
LAURA NIÑO CÁCERES

VISITING PROFESSOR (2020) LOS ANDES UNIVERSITY,
BOGOTÁ, COLOMBIA.

SENIOR INDEPENDENT CONSULTANT IN HEALTHCARE

AND DESIGN, FORMER PHILIPS DESIGN (2006-2009)

AND PHILIPS RESEARCH (2013-2014) EMPLOYEE.

OTERLEEKSTRAAT 9, 1023 ED AMSTERDAM,

THE NETHERLANDS

L.NINO@TUE.NL

CLAUDIA GÓMEZ LÓPEZ

BOGOTÁ, COLOMBIA

CLAUDIA.GOMEZ@FSFB.ORG.CO

LOREN CÓRDOBA

UNIVERSITY OF LOS ANDES

BOGOTÁ, COLOMBIA

LORECB610@GMAIL.COM

Systemic Design as a participatory tool framing perinatal care policies in Colombia

El Diseño sistémico como herramienta participativa para enmarcar políticas de cuidado perinatal en Colombia

Abstract. This paper analyses perinatal care in rural areas of Colombia using Complex Systems Thinking and Systemic Design from authors such as Edgar Morin, Donna Haraway and Peter H. Jones, with the intention to provide a critical position *vis-a-vis* the practices of the Colombian public healthcare system carried out in perinatal care. Through a series of systemic mappings of the relations of the key actors in perinatal care in Colombia, important asymmetries were found. The systemic mappings allowed the authors to pivot the current strategies for more equitable perinatal care, which are reflected in concrete opportunities for perinatal policy.

In addition, this paper proposes a new perspective on health inequity based on Complex Systems Thinking, based on diversity to increase wellbeing in the implementation of perinatal care practices, which begins with the authors' critical stand on the unsolved debate about the institutionalization of midwifery in perinatal care in Colombia, for those who would like to ascribe to it.

Keywords: complexity systems thinking, health inequity, perinatal care Colombia, perinatal mortality, systemic Design for policy making

Resumen. Este trabajo analiza el cuidado perinatal en áreas rurales en Colombia y utiliza teorías del pensamiento sistémico complejo y el Diseño sistémico, de autores tales como Edgar Morin, Donna Haraway y Peter H. Jones, con el fin de generar una crítica de las prácticas del sistema de salud. Lo anterior se consigue a partir de una serie de mapas sistémicos que permiten definir las relaciones entre los actores principales en el sistema perinatal en Colombia y sus asimetrías. A partir de la metodología utilizada, los autores develan la manera de generar un cuidado perinatal más participativo y equitativo reflejado en políticas concretas.

Adicionalmente la lógica del pensamiento lógico complejo y el Diseño sistémico permite introducir una nueva manera de ver la equidad, la cual se basa en la diversidad, pluralidad de cuidados y actores para incrementar el bienestar de la población que requiere atención perinatal por parte del sistema público de salud. Los argumentos aquí presentados también buscan contribuir a la discusión sobre el rol de la partería ancestral en Colombia, a partir de una mirada crítica del sistema de salud, el cual debe dejar de posponer la institucionalización de la misma para aquellas parteras que así lo quieran.

Palabras clave: cuidado perinatal, Diseño sistémico para políticas públicas, inequidad en salud, mortalidad perinatal, pensamiento sistémico complejo

Fecha de recepción: 16/08/2021

Fecha de aceptación: 16/11/2021

Cómo citar: Niño Cáceres, L. (2021).

Systemic Design as a participatory tool framing perinatal care policies in Colombia.

RChD: creación y pensamiento, 6 (11), 1-19.

<https://doi.org/10.5354/0719-837x.2021.64617>

Revista Chilena de Diseño,

rchd: creación y pensamiento

Universidad de Chile

2021, 6(11)

<http://rchd.uchile.cl>

Introduction

Health inequality is defined as illness and negative health outcomes that are avoidable. Furthermore, health inequity is defined as an unjust difference in health; this means that health inequity has a moral component referring to an unacceptable decrease in health prospects that certain groups in society have to endure. These tend to be low-income groups such as less educated people and minorities (Arcaya et al., 2015; Kawachi et al., 2002). In Colombia, health inequity is suffered by pregnant women living in faraway rural areas, and ethnic groups such Afro-Colombians and indigenous populations (Noreña-Herrera et al., 2015; Instituto Nacional de Salud [INS] & Panamerican Health Organization [PAHO], 2016).

Arcaya *et al.* (2015) & Starfield *et al.* (2012) argue that ancestral health inequality has been mostly explained through socio-economic and psychological aspects involving a relative form of deprivation or “inadequacy in diets, amenities, standards, services and activities which are common in society” (Bunte et al., 2019, p. 649). These least privileged groups suffer more from chronic diseases, greater incidence, and shorter life expectancy (up to 15 years), as the U.S. Census Bureau for the Centers for Disease Control and Prevention’s National Center for Health Statistics report by Schiller et al (2012) affirms. Thus, health inequalities create health inequity. However, what if the problem does not exclusively lie in societies’ less privileged groups but in the systematic practices of healthcare systems? If so, how are these practices characterized? And how can the current situation be changed? To explore these questions, the authors have selected principles from Complex Systems Thinking and Systemic Design, which are explained and applied to analyze perinatal care in Colombia.

Complex Systems Thinking has been incorporated by multiple disciplines, including healthcare, for over 70 years (Sturmberg & Martin, 2013). However, Systemic Design is a more recent field (François, 1999). Systemic designers are skilled at modelling complex prescriptive systems, which differ from predictive models. The latter involves a mathematical progressive order, whereas the prescriptive model approaches complexity as a non-linear matter, visualizes and connects elements of the system using pictogram symbols rather than a numerical description (Jones, 2020; Zeiler & Savanovic, 2009).

Systemic Design uses known Design competencies such form and process reasoning, participatory and generative research methods, supported in visualization practices such as mapping to re-purpose systems (Jones, 2020). Thus, the combination of Complex Systems Thinking and Systemic Design offers the opportunity to gain a new perspective in perinatal care issues by maintaining yet simplifying its complexity, with the support of visualizations to connect multiple aspects within the perinatal system.

Last but not least, Systemic Design is recently used for social innovation and public institutions to tackle wicked problems (van der Bijl-Brouwer & Malcolm, 2020). In this paper, it enabled to approach perinatal issues from a multi-stakeholder’s perspective due to the analysis of actors within a system, their position, level of influence and power. This perspective was

considered novel and inclusive to tackle health inequity and perinatal care matters within a public healthcare arena.

This paper begins with a definition of the selected Complex Systems principles used, followed by a summary of the current perinatal care situation in rural Colombia. After the Method is introduced (below), a series of insights based on primary and secondary sources are presented, which are analyzed a posteriori by a characterization using Systemic Design and Complex Systems Thinking.

