethnic groups. (4) Other elements, such as the doctor-patient relationship, the training and number of professionals, the availability and use of technology, and the health system model applied by such health professionals, may explain the differences between the health indicators of majority and minority groups which, due to the reasons explained above, do not have or have late access to health services.(4)

# Hierarchical organization of the traditional medical system

To increase intercultural sensitivity and learning, it is essential to approach the indigenous communities' cosmovision, since this knowledge is a guide to life, death, health, disease, and specific healing strategies to achieve health recovery. (5) Much of the strength and survival capacity of the indigenous communities is due to the efficacy of their traditional health systems, whose

"conceptual axis" or cosmovision is based on balance, harmony, and integrality. (6)

A traditional health system might be constituted by hierarchically-organized actors, as described below, beginning with the lower or primary level<sup>(7)</sup>:

- Comuneros: it is the lowest level of knowledge for disease intervention. It is based on self-care and self-assistance of health and on mothers and grandmothers' knowledge. It applies to mild ailments.
- Sobanderos: they are specialists in orthotics and trauma. They provide first aid to patients for severe wounds before they are referred to a hospital.
- Rezanderosand curanderos: they intervene in psychological-spiritual ailments and, sometimes, physical diseases. While the main resource of rezanderos is praying and a connection to the spirits, curanderos rely on ethnobotany.
- Parteras (Midwives): they are specialized in assisting newborns and women during the prenatal and postnatal periods.
- Traditional practitioners: they possess the wisdom on ethnobotanics that stems from their ancestors and Mother Earth as well as the spiritual power. They are the gods' messengers and, as such, they perform harmonizations, hold ceremonies, and perform rites. They also possess the wisdom needed to exorcize any iniquities against Nature, the spirit, the individuals, and the family.
- Chamán (xamán or shaman): they arethe highest hierarchical level. A shaman is an intermediary between human beings and the spiritual domain. Spirits may either heal or sicken someone, and the shaman is the go-between with such spirits. Shamans must have a vast knowledge of their surroundings; given that they are specialists in reality, which includes history, myths, cosmovision, a deep knowledge of nature and medicinal plants, and a control of trance.<sup>(8)</sup>

Shamans' initiation is a complex process that involves a series of habits, diets, and abstinence. Their training process includes a long preparation, which usually takes between 10 and 15 years. The access to such training is reserved to children

that are said to possess some kind of privilege or gift. Candidates are chosen by the current shaman and their education includes extensive studies of history, plants, spirituality, cosmovision, healing chants, and ceremonies.<sup>(9)</sup>

# Characteristics of traditional medical systems

The traditional therapeutic systems present five essential features which define them as medical systems and place them as alternatives of health care within a community<sup>(10)</sup>:

- They are valid as ethnomedicine (therapeutic system adapted to specific social, cultural and geographical contexts which meet the health-related needs of each group).
- They use natural resources (such as plants, minerals, water, among others), as therapeutic means to prevent and cure diseases and as elements that are closely related to culture and beliefs.
- They contemplate the cultural element of disease. Health/disease is perceived as a unit in a direct connection with the balance/imbalance of the environment.
- 4. They are closely integrated within the culture of each community.
- The therapeutic systems of the indigenous communities and of the traditional cultures are a part of other elements, which organize and balance the individual, the group, the environment, and the beliefs with the cosmos.<sup>(11)</sup>

# **Traditional Medicine and Latin American Health Systems**

Currently, traditional medicine is an important response option to health care needs in Latin American and Caribbean countries. (12,13) Such involvement has been supported by international health organizations such as the World Health Organization (WHO) and the Pan American Health Organization (PAHO), which have also attempted and organized campaigns to support and promote policies directed to articulate the traditional and official medical systems, especially

primary health care. Some civil organizations, such as non-governmental organizations (NGO), also support traditional medicine. (14,15)

Various debates about indigenous and conventional health systems have focused on the incorporation of indigenous perspectives, medicines, and treatments, in primary health care, (16) which implies acknowledging and understanding the potentialities, organization processes, protection of ecological environments and indigenous sanctuaries; and, in turn, promoting a cultural adaptation of health and welfare programs to strengthen indigenous cultures and their relationship with the State. (17)

For the 2006-2011 period, the PAHO and the WHO were resolved to include the indigenous perspective in national healthcare policies, improve the information and knowledge management concerning the health of indigenous communities, integrate an intercultural criterion in national health systems as a part of the primary health care strategy, and establish strategic alliances to promote the health of the indigenous communities. (18,19)

The aim of this study is to introduce the concepts, initiatives, and suggestions of the indigenous communities from Puerto Nariño concerning the health care system, so that they are considered when creating future health programs, and to provide the foundations for building and implementing an efficient intercultural health model.

# **METHOD**

#### Research design

This research was based on the ethnographic method, which allowed the integration within the population, the communication and perception of emotions, besides the understanding of ethno-cultural phenomena and factors. The three phases suggested by Amezcua were developed: preparatory, field research, analytical, and informative. (20)

# Research context: Puerto Nariño municipality

The research period went from 2010 to 2013 and it was conducted in Puerto Nariño, the second

municipality of the Colombian Amazon. The study population consists of indigenous communities that belong to the Tikuna, Cocama, and Yagua ethnicities.

Puerto Nariño is located on the south of the country, on the Amazonian Trapezium, a strip formed by the Putumayo and Amazon rivers, between Brazilian and Peruvian territories (Figure 1). The region is important since it is a natural reserve. The expression "lungs of the planet" identifies the Amazon area and, for biosafety reasons and to secure the future subsistence of mankind, the big economies have focused their interests on this region.

Ninety five percent (95%) of the population of the municipality consists of Colombian-Peruvian indigenous communities, belonging mainly to the Tikuna, Cocama, and Yagua ethnicities, which consist of 7102; 792, and 297 individuals, respectively. These communities have settled on the shore of the Amazon River and its main tributaries, and share similar views about nature.