Theoretical review

Principles selected from Complex Systems

Thinking framing perinatal asymmetries

Complex Systems Thinking involves a series of theories such as Systems Theory, that use non-linear thinking to study natural complex systems, such as societies. The study of these complex systems aims to understand how elements, defined as actors, relate to each other and interact (Sturmborg & Martin, 2013). The actors' relations are a core part of understanding a system. Thus, there is no attributing issues to a group in society, without assessing the transmitting actor's attitude and defining relations between them.

Furthermore, outcomes are defined as the result of *Sympoiesis*, which means co-production, collaboration and co-creation of a relation (Tsing *et al.*, 2017). Therefore, in complex systems, the joint participation and collaboration of actors characterizes the relation and the outcome.

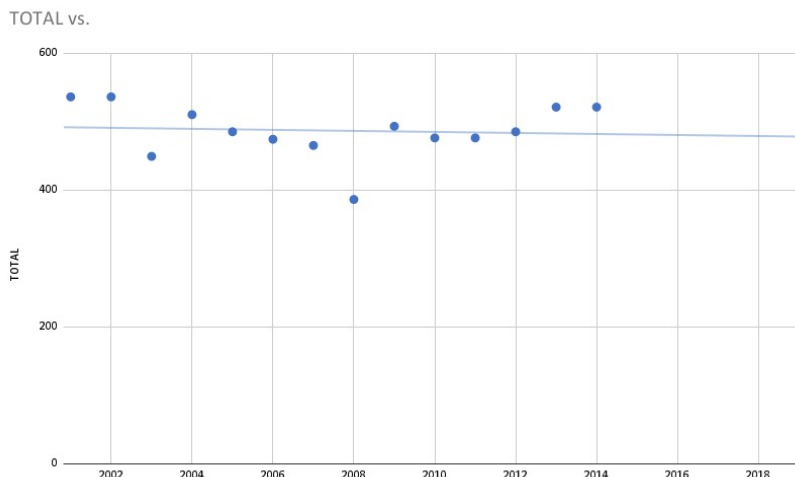
Participation, nevertheless, does not need to be equal among the actors of the system. These systems thrive with heterogeneity. The *Dialogic* principle allows complementary and antagonistic qualities within actors to co-exist and to benefit from their differences, and to achieve a unity. *Dialogical* characteristics such as human and technology, order and disorder, small and big, enable new possibilities, adaptation and evolution within complex systems (Montuori, 2008).

Openness allows actors to engage, relate, collaborate, etc. As this happens, the collective identity of actors in a complex system becomes a crucial element, because actors' relations are the effect of who they are and what they do (Latour, 1996). Thus, *Sympoiesis* becomes a choreography of actors' beliefs, logics and emotions in permanent friction and exchange. Aristotle, the first complex western thinker, coined a unique form of human complex interaction in his rhetoric, where exchange between actors should not solely involve the use of logic (rational argumentation). Instead, persuasion happens when actors appeal to their own *ethos* (beliefs), *logos* (logic) and *pathos* (emotions) in any persuasive exchange (Gottweis, 2007). Therefore, Complex Systems Thinking involves inherent complexity (*ethos*, *logos* and *pathos*) of human relations; related contractions and abrasions manifested in their interactions, which leads to *Dialogic* outcomes (Montuori, 2008). Thus, societies are a dynamic fabric of relations with scaffolding *ethos*, *logos* and *pathos* of actors; where openness enables collaboration and the creation of outcomes based on reciprocity, regardless of the effort involved. This *Sympoietic* dynamism creates an evolving equilibrium, where

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
714	591	553	569	526	536	536	449	510	485	474	465	386	493	476	476	485	521	521

Table 1. Statistical data of total number of pregnant women who died in Colombia, from 2001 to 2019 (perinatal mortality). Authorship source.

Table 2. Perinatal mortality tendency from 2001 to 2019. Authorship source.



the complex system is in tune, in symmetry, providing *emergence*, a self-organizing structure, a new cadence of relations that is bottom-up (micro level) and affects meso and macro levels of a system (Montuori, 2008).

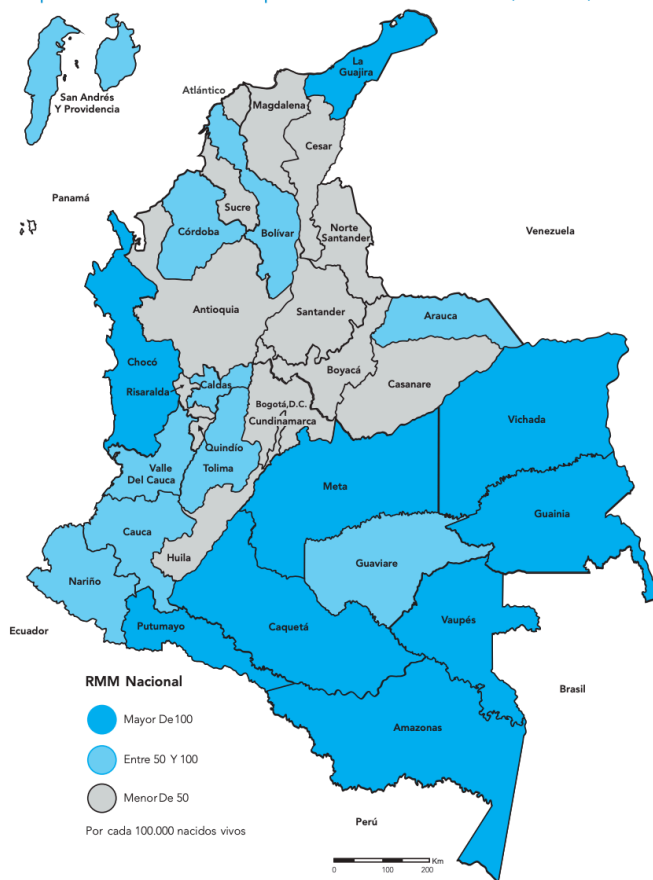
However, when relations are out of whack, there are asymmetries. These asymmetries reflect eroded, weak, tense or dominant relations within a complex system. The lack of openness to other actors’ ethos, logos and pathos, creates a static monologue. Such monologue can be evidence in the way health inequalities are described, by presenting them as shortcomings of less privileged actors, such as lack of timely consumption of healthcare services, lack of agency, lack of adherence to treatments, among others, which avoids looking critically into the relations of healthcare systems and less privileged actors (Arcaya *et al.*, 2015; Starfield *et al.*, 2012; Bunte, 2019). Before moving to perinatal care in Colombia and its mortality, a brief summary of the main complex systems principles to be used in this paper is created. These are *Symptoiesis*, Dialogic, Openness and Emergence.

Systemic issues framing perinatal mortality in rural Colombia

For over two decades perinatal mortality in Colombia has become a public healthcare concern. Furthermore, perinatal deaths within ethnic minorities have been reported for over a decade by authors such as Camacho *et al.* (2010), Saa *et al.* (2013) and Carrillo (2007). Thus, the authors of this paper gathered and analyzed separate data sets from the National Administrative Department of Statistics (DANE by its acronym in Spanish) between the years 2001 and 2019, involving perinatal deaths and they created Tables 1 & 2. The analysis yielded a decrease in the last decade. The numbers are nevertheless disturbing (see Table 1).

By analyzing the tendency between years 2001 and 2019 (Table 2), the data shows stagnation and lack of clear progress in tackling perinatal mortality. Thus, the authors find it significant to explore systemic structural issues in rural areas of Colombia connected to perinatal mortality to unlock opportunities.

Mapa 1. Razón de muerte materna por entidad territorial de residencia, Colombia, 2015.



Fuente: Sivigila, Instituto Nacional de Salud, Colombia, 2016

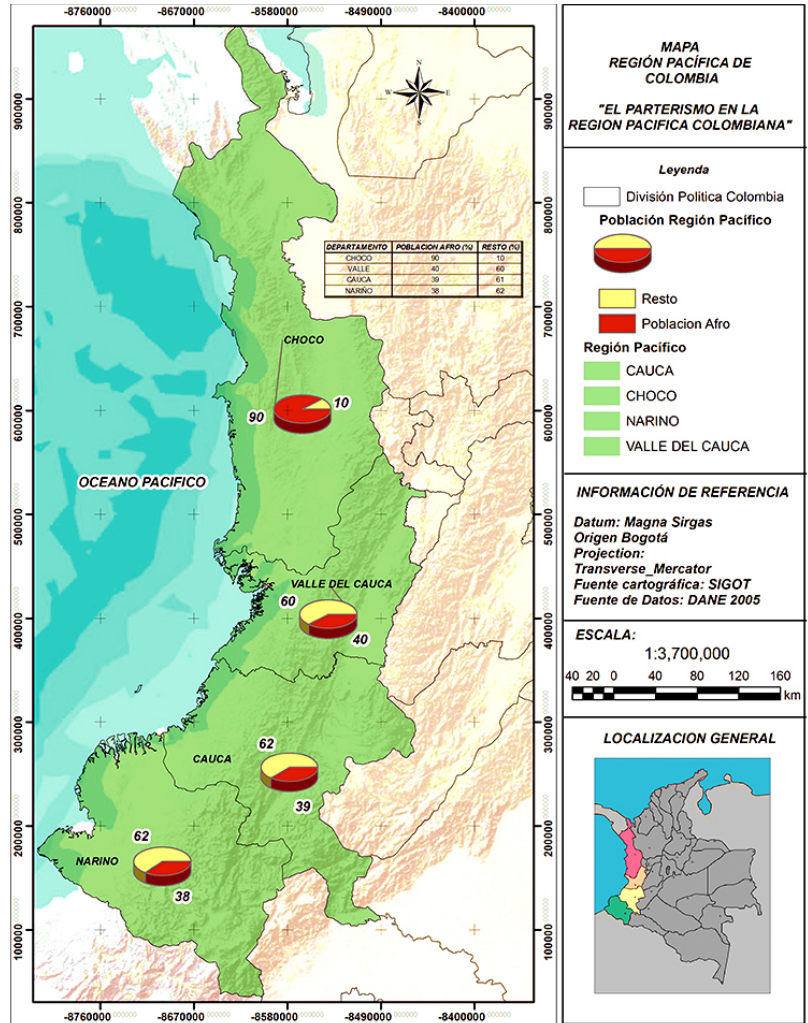
Figure 1. Map of Colombia presenting the ratio of death of pregnant women per 1000 alive infants born (2015). Source: PAHO-INS (2016:16) based on data from the System of Public Health Vigilance (acronym in Spanish SIVIGILA) and INS.

5

Prior to doing so, the authors inquired about the 2008 data outlier in the data set. In 2008, regions of Colombia such as the Amazon and the Orinoquia reported remarkably low numbers in general in comparison to other years, particularly connected to post-partum events. These areas have been identified as remote places with a significant population of ethnic communities of indigenous ascent and with notable perinatal mortality as shown in Figure 1 (INS & PAHO, 2016). This same report includes the Pacific region and the northernmost point of Colombia, La Guajira, with mostly Afro-Colombian and indigenous ethnicity, respectively. Therefore, the year 2008 suggests inconsistency in the data collection; a potential inability of public healthcare services to successfully follow-up and know if women are deceased in their communities because of lack of care, rather than the implementation of a successful approach to this issue, as the authors elaborate in the following paragraphs.

The Colombian General System of Social Security and Health (SGSSS by its acronym in Spanish) has focused its efforts on increasing its coverage to Colombians, as a human right promoted by the country's national Constitution. However, an increase in coverage has not resulted in increased access to care because of multiple reasons, including poor functioning of healthcare facilities in rural areas (Ayala-García, 2014; Yáñez Pérez & Medina

Figure 2. Ancestral midwifery practices in the Pacific Coast of Colombia, Portela Guarín (2018:1). Source: Bank of the Republic Gallery of images from the exhibition: Partería, saber ancestral y práctica viva.



6

Pérez, 2018; Calderón *et al.*, 2011).

Furthermore, the decentralized sgsss promotes patronage and decreases inclusion of minorities disconnected from political interests. Merlano-Porras & Gorbanev (2013) argue that the financial incentives are above the populations’ best interests, widening inequality.

The main focus of the services provided by the sgsss in these faraway regions involves primary care, regrettably clashing with the lack of preventive health culture in these populations who tend to access healthcare services mostly in emergency situations. This clashing cultural usage of healthcare services is further elaborated in the following paragraphs.

Perinatal care in Colombia: a midwifery legacy struggling to survive

Midwifery is a core practice of ethnic populations such as indigenous communities and Afro-Colombian descendants. It is mostly located in Colombia, on the Pacific coast, where significant ethnic populations such as Afro-Colombian and indigenous communities live today (see figure 2). Midwifery constitutes a key aspect of the social structure of these ethnic

communities because pregnancy is seen as a physical, emotional, social and communal event. The arrival of a newborn, affects not only the mother to be, but the community at large.

Chants, herbal remedies and high touch practices reflect the spiritual and ceremonial understanding of this evolutionary and celebratory process (Giraldo Duque & López Ramírez, 2019). Unquestionably, midwifery is at the core of long-standing Afro-Colombian traditions. These practices provide comfort, safety, bonding and care to pregnant women from these communities. Proof of this involves the informal name given to the midwives on the Pacific coast: *comadrona*. This word is derived from the words *co* and *madre*, meaning second mother (Sarria Viáfara, 2019).