Section 2 of Executive Order 2164, passed in 1995 by the Colombian legislature, sets forth that an indigenous community is a group or ensemble of families having an Amerindian lineage. Those communities are conscious of their identities and share values, traits, uses and customs of their culture, as well as their own forms of government, management, social control, or own normative systems, which differentiate their communities from others, no matter whether they are in possession of a title deed or not, or cannot legally prove such title deeds, or whose resguardos [legal figure in Colombia that enables collective ownership over traditional territories by their local inhabitants] were dissolved, divided or declared vacant. Section 63 of the Colombian Constitution gave constitutional identity to the indigenous resguardo by declaring that the community lands are unalienable, imprescriptible, and unattachable as well as of public use. (17)

Almost all the territorial area of the municipality of Puerto Nariño consists of indigenous *resguardos*, which cover 93.96% of the municipality and are acknowledged as legal, territorial, and sociopolitical institutions of a special nature, with power to organize their territory and manage natural resources.<sup>(17)</sup>

The indigenous communities have settled on the shore of the Amazon, Amacayacu, Loretoyacu, Bohiabuazú, and Atacuari rivers. The Cocama community is settled on the shore of the Atacuari River, while the Yagua have settled mainly along the Amazon River, and the Tikuna are scattered all along the territory. Currently, each community has adopted the system of *cabildos* [administrative council which governs a municipality]for their administrative organization, the *Curaca* being the main local authority. The 21 communities have also organized themselves around the *Cabildo Mayor* (main council), which is the main administrative and legal authority in the territory.<sup>(22)</sup>

# **Data collection techniques**

The techniques used to collect data were: participant observation, an open-ended interview, semi-structured interviews, and discussion groups. (23,24)

### **Participant Observation**

The researcher interacted with the informants during a period in their own environment, and during these period data was non-intrusively collected; the inhabitants' language was learned and different observations concerning health were written down on a field notebook. To get closer to the population, the researcher lived in the municipality for two years, during which time she took part in social, academic, and recreational activities. She shared community activities such as working in the minga (where women cooked and men carried out agricultural or construction work). The key informants were identified and contacted. (23) Through the first informant, it was possible to contact each community leader (Curacas), the elderly, the Shamans, the health officers, the civil servants, the students, and other research participants.

# **Interviews**

With the *Curacas'* support, it was possible to summon the rest of community, with whom the most accurate means of recording the interviews (sound recorder) was agreed upon. Soon, researchers were able to gain the trust of a few people, who facilitated contact with others; such

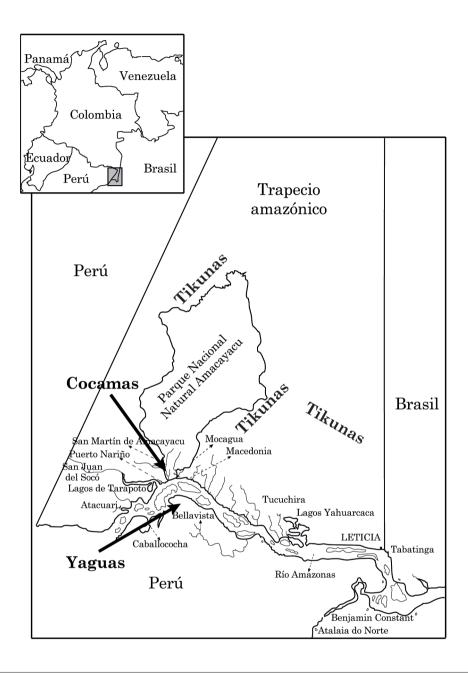


Figure 1. Indigenous communities in the Amazonian trapezium. Amazonas Department, Colombia.

Source: Own elaboration based on data from Fraguell Sansbelló and Muñoz Flores. (21)

contact spontaneously lead to the snowball sampling and the collection and expansion of information until data saturation was achieved.<sup>(24)</sup>

Thirty eight (38) people were interviewed (Table No. 1), who understood the study goals

and signed the informed consent form. They were asked about the municipal health system through an open-ended interview. Once they joined the group, the researchers knew which questions to ask and how to ask them; from then on, they

Table 1. Profiles and number of people interviewed. Indigenous communities (Tikuna, Cocama, and Yagua ethnicities), Puerto Nariño municipality, Amazonas department, Colombia. 2010-2013.

Ethnicity	Role in the Community	Number
Tikuna	Curaca	12
	Health Promoter	1
	Officer at the Colombian Agricultural Institute	1
	University Professional	1
	University Student	2
	Trainee	1
	Traditional physician	3
	Shaman	1
	Craftswoman	1
	University Dean	1
Cocama	Curaca	3
	Health Promoter	1
	Chamana	1
Yagua	Curaca	6
	Woman officer at the Colombian Family Welfare Institute	1
	Civil Servants at the municipal town hall	1
	University student	1

started conducting semi-structured interviews (asking more specific research questions). The participants felt confident and interested in outlining topics without expressing preconceptions which could affect the research. As the research went on, the full script was created, which is typical of the emergent cascade design in the qualitative research.<sup>(25-27)</sup>

# **Discussion Groups**

Ten groups were formed, each with 6-8 members, who were men and women from the 21 communities, representing the three ethnicities which inhabit the zone (Table 2). The objectives of the project were informed. Participation was voluntary.

Discussions were enlivened through surveys, and participants easily came to deep conclusions. (28) Sessions lasted between one and two hours, and at the end, a certain time to listen to the participants' suggestions and ideals was set. The meetings were held in a circular arrangement to facilitate the communication among the participants. (28) Data saturation was reached with the eighth discussion group.

The protocol started with the opening made by the key informant, the researcher's introduction and the invitation to participate, the signing of the informed consent form, the participants' introduction, the presentation of the introductory topic (opinion about the municipal health system, concepts about causes of disease, and suggestions concerning the healthcare system), the interviewees' participation, the closing, the acknowledgements, and dinner, snacks or lunch.

The participants' authorization to be recorded was requested. The participants had been previously informed of recording advantages, confidentiality issues, their freedom to leave the study at any time, and the absence of risks.

# **Data analysis**

The data collected during the observations, field notes, interviews and discussion groups were transcribed. Data were temporarily put aside, in accordance with the reflexivity principle, (29) which clarified ideas to analyze data objectively. The interviews and discussions were listened to twice and three times, and were compared to the transcriptions. The results were codified and organized in tables per the category to which each study objective belonged, grouping the common topics and creating new categories of analysis emerging from the discourse.

# Data validation and verification

The protocol, the interviews, their transcription, the analysis of the results, and the final report were validated by a group of experts who were external to the process, as a qualitative research quality criterion.<sup>(30)</sup>

Table 2. Composition of the studied groups. Indigenous communities (Tikuna, Cocama, and Yagua ethnicities), Municipality of Puerto Nariño, Amazonas department, Colombia. 2010-2013.

Discussion Group	Community	Number of Representatives	Ethnicities		
			Tikuna	Cocama	Yagua
1	San Juan de Atacuari	4	-	Х	Х
	Tres Esquinas Boyahuazú	4	Χ	-	Χ
2	Siete de Agosto	3	-	Χ	χ
	Naranjales	4	Χ	-	-
3	Patrullero	3	Χ	-	-
	Veinte de Julio	4	Χ	-	Х
4	Puerto Esperanza	2	Χ	-	-
	Valencia por el río Amazonas	3	Χ	-	χ
	San Pedro de Tipisca	3	Χ	-	-
5	Santarén	2	Χ	-	-
	Puerto Rico	3	Χ	-	-
	Doce de Octubre	3	-	-	Х
6	San Juan del Socó	4	Χ	-	-
	San José de Villa Andrea	2	Χ	-	-
7	Santa Teresita del Niño Jesús	2	Χ	-	-
	Nuevo Paraíso	2	Χ	-	-
	Pozo Redondo	2	Χ	-	-
8	San Francisco de Loretoyacu	4	Χ	-	-
	Santa Clara de Tarapoto	4	Χ	-	-
9	Ticoya por el río Loretoyacú	8	Χ	Х	Χ
10	Casco urbano	8	Χ	Χ	Х

# **Applicability of results**

The results collected were socialized with the participants (thus meeting another quality criterion and validating the results)<sup>(30)</sup> and sent to the municipal and departmental administrations to contribute to the creation of health programs and projects.

# **RESULTS**

# Participants' conceptions concerning health and health-related practices

Table 3 shows the concepts expressed by the participants, concerning health. When this topic was openly brought up, the answers were focused

Table 3. Participants' conceptions regarding the category named "health" and any other related practices. Indigenous communities (Tikuna, Cocama, and Yagua ethnicities), Municipality of Puerto Nariño, Amazonas department, Colombia. 2010-2013.

Subcategory	Participants' conceptions
Care	When a kid suffers from diarrhea, or runs a fever, you go to the hospital, but your case is not quickly dealt with.
	Sometimes, kids die before their time has come, because they did not receive proper care.
	Mothers do not take their kids to the hospital any longer, because the care received is poor and kids are not cured.
Causes of disease	The excrements from pigs and hens contaminated the water well and then everyone contracted cholera.
	The children's susto [fright] causes diarrhea and vomits, but when they are taken to the doctor, they prescribe medicines to stop diarrhea, but do not prescribe anything for the fright.
	Western medicine controls your disease but does not heal you.
	Many diseases come from food or animals. There are some human parasites, and as sanitary practices are inefficient they are transmitted to animals. In order to break the cycle it is necessary to improve the basic sanitary practices.
	In the times of our parents and grandparents, there were plenty of natural resources and diseases were not heard of.
Distrust	There is a hospital here where you take your children to and you see they don't get any better because they are not taken good care of.
	I told them not to go to hospital because doctors would take a knife and cut one of their eyes and there is a remedy for that.
	From the point of view of health, it is a worrying topic because we have a hospital but when kids get sick, doctors just prescribe them acetaminophen or salbutamol.
	At the moment, we do have an epidemic, but there are mothers who do not take their kids to the hospital any longer because they are fed up with doctors always prescribing them the same.
Western medicine	Today, our remedies, our natural plants, our sacred trees, our grandmothers' research have the same ingredients and poultices as those in the painkillers that are currently prescribed for diseases.
	I don't agree with bodies of indigenous peoples being subject to a necropsy or autopsy, because it is against our ancestors' traditions, our customs, our ethnicity.
	I disagree with the work that the Ministry of Health carried out, mostly in connection with women, vaccination control, cervix, tubal ligation, abortion, medicine intake.
	Traditional medicine is important, but it is time we connected with western medicine.
	We do not disqualify western technology because it is effective, but our own ways are better than it.
Traditional medicine	Given that they feel love and affection for the patient, the traditional doctor try to find the cure by all means.
	What is worth is affection, love, and the gift of relieving pain.
	This is not for everyone, because according to the Tikuna people, the one who wants to be a shaman is ready since conception, which is totally different from the non-indigenous person that wants to study medicine at university and that earns a degree.
	Some medicines of western medicine work, but traditional medicine is better.
	When one works in the area of medicine, it is necessary to have all that is needed to prepare medicines.
Prevention	There's a lack of prevention and of the elements and tools necessary to prevent diseases.
Health	It is all about health, hygiene, and cleanliness when it comes to animals.

mainly on the care provided to them by the health system, the causes of disease, their distrust concerning the western medical system, the types of medicines identified in the municipality, prevention, and the health service.

#### Care

Indigenous communities base their notion of western medicine on the care they have received at the local hospital. The hospital is located in the urban zone of the municipality, which makes the access to it harder for the ill people that come from communities located along the river, or within the jungle. Moreover, the limited economic resources of the hospital prevent the fulfillment of the needs of the communities, which believe that the provision of services is slow and inefficient, and that they do not treat the causes of their diseases.

#### Causes of disease

In all the communities of Puerto Nariño, healthdisease is conceived as a whole and as a process. A disease is the absence of health and they can clearly identify the elements that cause it. They understand disease as the result of inappropriate practices, and in most cases, humankind is responsible for such practices. Health is closely related to emotions, harmony with nature, water purity, diet, and hygiene. Elements such as the absence of hygienic measures, unhealthy eating habits, deficiencies in basic sanitation, the arrival of foreigners, and the introduction of western culture practices can modify the balance, affect health, and cause a disease. They acknowledge the existence of cancer and biological agents, mainly parasites, as the sources of diseases, and the role that plagues and rodents play when it comes to disease transmission.