To the *comadrona* or ancestral midwives, high trust is given to undertake multiple care and healing activities beyond perinatal care. *Comadronas* also happen to be the only source of care for pregnant women in many faraway regions of rural Colombia.

Regrettably, outsiders have stigmatized these ancestral practices and called midwives *witches*. Ancestral midwifery has been seen for centuries as a primitive form of care since it lacks written manuscripts and many elderly midwives are illiterate (Sarria Viáfara, 2019).

The scsss also has a distant attitude to ancestral midwifery. It does not recognize it, which marginalizes it with detrimental consequences for the practicing communities. Instead of midwifery, the scsss provides women with low-risk pregnancies, services in primary care by nurses and family doctors; high-risk pregnancies are treated in secondary care by specialists such as obstetricians (Gaviria Uribe *et al.*, 2017). This western practice may look viable, however women who have never experienced healthcare services before tend to find it alienating. A previously referred study argues that 60.2% of pregnant women's deaths were preventable. That 84.5% of the diseased knew about the availability of health perinatal services at their disposal, and 29% did not have any prenatal checkups (INS & PAHO, 2016).

Thus, the cultural gap between the scsss y ethnic minorities presents itself as a barrier. The preventable nature of the perinatal deaths in Colombia invites an analysis using Complex Systems Thinking and Systemic Design to unlock new strategies at the policy levels to address the current situation. This analysis is presented in the Results chapter.

Methods

Four methods were used to study the current perinatal situation in Colombia:

1. Literature review analysis.
2. Semi-structured interviews with pregnant women, traditional midwives, and perinatal healthcare professionals.
3. Ethnographic analysis of an ancestral medicine health unit in Bogota.
4. Systemic characterization through cognitive mapping, visual representations.

1. The literature review analysis followed the six steps of Onwuegbuzie, Leech & Collins (2012), which comprises: a) the definition of the research problem

as precisely as possible; b) the search for relevant secondary sources; c) the selection and perusal of at least two appropriate general references, d) the formulation of key words or phrases connected to the problem or question of interest; e) the search of the general references for relevant primary sources, and; f) the reading of relevant primary sources, the notation and summary of key points (which were captured in an Excel sheet). The papers were categorized based on: a) authors in APA style; b) angle or discipline framing the paper, for example, perinatal mortality in rural Colombia; c) main subject addressed in the paper, and; d) main insights. This exercise was done using an interpretation of the information addressed in the papers following Schwandt *et al.'s* (2007) approach, which involves the breakdown of the whole into its components. Then, by assembling the parts, the main issues and whole picture of the subject researched becomes apparent.

Through this methodological approach, the authors conducted a review that allowed them to get a general understanding of the main issues to be further analyzed using systemic and cognitive mappings explained next. The reviewed papers had statistical analysis of perinatal mortality in women, clinical assessment of deaths of women who were pregnant, qualitative interviews with pregnant women about their perception of the Colombian sgss, and socio-economic and cultural issues connected to perinatal care and mortality in the country.

2. A series of seven semi-structured interviews were conducted with pregnant women, women who gave birth recently and fathers to be, from various socio-economic backgrounds and geographical locations in Colombia. The perinatal healthcare professionals included two ob-gyn physicians and two nurses. The interviews to the mentioned groups were carried out remotely and had a duration of 90 minutes. The main goal of the interviews was to define the perinatal health's *logos*, *ethos* and *pathos* according to the interviewees, and their experience with perinatal services within the public and private healthcare systems in Colombia.
3. Three traditional midwives from a multicultural, community-based health center in Bogota called Kilombo Yumma were included and interviewed at the ancestral medicine center. Their unique approach to perinatal care made it highly relevant for the authors to visit this facility. The Kilombo initiatives are introduced predominantly in the Results chapter. Briefly, Kilombo Yumma's founders are women displaced by the Colombian conflict. They come from the Pacific coast and, prior to arriving in Bogota, practiced midwifery. The authors pursue a purposive sampling strategy involving experts from different perinatal practices to ensure a comprehensive understanding of the current systemic dynamics. An analysis of the main findings using Complex System Theories allowed the authors to define a deeper and fresh perspective about perinatal care in Colombia. This analysis involved the principles described in the Theoretical Review (above).
4. Systemic maps identify the main actors within a subsystem such as perinatal, their relations, dependencies and levels of influence (Sturmberg & Martin, 2013; Latour, 1993; Strijbos & Basden, 2006). Cognitive maps apply Complex Systems principles by visualizing comparative elements (Nadel,

Groups/identities

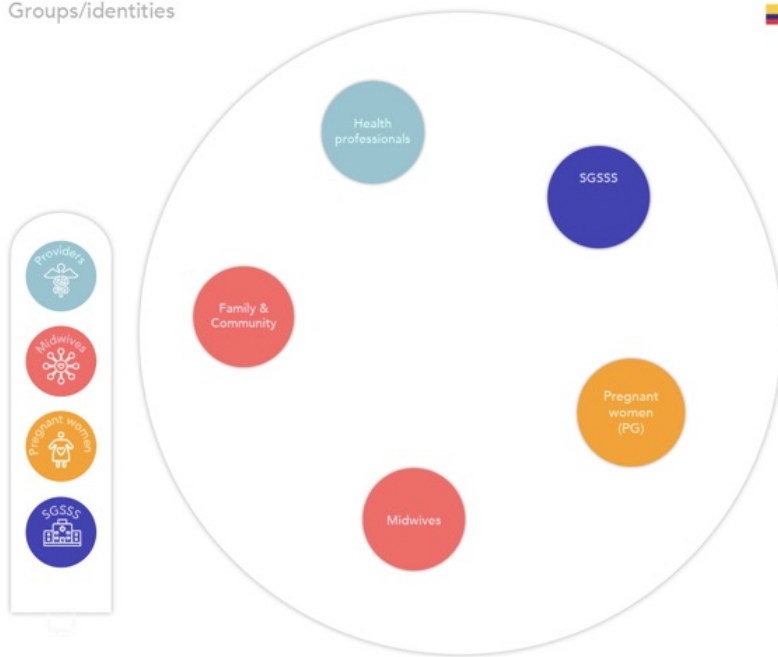
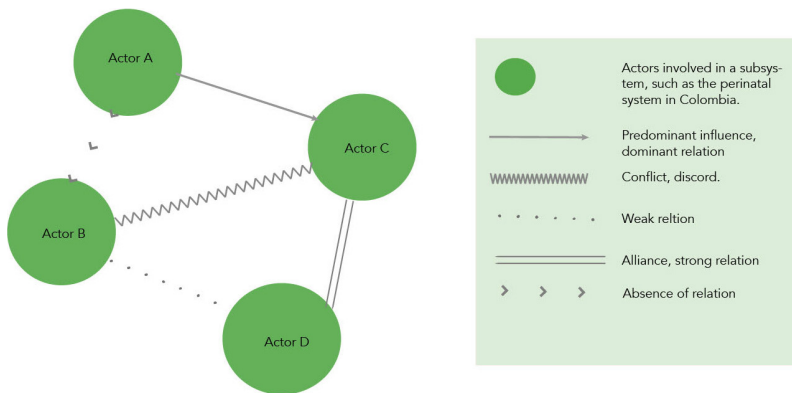


Figure 3. Actors of the perinatal studied subsystem.