#### Distrust

Indigenous communities think that western medicine treats diseases, controls them, but does not cure them, because it does not treat their causes. Every disease has its origin in an individual's behavior or experiences, something that western doctors do not treat but traditional practitioners do. Indigenous peoples prefer not to go to hospitals

because they are not timely treated and are prescribed the same medicines. They reject every surgical procedure used by western medicine because they perceive them as hasty and invasive. Both men and women were upset in regards to the sterilization and birth control practices and dismissed them completely. They stated that the official health institution encouraged women to accept such program arguing that it was free, but did not explain it clearly, nor did it inform the traditional practitioners and the rest of the community about it. The official health institution did not consider that such program is against their culture and ancestral learnings.

#### Traditional medicine vs. western medicine

The participants acknowledge two kinds of medicine within their territory: traditional medicine, which is practiced by shamans, traditional practitioners, and healers; and western medicine, which is practiced at the local hospital by university professionals graduated from medical schools all over the country. Both western and traditional medicine are accepted, though they prefer traditional medicine.

The healing ability is a gift people are born with, although they have not been admitted to a university to earn a degree. For them, traditional doctors have that gift, feel affection for patients, and endeavor to get the elements to prepare the treatments until patients are cured. This is a value that they do not find when they visit western doctors.

#### Prevention and health

They admit that prevention is an important part of disease control, and they highlight hygienic measures, the organization of their homes, and the care and cleanliness of their children.

# Participants' suggestions in connection with the health system

Table 4 shows the suggestions that participants made in connection with the health system. Their demands are mainly focused on support, complementarity, dialogue, education, politics, and respect.

Table 4. Participants' suggestions in connection with the health system. Indigenous communities (Tikuna, Cocama, and Yagua ethnicities), Municipality of Puerto Nariño, Amazonas department, Colombia. 2010-2013.

Subcategory	Participants' conceptions	Ethnicity
Support	Instead of investing in buying chemical medicines from a laboratory, buy those medicines from them. [the traditional healers]	Tikuna
	$Instead\ of\ investing\ in\ those\ things,\ they\ should\ invest\ in\ supporting\ what\ we\ have,\ in\ midwives.$	Tikuna
	Support those who know how to prepare medicines to avoid tubal ligation.	Tikuna
	Health Ministry, leaders currently in power, we want this resguardo to be valued, on behalf of all the indige- nous and non-indigenous population, as well as our own reality, our traditional practitioners, our shamans, our sobanderos, our midwives, our herbalists, our spiritualists to be recognized.	Cocama
	Support traditional practitioners so they can manage the institution.	Tikuna
	Traditional practitioners are far away, I wish they had a place nearby to work and teach, because they know a lot.	Yagua
	Authorities have to invest in and recognize our midwives, our grandparents that know how to make preparations, they should support our people.	Tikuna
Complementarity	A disease that traditional practitioners can't treat should be referred to the hospital.	Tikuna
	Just as there is a western medicine hospital, it would be good to have a place for traditional practitioners to treat spiritual diseases.	Cocama
	Likewise, when western doctors are treating a patient with a disease that is not their specialty, said patient should be referred to traditional practitioners.	Tikuna
	There are diseases that shamans cannot cure, and there are diseases that western doctors cannot cure, so both [should] collaborate to treat the disease.	Yagua
	We, as parents, should not reject everything that is western, because it could also be useful to us as persons.	Cocama
Dialogue	Agree with the community on what is wanted and what is needed.	Tikuna
	Request a meeting with the indigenous community authorities and HIC [health insurance companies], HCP [health care providers], and the Ministry of Health, among others.	Tikuna
Education	Create training schools so that Cocamas could recover their reality in the next 10-15 years, the time the process takes, because, otherwise we are going to disappear as a community.	Tikuna
Politics	Suggest the community as primary care level.	Tikuna
	Nowadays, health has become a business in Colombia.	Tikuna
	Provide support so that primary care is provided in the community.	Cocama
	The proposals of the three indigenous groups that live there is based on their life plans, but the authorities in charge that are elected every four years do not have political will.	Tikuna
Respect	The most important thing is the communication and respect that traditional practitioners provide to the patient.	Tikuna
	For the love and affection they provide to their patients, traditional practitioners strive to be understood and make all possible efforts to cure them.	Tikuna

### Support

Communities trust their traditional practitioners and ask to be supported with investments, so that traditional practitioners can have a place to work, preferably close to the communities, and make use of the necessary resources. They also request support for midwives and other actors of the traditional medical system.

# Complementarity

They suggest coordinated work between traditional practitioners and western doctors, in which everyone is aware of their limitations and rely on each other. They encourage people not to totally dismiss western medicine, because they recognize that it is useful on many occasions, and they state that those cases where surgery is needed are the exclusive responsibility of western medicine. They request their traditional practitioners to be the primary care level.

### Dialogue

Indigenous peoples want to be heard, respected, and considered when it comes to decisions that affect their health or their way of understanding it.

# **Education**

They ask for a place to train people in traditional medicine, where the elders could pass on all their knowledge. Apprentices from the communities and students and graduates from universities could attend this school, so ancient knowledge is preserved and western people may understand their reality in a better way.

### **Politics**

Suggestions made by the participants are mainly aimed at political authorities. They feel that at present, health has become a business in Colombia, and that the local administration has long ignored their requests; as result, they do not trust state policies. The three ethnic groups invite authorities to accept the plan they have devised for their lives.

# Respect

They request authorities to acknowledge and respect their culture, and that surgeries or hormone therapies to control the number of births (a strategy that, according to them, has been used without providing the relevant information to women and authorities) be not performed on women.

### **DISCUSSION**

Indigenous communities of Puerto Nariño belong mainly to the Tikuna, Cocama, and Yagua ethnicities. Together they constitute the TICOYA *resguardo* (social and administrative organization), in which they share beliefs, traditions, and life proposals, and together they have built a life plan in which they integrate those aspects. (31-33)

Throughout the research, harmony and agreement were observed, and there were no discourse differences depending on the different ethnicities. Such consensus can be interpreted as the result of resistance to countless factors that have simultaneously threatened these three ethnic groups and have endangered their cultural identity and their stability within the territory. Therefore, together they have developed knowledge that enables them to preserve health in a tough environment. The three ethnic groups share a holistic view of health and base their cosmovisions on the respect for nature, the jungle, and the river, as well as for the animals, plants, and minerals that live within nature.

The ideas raised throughout the research are an essential contribution to the construction and implementation of an advantageous, efficient, and relevant health model. Therefore, it is essential to take culture and ancient knowledge into account.

# Traditional medicine vs. western medicine

Participants identify two types of medicine within their territory, and each one of them has a different degree of acceptance and trust. Traditional practitioners feel affection for patients and make all possible efforts to cure them. On the contrary, western doctors are strangers that examine patients and prescribe medicines, but do not focus on obtaining, preparing, and applying them.

The participant observation allowed us to assess the leadership of traditional practitioners. Their way of living is a role model to follow as an example and it strengthens the cultural identity of the people. On the one hand, the community considers traditional practitioners possess gifts and powers that they have developed with discipline and research and some young people would like to receive them. On the other hand, the relationship between the public health care staff and the indigenous peoples that look for care is not as harmonious.

# Decrease in the principle of opportunity

The shortage of economic resources and the geographic distance between the hospital and the communities makes it necessary to reconsider preventive health care. Practice has shown that the untimely manner of providing care in small events generates greater damages. For different reasons, indigenous individuals turn to western doctors as a last resort and, from the western point of view, there is nothing much that can be done at that time. Thus, the principle of opportunity is gradually reduced. For that reason, it is important for indigenous peoples to identify which diseases can be better treated by western doctors and to resort to them in a timely manner. Specifically, indigenous peoples must consider western doctors as an alternative.

# Lack of information and understanding within state health institutions

In relation to sexual and reproductive health programs, there is evidence of a deep lack of information and understanding within state health institutions. Traditionally, the reproductive ability has been an indicator of health in women and of virility in men. For grandmothers, there is no such thing as the concept of "planning", because throughout their lives as young women their priority was to conceive since there was no family without children. Medicinal plants were only used to stop hemorrhage after birth and to reduce

the size of the uterus, that is to say, just to "heal the womb." These methods, which women still use on their grandmothers' advice, guarantee the guick recovery of the body, which must be strong enough to keep on working without experiencing pain or weakness. Only after bearing their last child, and knowing that their body could not endure any more births, grandmothers used some medicinal plants as contraception methods. In the indigenous culture, the most important role of women is reproduction whereas manhood is expressed in the number of children they have. Birth control methods in women can cause their spouses to reject and repudiate them, and, thus, public policies may seem harmful and cruel to the indigenous community. Results clearly show that the methods used have not generated positive feedback from the community and, for that reason, health organizations should be very careful and respectful of the indigenous cosmovisions regarding the development of health programs connected with sexual and reproductive health. If the practices implemented by the western health care system, such as birth control, are not fully explained and agreed upon with the community, they would increase rejection and affect family stability and social balance.

Concerns and suggestions raised by the participants agree with what PAHO-WHO's proposal, which can be summarized as the need for an intercultural health system that allows to articulate and harmonize both kinds of knowledge. (14,15) Medical systems should be defined as cultural systems, because it is impossible to understand the different medical systems without understanding the cultural context in which they are inserted, where ailments and diseases are produced, cured, and healed. (34)

# Recognizing the natural cause of a disease: meeting point of the indigenous and the western medical systems

The participants showed understanding of the natural causes of a disease, which is a meeting point with the western system and can be a starting point of public healthcare policies. Accepting these causes and implementing its prevention by means of public healthcare strategies, by

consensus with the community, could show positive results. Acknowledging the natural causes of diseases is an element that is not frequently found in studies carried out in other indigenous cultures, which ascribe the causes of disease to witchcraft, curses, or punishments.(7) Although they consider that these aspects play a role in triggering a disease, they appear to be less important to them. We found a coincidence in these results with the ones found in the Embera community, in which a disease is related to a physical, psychological, spiritual, social, or environmental imbalance, which can be attributed to three different causes: 1) the imbalance of positive energies or the indigenous person's estrangement from their spiritual life; 2) a contact with negative energies or evil spirits; and 3) intermingling.(7)

In 1926, surgeon Ferdinand Sauerbruch coined the proverb "Natural sciences help to understand disease, but not the diseased person" [Own translation]. (35) While western medicine separates body from mind, in the indigenous thinking not a single human action is separated from its cultural reality. (10) Indigenous peoples from Puerto Nariño have a holistic vision of health and base their cosmovision on the respect for nature, the jungle, the river, and the animals, plants, and minerals that live there. That is the reason why it is important that western doctors should profit from the synergy that exists between nature and both physical and mental health: it is not about changing their academic training, but of profiting from the holistic view of the traditional system.

Overall, all processes of social and cultural interaction that involve different beliefs are subject to conflicts, especially if one health care model rules over another<sup>(36)</sup>; thus, it is necessary for the Western World to put aside its intellectual arrogance when looking down contemptuously on everything that does not come from academic studies.

# Interculturality and complementarity

This research showed that indigenous communities accept western medicine, admit their effectiveness, and recognize its exclusivity when surgical treatments are required; they state that both traditional and western doctors have their

own advantages and limitations, and propose an articulated and intercultural work.