Source: Map created by the authors

Figure 4. Relations variables applied to analyze perinatal subsystem.

Source: Image created by the authors based on Herbert (2017: 14)



2013) such as levels of activity of the actors (macro, meso, micro) within one system, positioning within the system, etc.

Following Complex Systems principles, the first step was to identify the groups within the perinatal system of Colombia. This was done by grouping them by their identities (Latour, 1996). Each group was assigned a circle as represented in figure 3. The mapping followed a selection of variables of relations used in conflict resolutions maps by Herbert (2017: 14). These variables include, relations of conflict, alliance, predominance, etc. (see figure 4).

Once the relations were mapped, the authors continued to create new maps of the main insights found in primary and secondary sources. The goal of the second cognitive mapping was to recognize the connection between the issues, causality (root causes), correspondence between the issues, and to assess which core ones could be addressed to create

a positive knock-on effect on others. In this way, the system could be repurposed (Robertson, 1991) towards decreasing perinatal mortality.

The information analyzed through Complexity Systems Thinking and Systemic Design included the review of over 35 papers about the sgsss services and perinatal mortality in Colombia. The papers were found in Google Scholar and the Library Search of the Technology University of Eindhoven.

Results

Insights from primary and secondary sources.

Combined insights from primary and secondary sources provide a deeper understanding about several reasons behind perinatal mortality in rural Colombia. These involve pitfalls in the SGSSS and within the population, such as:

SGSSS

- Shortage of healthcare professionals.
- Discontinued services of the SGSSS.
- Long distance and high cost of reaching healthcare facilities, such as hospitals, from rural communities.

Pregnant women in faraway areas

- Use healthcare services only for emergency-related issues.
- Are not aware of primary care.
- Do not trust public institutions, including the sgsss.
- Find the bureaucratic procedures too complicated and disengaging.
- Have limited or absent cultural connection to the practices of sgsss.

Thus, in these faraway areas, ancestral midwives provide most perinatal care to pregnant women. These *comadronas*, however, are not recognized as a supporting role in perinatal care, nor financially compensated. Informally, some healthcare providers have trained midwives to measure blood pressure and assess warning signs. These efforts address the interests of both actors, healthcare professionals and midwives, to create a relation to the healthcare system, to complement and support pregnant women in faraway areas.

Lasso Toro (2012) conducted a large study involving multiple focus groups with women from the Pacific coast of Colombia. This study refers to women's experiences with the sgsss in a prominent Afro-Colombian region. Afro-Colombians have held on to their traditions as their way of resistance and survival, which can explain the important footing of ancestral midwifery in these regions.

The author argues that the unsatisfactory experiences of low-income Afro-Colombians with the sgsss is due to the number of checkups, which felt excessive to their relatives, and were defined as exaggerated and irrelevant. There is a clashing belief that pregnancy is not a disease to be medically addressed.

Many pregnant women also felt highly disconnected from the sgsss and the advice of the healthcare providers, which involved asking them to change their diets to eat more greens. Some mentioned that in their homes



Figure 5. The ethos, logos and pathos of perinatal care of Kilombo Yumma, Bogotá (2021).
Source: Photos made by the authors of this paper.

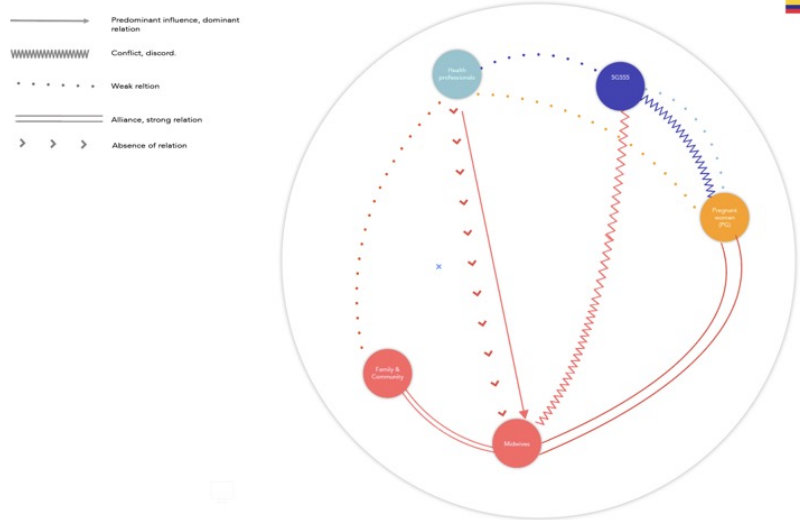
all there is to eat is rice and plantain. Some refer lack of interest in visiting again, since they were told to stop eating food they like. They do not see the purpose of continuing the checkups. Some were advised to eat less, which made no sense to them, since they are told in their communities that a pregnant woman should never diet. Furthermore, it is believed that pregnant women should do as little as possible, which also contradicts the advice given by healthcare providers to women, to actively walk and continue with their lives.

There is a highly significant cultural disconnect between the scsss and the local population, which hampers a good implementation of protocols and attempts to support pregnant women. The stiffness of the scsss is perceived in its inability to incorporate local beliefs into their practice. In recent years the scsss has been exposed by academic and key public institutions such as Colombia's Bank of the Republic, which promotes midwifery as a valid form of perinatal care in most European countries; and highlights the limiting biometrics approach of the public healthcare system, which can be complemented by ancestral midwifery (León & Pabón, 2020; Portela Guarín, 2017).

This complementary approach is already taking place in Bogota, the capital of Colombia. It is called *Kilombo*, an African word referring to the center of the black culture, where resistance and politics are made, according to the leader of one of the 10 Kilombos in the city. The photos below (figure 5) share an impression of the different ethos, logos and pathos regarding perinatal care, where wood instead of metal is intentionally used in their practices with pregnant women, among others.