Interculturality is understood as those health practices and health care that articulate indigenous and western medicine and where both types of medicine are considered complementary. The basic premises are mutual respect, equal knowledge acknowledgement, willingness to interact, and flexibility to change because of those interactions. Intercultural experiences favor the possibility of helping the diseased person appropriately when one of these two kinds of medicine does not provide a solution to a certain problem; they improve the access to primary and secondary health care not only because of the support to the traditional system, but also because of an early and adequate care provision; they generate more trust from indigenous users towards the health system when they see that their values, beliefs, and culture are respected. (37)

Although Colombia is considered a multiethnic and multicultural country, and its legislation was changed in order to recognize the special rights of indigenous peoples, the current health system is based on scientific knowledge and disregards the popular knowledge that is part of such cultural diversity. The increase in the prevalence of imported diseases for which the traditional medical system has no therapeutic options and the implementation of health actions from official institutions that ignore the diverse cosmologies of indigenous peoples imply a low impact on individual and collective health. (29, 32, 39)

The intercultural relationship of the health staff with the patients must be tinged with comprehensive care, full respect, and a genuine loving compassion towards the suffering "other."(5) A person cannot be a good health worker if they do not know and understand the general and specific sociocultural characteristics of the people that they intend to serve. Therefore, medical practice within intercultural contexts means to adapt and adequate themselves to such reality. (5) The differences between the notions and approaches about health care and disease explain the cultural barrier that exists between indigenous communities and health care service providers. The lack of understanding between users and providers is expressed by the strong resistance to using the health services and by a huge distrust towards the professionals that practice modern medicine. (16,40)

# Language: a decisive factor in the encounter of indigenous peoples with the western health system

Although doctors are not obliged to know their language, they have to consider what a lack of understanding can imply, and, therefore must find people that could act as interpreters. The results of this research agree with the statements published by the WHO,<sup>(19)</sup> which state that quite often the healthcare staff only provides quick explanations about the disease, its transmission and progression and the need to follow the prescribed treatment, without making sure the information is in fact understood. Sometimes, the patient is accompanied by a bilingual relative that acts as an interpreter, but if the health staff does not know the indigenous language, they have no control over the information received.

History has led indigenous peoples to naturally distrust the white man which, added to the disease and their ignorance of the language, increases their vulnerability. Therefore, it is important that their encounter with the western health system could secure a harmonious understanding, a situation which most of the time does not occur, as indigenous persons are left at the mercy of a public officer that does not try hard to understand and provide them with care.

According to Berlin and Fowkes, cited by Alarcónet *al.*,<sup>(41)</sup> success in intercultural communication can be achieved through a process composed by five elements: "listening, explaining, acknowledging, recommending, and negotiating." Although language can be a great barrier in communication, it does not constitute an obstacle in the professional-patient relationship, if and when professionals are open to dialogue and somewhat know the medical culture of their patients, such as, how they name the diseases, the relationship between habits and culture, the bodily dimension of suffering, and the use of traditional herbs, among others.<sup>(41)</sup>

# Health indicators in the Amazonas, the most unfavorable of the country

In accordance with the information published by Colombia's Health Ministry, in the Amazon area in 2012, child mortality rates, mortality rates in children under the age of 5, and mortality in mothers were the highest of the country. The general mortality rate in Colombia was reduced in the 2008-2010 period, unlike the Amazonía-Orinoquía region were mortality tended to increase. In addition, the lowest vaccination coverage of the country is found in that region. (42) Such unfavorable indicators show that the health strategies for the region are not working as efficiently as they do in the rest of the country, which poses a risk for the stability and survival of the groups that inhabit that region. This shows the need to listen to them and get them involved in the solution of such issue.

The participants of the research ask for validation and financial support of midwives and traditional practitioners that are aware of their reality. They suggest that their traditional practitioners be the primary care level, and that a well-equipped traditional medicine hospital be built for their doctors to be able to work.

This suggestion should be thought of as an opportunity for improvement, and for building and implementing an intercultural health system that is based on the already existing medical traditional system, which has the following qualifying characteristics:

- Social and administrative organization, through the creation of the TICOYA Resguardo. (31-33)
- Validity of its ethnomedicine, which has been adapted to a tough geographical context and has responded to health needs, for which reason it stayed in the region.<sup>(10)</sup>
- Use of natural resources (plants, minerals, water, among others) as a therapeutic means to prevent and fight diseases, and as elements closely connected to culture and the world of beliefs.<sup>(11)</sup>
- The health-disease process is considered an undivided cultural element and it is directly connected with the balance-imbalance of the environment. (43,44)
- The health care system is closely connected to the people's culture and traditions.
- Cultural roots and respect for tradition.

The participants' suggestions agree with the provisions set forth in the Alma Ata Declaration over

35 years ago, in which primary care was defined as: "the first level of contact of individuals, families, and the community with the national health system, bringing health care as close as possible to where people live and work, and it constitutes the first element of an ongoing health care process." (45)

In addition to the already mentioned characteristics, there has been evidence in Puerto Nariño of a previous positive intercultural labor model, for example, the implementation of a strategy for the treatment and control of tuberculosis in indigenous communities that was considered successful and an inspirational intercultural approach. (46) In such process, the Amazon communities appeared to be receptive to this western proposal. The program included the training and preparation of health agents to generate trust among the indigenous peoples and increase their access to health services.

Interculturality is also an opportunity for the official medical system to learn about the indigenous medical system and improve thanks to the incorporation of their concepts and tools. It should be assumed that the official medical system is not the only one that is summoned to "save" the indigenous peoples by incorporating them into their own role models, ideas about modernity, scientific knowledge, universalism, but it is also possible to learn from the indigenous system.<sup>(9)</sup>

# Towards the creation of an intercultural health system based on the needs and initiatives expressed by the participants

Based on previous experiences and the results of this research, we propose the following strategies to be used towards the building of an intercultural health model for Puerto Nariño:

- To pay attention to and respect the contributions of indigenous traditional medicine at a local level.
- 2. To understand the scientific grounds underlying in the beliefs, concepts, and practices of traditional medicine.

- To apply the concept of comprehensive health based on balance and the holistic approach of health proposed by indigenous peoples.
- 4. To incorporate in public health policies the traditional medicine guidelines set forth by the WHO, mainly concerning health care in accordance with indigenous customs and uses.
- To consider traditional medicine as an alternative to primary care and to appropriately articulate it with western medicine, as well as to explore alternative health care models.
- To record and handle in an ethical way the results of traditional treatments.
- To sensitize and train officers and medical staff in the therapeutic alternatives of traditional medicine and in the local language.
- 8. To work in the recovery of the historical memory of traditional medicine knowledge among the indigenous peoples.
- 9. To design health promotion and prevention actions that integrate both types of knowledge.
- To protect medicinal plants and natural environments that are sacred to the indigenous culture.
- 11. To agree with the population on the strategies and programs in the health field that respect their needs, beliefs, and customs.
- 12. To create and strengthen indigenous human resources around health, with an increase in the number of indigenous health professionals working in the region.
- 13. To build a center of research and services in traditional and complementary medicine.

To conclude, it can be said that the difficult geographical and economic conditions and the unfavorable health indicators of the region compel us to: a) think about an alternative health system that meets the needs and expectations of the Municipality; b) consider that their social and administrative organization, cultural roots, ancestral wisdom, and receptivity to western knowledge, make them ideal to build and implement an intercultural health model.

### **ACKNOWLEDGEMENTS**

We thank the Universidad Nacional Abierta y a Distancia (UNAD), the Universidad Andina Simón Bolívar, located in Bolivia, and the Colombian Agricultural Institute [Instituto Colombiano Agropecuario] Amazonas branch office for the support given to conduct this research.

# **BIBLIOGRAPHIC REFERENCES**

- 1. Asamblea General de las Naciones Unidas. Declaración de las Naciones Unidas sobre los derechos de los pueblos indígenas [Internet]. 13 sep 2007 [citado 3 abr 2014]. Available from: http://www.un.org/esa/socdev/unpfii/documents/DRIPS\_es.pdf.
- 2. del Cid Lucero VM, compilador. Antecedentes, situación actual y perspectivas de la salud intercultural en América Latina. Bluefields, Nicaragua: Universidad de las Regiones Autónomas de la Costa Caribe Nicaragüense; 2008.
- 3. Tombé VR, Montero AC, Bustamante BC. Política en Salud Pública para pueblos indígenas colombianos. En: del Cid Lucero VM, compilador. Antecedentes, situación actual y perspectivas de la salud intercultural en América Latina. Bluefields, Nicaragua: Universidad de las Regiones Autónomas de la Costa Caribe Nicaragüense; 2008.
- 4. Torres C. La equidad en materia de salud vista con enfoque étnico. Pan American Journal of Public Health. 2001;10(3):188-201.
- 5. Campos-Navarro R. Hacia un diálogo intercultural en salud. México DF: Yolpahtli; 2003.
- 6. Organización Panamericana de la Salud, Organización Mundial de la Salud, División de Desarrollo de Sistemas y Servicios de Salud. Fortalecimiento y desarrollo de los sistemas de salud tradicionales: Organización y provisión de servicios de salud en poblaciones multiculturales. Washington DC: OPS; 1997.
- 7. Cardona-Arias JA. Sistema médico tradicional de comunidades indígenas Emberá-Chamí del Departamento de Caldas-Colombia. Revista de Salud Pública. 2012;14(4):630-643.
- 8. Andrade SMG, Martínez LE, Morales P, Ortiz GR, Sandoval H, Zuluaga G. Aproximación a la medicina tradicional Colombiana: Una mirada al margen de la cultura occidental. Revista Ciencias de la Salud. 2005;3(1):98-106.
- 9. Instituto Interamericano de Derechos Humanos. Campaña educativa sobre derechos humanos y derechos indígenas: salud indígena y derechos humanos: manual de contenidos. San José: IIDH, ASDI, OPS; 2006.

- 10. Mena AJA. Tres ámbitos de expresión de la cultura tradicional de salud y de la etnomedicina en Mesoamérica. Revista de Antropología Experimental. 2006;(6):107-117.
- 11. Mena AJA. La medicina tradicional como medicina ecocultural. Gazeta de Antropología. 2005;(21): 10
- 12. Nigenda G, Mora-Flores G, Aldama-Lopez S, Orozco-Nunez E. Practice of traditional medicine in Latin America and the Caribbean: the dilemma between regulation and tolerance. Salud Pública de México. 2001;43(1):41-51.
- 13. Correa CM. Protección y promoción de la medicina tradicional: consecuencias para la salud pública en los países en desarrollo. Geneva: South Centre; 2002.
- 14. Organización Panamericana de la Salud, Organización Mundial de la Salud. Estrategia de la OMS sobre medicina tradicional 2002-2005. Ginebra: OMS; 2002.
- 15. Segovia G, Quispe R, Segovia IA. El diálogo intercultural en salud, necesario para el abordaje de las inequidades sanitarias y los conflictos sociales en la selva peruana, 2011. Revista Médica Panacea. 2012;2(2):58-61.
- 16. Gonzales GF, Aguilar J, Villar M. The world summit of harmonization on traditional, alternative and complementary medicine (TACM) in Lima, Peru. Evidence-Based Complementary and Alternative Medicine. 2010;7(2):271-275.
- 17. Sánchez E, Enrique M, Benjumea S, Rodríguez I, Nieto B. Los pueblos indígenas en Colombia: Derechos, políticas y desafíos. Bogotá: Unicef; 2003.
- 18. Organización Panamericana de la Salud, Organización Mundial de la Salud. Prestación de servicios de salud en zonas con pueblos indígenas. Quito: OPS-OMS; 2009.
- 19. Organización Panamericana de la Salud, Organización Mundial de la Salud. Acciones y estrategias para alcanzar los ODMS en zonas con pueblos indígenas. Quito: OPS; 2008.
- 20. Amezcua M. El trabajo de campo etnográfico en salud: una aproximación a la observación participante. Index de Enfermería. 2000;(30):30-35.