The Kilombo health centers combine ancestral knowledge from midwifery, including medicinal plants from African heritage, and perinatal checkups elicited by the scsss. The team involves an ancestral midwife, a *sabedora* (person who knows about medicinal plants), a nurse, and a community worker. This team supports people at a health care center in six low-income communities in Bogota. They also have outreach programs, where they wander around communities looking for pregnant women without health care support. They approach any interaction with any pregnant women as a joint team: the midwife and the nurse examine the pregnant women, one after another, and then have support from the *sabedora* for any medicinal plant they require.

Figure 6. Cognitive mappings of relations, perinatal subsystem. Source: map created by the authors of this paper



12

Plants are used for swollen legs or hypertension in women with high blood pressure. The role of the community worker is a vital one, since he/she helps with the bureaucratic tasks between the population and the SGSSS. The Kilombo staff gets paid by the municipality of Bogota for their assistance to the communities. Many of the people assisted by the Kilombo are civil war refugees from other parts of the country, vulnerable people who arrive in Bogota without no understanding of how things work, and without knowing how to claim their basic rights, such as healthcare.

Thus, the Kilombos connect not only cultural health worlds but also different logos (logics) of doing things, such as the bureaucratic paperwork to enable access to health care in these communities. One of the striking comments from the Kilombo team is that their patients feel their health center is a safe place, where they feel comfortable, supported and guided. These are basic human aspects that the SGSSS seems to have forgotten. The origin of the Kilombos involves civil war refugees from ethnic minorities, mostly from the Pacific. After years of cultural disengagement and annihilation, they decided to create a concept where they fused their ancestral midwifery practices with western medicine. To them, fusing approaches and cultures is a natural thing. They consider they have been adjusting and evolving their culture for centuries. The long-standing migrations to the capital have enabled the arrival and support of newcomers. The municipality of Bogota City is supporting these ethnic initiatives with programs of inclusion and recognition of the populations who have willingly or forcedly arrived in Bogota.

However, the Kilombos are far from having it easy. The lack of institutional recognition and validity by the SGSSS makes their financial situation highly unstable. They mostly depend on the goodwill of the municipality of Bogota and its Secretary of Health to keep them alive. Whenever there is a change of year or personnel in key positions within Bogota's main municipal and health cabinet teams, their livelihood is questioned, and their salaries are

not paid until the Kilombos can prove their support to the communities. Their vulnerability is significant in the current context. Thus, getting their approach recognized and institutionalized by the scsss is a key goal. The institutionalization of midwifery should be a possibility and not an imposition for those who are interested in complementary approaches to perinatal care. This institutionalization should neither be seen as the medicalization of midwives' practices nor the loss of their identity. On the contrary, it is aimed at increasing mutual correspondence between perinatal ethos.

Findings from systemic and cognitive mappings

By applying Complex Systems Thinking and Systemic Design to the findings in Colombia, different mappings were done (figure 6). The mappings based on the interviews allowed relations to be characterized. The findings present a highly fractured system between the healthcare workers and the government, between the healthcare workers and the pregnant women and their families and the SGSSS and midwives. These fractures are given by the relation defined as conflict or discord. Although the Colombian government has a thorough perinatal approach, the poor relations, and the existing cultural gaps make it difficult to implement.

There is a highly resented relation of discord between the government and the midwives, since their practice is being ignored and set aside. Although the relation is of discord, it is also of absence and negligence. Midwives are not recognized for the care and support they provide to pregnant women. In faraway rural areas, where there is no presence of the state through the scsss, midwives are the only ones who can deliver babies.

13

They also argue that they are a cultural bastion in their communities, serving not only a baby delivery function. They pass-on the oral culture and knowledge from their African ancestors, their knowledge of plants and more importantly they see pregnancy as a personal transformation of the self. Not only a physiological phenomenon. Where a pregnant woman should be prepared mentally, physically and emotionally to acquire a new role in her life and in her community. Thus, the community's role of support and guidance is essential. One key aspect of their culture is that the birth of the baby is also seen as a moment of union between the parents of the baby to be born. The male has a key role of supporting the woman in labor and raising the baby, aspects that western culture takes for granted and assumes that individuals are assertively doing.

The discord relation between the scsss and pregnant women is based on internal barriers such as cultural beliefs, but also involves external barriers such as poorly functioning health facilities, absence of well-equipped health centers and difficulties, bureaucracy and distance to access care. There are other weak relations between nutritionists and pregnant women, since they find their advice out of touch and difficult to follow. There is a weak relation between health insurers and pregnant women. There are, however, strong relations in the system, such as those between midwives and pregnant women, or pregnant women and communities.

Patterns, structures and relations of perinatal sgsss in Colombia

There is a strong dominant clinical logic at the center of the perinatal practices. There is a hierarchy and dominant relation. The sgsss and healthcare professionals undermine midwives and their ancestral approach to birth. Although the intention of the public sgsss is to enable safer care, the lack of a more encompassing health ethos, logos and pathos in their approaches is affecting pregnant women by creating cracks in the system, evidenced through discord and weak relations. Pregnant women are caught up in an SGSSS that can be perceived as arrogant or intransigent, where they feel disconnected, lost, unsupported and uncared for.

Sympoiesis

There is no *Sympoiesis* in the perinatal system analyzed. There is no flow of knowledge and contributions between actors who have a different health *ethos*, *logos* and *pathos* from the SGSSS. There is a lack of active participation and representation of a complementary health ethos, logos and pathos, besides the clinical one.

Instead, there are *Allopoiesic* relations. These are characterized by a mechanical process which promotes endogenous *logos*, *ethos* and *pathos* of organizations and the sgsss itself. This endogenous approach impedes the incorporation of elements from their surrounding context.

The current patterns observed through the analysis of relations, are of a sgsss that is rigid, with a top-down approach to perinatal care; with the inability to collaborate with others who hold different views and practices, in a country that is by definition multicultural and with plural health *ethos* about pregnancy and birth. This stiff approach to perinatal care denotes its inability to connect with micro-levels of the system. This pattern is limiting the sgsss's effectiveness to provide a care service that is catered to a multicultural society. The pattern also suggests the strong focus of a sgsss based on symptoms or physical aspects of care, rather than the individual and his/her culture, which is not detached from a human being. Thus, the perinatal care macro actors, such as governments and regulators, are creating a vacuum of care.

Dialogic

Although ancestral midwifery is a highly complementary approach to perinatal care, there are actors within perinatal systems that are not integrating nor creating a unity with antagonistic health ethos. This attitude is preventing the possibility of reaping the complementary views' benefits. Instead of a Dialogic relation, there is a loud monologue of clinical *ethos*.

Openness

Increased openness is recognized in the attitude of the midwives, more than other actors in perinatal healthcare. In Colombia, although midwives are not acknowledged nor paid by the sgsss, they have received and applied training from physicians to support women with high-risk pregnancies. Furthermore, midwives see their role in their communities in permanent evolution as a way to adapt, resist and survive. These attitudes and behaviors reflect their Openness to new relations and cadence within a system.

Emergence

The SGSSS and professionals have regrettably adopted a rigid attitude towards care. This does not allow actors with diverse health *ethos*, *logos* and *pathos* to create better cadence and perinatal outcomes; to create breathing space within the system for self-organization. The inelastic practices in perinatal care have led to the choking of the system by not allowing other actors to participate, collaborate and shape outcomes in mutually beneficial ways. Thus, there is limited emergence and opportunity for some of the actors to thrive.

Conclusion

Complex Systems Thinking and Systemic Design allowed the authors to widen their understanding of issues that are at the core of perinatal health inequity in Colombia, by shifting the focus on limitations within the affected communities and pinpointing the shortcomings of the SGSSS with its monodimensional understanding and practices of healthcare within perinatal care. The restricting understanding of perinatal care by SGSSS is systematically excluding widely implemented ancestral midwifery from Afro-Colombian descendants among other communities. Thus, the authors argue about the urgency to recognize and institutionalize ancestral midwifery in Colombia, to avoid widening the current cultural and healthcare gaps between the most affected communities. Its institutionalization by the SGSSS can contribute to the decrease of perinatal mortality in the country, as no other strategy led by the SGSSS in two decades seemed to significantly change the current perinatal mortality situation. The long-standing debate held by the healthcare sector regarding the legitimacy of midwifery as a valid source of health care requires immediate resolution. The designation of ancestral midwifery as cultural patrimony is not enough to save lives. The integration and participation of this practice must be done by the SGSSS.

15

Discussion

This paper encourages policy makers to shift the focus about health inequity from the inadequacy of the least privileged groups in societies to an inadequacy from the SGSSS to incorporate a more comprehensive cultural approach to perinatal care. This pivotal focus places the urge for change in perinatal care at the SGSSS.

Moreover, the analysis of the relations and patterns of the perinatal system reflect the detached approach to serve pregnant women and the constraints to collaborate with other actors within the SGSSS. Without a mutual flow of knowledge and acceptance of the validity of complementary perinatal approaches such as ancestral midwifery, better health outcomes are hampered. The authors therefore argue that a plural health *ethos*, *logos* and *pathos*, and collaborative interactions such as the ones seen at Kilombo Yumma in Bogota can potentially improve outcomes.

Diversity in a system is necessary for its resilience and the emergence of new relations, which creates adaptability. The team of the Kilombo Yumma taps into the health *ethos* of its population to connect two different worlds in one healthcare service offer, making this concept more effective at providing access to healthcare to ethnic pregnant women than the SGSSS.

Sympoiesis in the perinatal system is where different disciplines find a way to collaborate, to exchange knowledge and to find value in each other's differences (dialogic); in which different multicultural practices are

incorporated into perinatal care, without seeing them as threatening or having to annihilate the other; where the actors to be treated are understood and served encompassing their health beliefs, logic and emotions in a holistic way. Therefore, healthcare is defined as an active flow of mutual knowledge, collaborative interactions, joint plans to address not solely the symptoms but the mind, body and emotions of human beings. In other words, to align and integrate the human experience and the physiological one. Inequality and equality, inequity and equity are part of any complex system. Contradictions are inherent qualities within any society. As they interact, they create a unity. Thus, inequality is not per-se the issue within a system. It is the absence of participation, collaboration and openness, which is eroding the perinatal system in Colombia, whilst leaving key actors out. The lack of mutual exchange has created stagnation and asphyxiation within the interactions, with detrimental effects for ancestral midwives and their communities. Re-purposing the system requires the SGSSS to acknowledge its practices and to shift its attitude, beginning with inclusiveness of diverse health ethos, logos and pathos.

Next to Colombia, in Ecuador, Chile, Bolivia and Mexico, the role of ancestral and contemporary urban midwifery are heavily discussed, mostly at the academic level. Sociologists, anthropologists, public healthcare and political scientists argue about the backwards approach to these practices that healthcare systems have had. The goal has been primarily to medicalize these practices instead of finding a complementary approach. Thus, the plea is a regional one, where inclusion and integrity are missing for those practicing and wanting this approach as a valid and complementary form of perinatal care in Colombia and other Latin American countries (Ramírez & Laako, 2019; Murrieta, 2016; Álvarez & Orrego, 2014; Carvajal Barona *et al.*, 2018). The lack of political representation and legitimization within the main public healthcare sector weakens traditional midwifery, which weakens communities and cultural legacies of other forms and expressions of care.

The following are the opportunities identified by the authors for policy makers:

- A. An intercultural strategy of mutual recognition of ancestral midwifery carried out by ethnic communities such as Afro-Colombians, as a legitimate form of perinatal healthcare from the SGSSS to avoid and close health inequity gaps.
- B. Promote spaces and the access to ancestral knowledge and exchange between communities and western medicine. For instance, the sgsss can support midwifery with technical aspects to identify and manage risks in a timely manner; while midwifery can teach the sgsss how to build horizontal relationships to increase its footing in community networks.
- C. The recognition and institutionalization of ancestral midwifery practices by the sgsss to increase safety, timely identification of high-risk pregnancies, and culturally competent support of pregnant women in rural faraway areas of Colombia, to ensure a minimum of checkups.
- A. The institutionalization of ancestral midwifery to ensure financial resources for sustainable and autonomous operation of the Kilombos, as well as other multicultural community-based health centers.
- B. Legitimization of ancestral midwives as active actors of the sgsss.
- C. Guarantees for the active participation of midwives and sabedoras during

and after the pregnancy.

- D. Facilitate dialogues to formulate and create health care programs able to adapt to the context of the pregnant women. This includes allowing ancestral midwives to join pregnant women in public hospitals in the country; today they are forbidden to do so.
- E. Guarantee the access to ancestral medicine within healthcare plans, which involves protecting and guaranteeing the right to choose the type of perinatal healthcare women want.

The authors of this paper argue about the potential to implement this methodological approach to other disease healthcare paths, and invite policy makers, researchers and designers to apply it to other context settings. The methodology is seen as a participatory and cathartic approach that allows to engage with multiple actors in equitable ways, regardless of their ethnic background, role, or origin.

Limitations of this paper include the methodological shortcomings of Complex Systems Thinking and Systemic Design, which involve the thorough diagnosis of systemic issues, however, it requires the support of a complementary Design method such as co-creation to reach the results of this paper, next to a series of qualitative traditional methods employed. Additionally, the method requires an expert in the field to implement it, which poses significant challenges in rural areas with limited capacity of these experts in place. This paper refers to the diagnosis conducted with Complex Systems Thinking and Systemic Design, however, as any Design activity it should be prototyped and tested in the field, which was exempted from this paper intentionally by the authors.