- 21. Fraguell-Sansbelló RM, Muñoz-Flores JC. Ecoturismo itinerante en el Trapecio amazónico colombiano. Estudios y Perspectivas en Turismo. 2003;12(1-2):48-62.
- 22. Municipio de Puerto Nariño. Plan de Desarrollo 2008-2011 [Internet]. 2008 [cited 4 abr 2014]. Available from: http://cdim.esap.edu.co/BancoMedios/Documentos%20PDF/plan%20 de%20desarrollo%20nechu%20-%20pto%20 nari%C3%B1o 1.pdf.
- 23. Martín JR. Observación Participante: informantes claves y rol del investigador. Nure Investigación. 2009;(42):1-4.
- 24. Gil Flores J. La metodología de investigación mediante grupos de discusión. Enseñanza & Teaching: Revista Interuniversitaria de Didáctica. 1992;(10):199-214.
- 25. Álvarez CA. La etnografía como modelo de investigación en educación. Gaceta de Antropología. 2008;24(1):10.
- 26. Álvarez-Gayou Jurgenson JL. Cómo hacer investigación cualitativa: Fundamentos y metodología. México: Paidós Educador; 2003.
- 27. Bolseguí M, Smith AF. Construcción de un modelo conceptual a través de la investigación cualitativa. Sapiens Revista Universitaria de Investigación. 2006;7(1):207-229.
- 28. Callejo Gallego J. Observación, entrevista y grupo de discusión: el silencio de tres prácticas de investigación. Revista Española de Salud Pública. 2002;76(5):409-422.
- 29. Cuesta Benjumea C. Estrategias cualitativas más usadas en el campo de la salud. Nure Investigación [Internet]. 2006;(25) [cited 4 abr 2014]. Available from: http://www.nureinvestigacion.es/FICHEROS\_ADMINISTRADOR/F\_METODOLOGICA/FMetod 25.pdf.
- 30. Calderón C. Criterios de calidad en la investigación cualitativa en salud (ICS): apuntes para un debate necesario. Revista Española de Salud Pública. 2002;76(5):473-482.
- 31. Acosta LE, Mendoza D. El conocimiento tradicional: Clave en la construcción del desarrollo sostenible en la Amazonía Colombiana. Colombia Amazónica. 2006(Nº Esp):101-118.
- 32. Bodnar Y. Colombia: apuntes sobre la diversidad cultural y la información sociodemográfica disponible en los pueblos indígenas. En: Pueblos indígenas y afrodescendientes de América Latina y el Caribe: información sociodemográfica para políticas y programas. Santiago de Chile: CEPAL; 2006.

- 33. Asociación de Autoridades Indígenas ATI-COYA. Actualización del plan de vida de los pueblos Tikuna, Cocama, Yagua, 2007-2017. Puerto Nariño: TICOYA; 2007.
- 34. Yarzabal L, Espinal C, Aragón LE. La salud en la Región Amazónica propuesta de un programa de investigación y formación de recursos humanos. Educación Superior y Sociedad. 2010;3(1):53-62.
- 35. Knipper M. Más allá de lo indígena: Salud e interculturalidad a nivel global. Revista Peruana de Medicina Experimental y Salud Pública. 2010;27(1):94-101.
- 36. Alarcón AM, Astudillo DP, Barrios CS, Rivas RE. Política de Salud Intercultural: Perspectiva de usuarios mapuches y equipos de salud en la IX región, Chile. Revista Médica de Chile. 2004;132(9):1109-1114.
- 37. Mignone J, Bartlett J, O'Neil J, Orchard T. Best practices in intercultural health: five case studies in Latin America. Journal of Ethnobiology and Ethnomedicine. 2007;3:31.
- 38. Izquierdo Torres B. Políticas Públicas en salud para pueblos indígenas en Colombia con enfoque intercultural. [Tesis Maestría en Administración Pública]. Bogotá: ESAP; 2007.
- 39. Sánchez E, Arango R. Los pueblos indígenas de Colombia en el umbral del nuevo milenio. Bogotá: Departamento Nacional de Planeación; 2001.
- 40. Aizenberg L. Hacia una aproximación crítica a la salud intercultural: Un estudio de caso de mujeres indígenas en el Amazonas boliviano. Revista Latinoamericana de Población. 2011;5(9):49-69.
- 41. Alarcón AM, Vidal A, Neira Rozas J. Salud intercultural: elementos para la construcción de sus bases conceptuales. Revista Médica de Chile. 2003;131(9):1061-1065.
- 42. Ministerio de Salud y Protección Social de Colombia. Análisis de Situación de Salud según regiones. Bogotá: MNISALUD; 2013.
- 43. Aparicio Mena AJ. Idea de salud intercultural: Una aproximación antropológica a la idea de salud intercultural, derivada de la medicina tradicional china, en contacto con diferentes culturas. Gaceta de Antropología. 2004;20:05.
- 44. Neira Rozas J. Salud y pueblos indígenas en Chile: una mirada desde la Medicina Social. Nueva Época Salud Problema. 2004;9(17):57-62.
- 45. Organización Panamericana de la Salud. Declaración de Alma-Ata: Conferencia Internacional

sobre Atención Primaria de Salud, Alma-Ata, URSS, 6-12 de septiembre de 1978 [Internet]. Pan American Health Organization [cited 4 abr 2014]. Available from: http://www1.paho.org/spanish/dd/pin/alma-ata declaracion.htm.

46. Organización Panamericana de la Salud, Organización Mundial de la Salud. Enfoque intercultural: Prevención de la tuberculosis en pueblos indígenas. Bogotá: OPS; 2009.

#### **CITATION**

Patiño Suaza AE, Sandín Vásquez M. Dialogo y respeto: bases para la construcción de un sistema de salud intercultural para las comunidades indígenas de Puerto Nariño, Amazonas, Colombia. Salud Colectiva. 2014;10(3):379-396.

Received: 12 May 2014 | Modified: 18 August 2014 | Accepted: 1 October 2014



Content is licensed under a Creative Commons

Attribution — you must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).

Noncommercial — You may not use this work for commercial purposes.

The translation of this article is part of an inter-departmental and inter-institutional collaboration including the Undergraduate Program in Sworn Translation Studies (English < > Spanish) and the Institute of Collective Health at the Universidad Nacional de Lanús and the Health Disparities Research Laboratory at the University of Denver. This article was translated by Giselle Barbera and María Florencia Luhrs under the guidance of María Victoria Illas, reviewed by Anne Neuweiler under the guidance of Julia Roncoroni, and prepared for publication by Micaela Ailén Calvezere Moriondo under the guidance of Vanessa Di Cecco. The final version was approved by the article author(s).