The authors argue that Complex Systems Thinking and Systemic Design are highly suited to define and implement complementary perinatal practices that have encompassed ethos by healthcare systems. Systemic Design positions itself as a distinctively befitting method over other more broadly known Design methods such as a Human Centered Design, which do not address systemic aspects in structural ways.

The authors aim to encourage further research in the areas of inequality in reproductive rights for lower income populations, such as the ones found in rural areas throughout this study. With a lack of encompassing and Complex Thinking approaches to perinatal care, the choice to vulnerable populations is also denied.

Finally, yet importantly, the outcomes of these methods call for policy makers' expertise to take the lead, since change can only begin at the normative levels of healthcare systems rather than the focus on the disparities of the affected communities.

References

- Álvarez, D. & Orrego, M. I. M. (2014). Oficios que cuidan la vida: partería y curación. *Iconos - Revista de Ciencias Sociales*, 50, 149-160.
- Arcaya, M.C., Arcaya, A.L. & Subramanian, S.V. (2015). Inequalities in health: definitions, concepts, and theories. *Global Health Action*, 8(1), 27106.
- Ayala-García, J. (2014). La salud en Colombia: más cobertura pero menos acceso. *Documentos de Trabajo Sobre Economía Regional y Urbana*, 204.
- Radboud University, Bunter, L., Duin Van, S., Graves, R., Güntner, K., Schrader, E., Voss, A. S., & Nadina, Z. (2019, August). *Mind the gap. How can healthcare professionals alleviate the effects of poverty-related health disparities in Nijmegen, The Netherlands?* Radboud University Honours Open Access.
- Calderón, C. A., Botero, J. C., Bolaños, J. O. & Martínez, R. R. (2011). Sistema de salud en Colombia: 20 años de logros y problemas. *Ciencia & Saúde Coletiva*, 16(6), 2817-2828. <https://doi.org/10.1590/s1413-81232011000600020>
- Camacho, Y., Villanueva, M., Marrugo, A. & Yazo, C. (2010). Mortalidad Materna: un reto que persiste para la Salud Pública en Colombia. *CES Salud Pública*, 1(1), 100-108.
- Carrillo, U. (2007). Mortalidad materna en Colombia: reflexiones en torno a la situación y la política pública durante la última década. *Revista Ciencias de la Salud*, 5(2), 72-85.
- Carvajal Barona, R., Gómez Gómez, M.C., Restrepo Acuña, N., Varela Arévalo, M.T., Navarro Valencia, M.C. & Valencia, E.S.A. (2018). Panorama académico y político que enfrentan las parteras tradicionales en América Latina. *Revista Cubana de Salud Pública*, 44, e1061.
- François, C. (1999). Systemics and cybernetics in a historical perspective. *Systems Research and Behavioral Science*, 16, 203-219.
- Gaviria Uribe, A., Correa Serna, L.F., Dávila Guerrero, C.E., Burgos Bernal, G. & Osorio Saldarriaga, E.J. (2017). *Lineamiento técnico y operativo de la Ruta Integral de Atención en Salud Materno Perinatal*. Ministerio de Salud y Protección Social.
- Giraldo Duque, Y.A. & López Ramírez, J.M. (2019). *La Partería Tradicional Afro del Pacífico colombiano como patrimonio cultural y la importancia de sus prácticas de comunicación*. Universidad Autónoma de Occidente. <http://red.uao.edu.co/handle/10614/12382>
- Gottweis, H. (2017). Rhetoric in policy making: Between logos, ethos, and pathos. *Handbook of Public Policy Analysis* (pp. 263-276). Routledge.
- Herbert, S. (2017). *Conflict analysis: Topic guide*. GSDRC, University of Birmingham. <https://gsdrc.org/wp-content/uploads/2017/05/ConflictAnalysis.pdf>
- Hoyos-Vertel, L. M. & Muñoz De Rodríguez, L. (2020). Barreras de acceso a controles prenatales en mujeres con morbilidad materna extrema en Antioquia, Colombia. *Revista de Salud Pública*, 21, 17-21.
- Organización Panamericana de la Salud/Organización Mundial de la Salud, Instituto Nacional de Salud, Rodríguez Latorre, S. P., Cuevas Ortiz, E. L., Romero, P. C., & Ávila, G. A. (2016, December). Protocolo de vigilancia epidemiológica de la mortalidad materna (ISBN: 978-92-75-31933-8). IRIS PAHO. <https://iris.paho.org/handle/10665.2/33712>
- Jones, P. (2020). Systemic Design: Design for Complex, Social, and Sociotechnical Systems. In G.S. Metcalf, K. Kijima & H. Deguchi, *Handbook of Systems Sciences* (pp. 787-811). Springer.
- Kawachi, I., Subramanian, S.V. & Almeida-Filho, N. (2002). A glossary for health inequalities. *Journal of Epidemiology & Community Health*, 56(9), 647-652.
- Lasso Toro, P. (2012). Atención prenatal: ¿tensiones o rutas de posibilidad entre la cultura y el sistema de salud? *Pensamiento psicológico*, 10(2), 123-133.
- Latour, B. (1996). On actor-network theory: A few clarifications. *Soziale Welt*, 47(4), 369-381. <http://www.jstor.org/stable/40878163>
- León, C.P.M., Roa, I.D.A. & Pabón, A.C.B. (2020). Aportes de la partería tradicional al ejercicio del cuidado materno-perinatal en Colombia: una visión intercultural del fenómeno. *Ciencia y Salud Virtual*, 12(1), 29-35.
- Marrugo-Arnedo, C. A., Florez-Tanus, Á., López-Pájaro, K., Mazenett-Granados, E., Orozco-Africano, J. & Alvis-Guzmán, N. (2017). Impacto económico y sanitario del control prenatal en embarazadas afiliadas al régimen subsidiado en Colombia durante 2014. *Salud Pública de México*, 59, 176-182.
- Merlano-Porras, C. A., & Gorbanev, I. (2013). Sistema de salud en Colombia: una revisión sistemática de literatura. *Gerencia y Políticas de salud*, 12(24).
- Montuori, A. (2008). *Edgar Morin's path of complexity*. Hampton Press
- Onwuegbuzie, A.J., Leech, N.L. & Collins, K.M. (2012). Qualitative analysis techniques for the review of the literature. *Qualitative Report*, 17, 56, 1-28.
- Murrieta, A.P. (2016). Mujer y salud. Miradas en torno al nacimiento. *Clivajes - Revista de Ciencias Sociales*, 6, 79-91.
- Nadel, L. (2013). Cognitive maps. In D. Waller & L. Nadel (Eds.), *Handbook of spatial cognition* (pp. 155-171). American Psychological Association. <https://doi.org/10.1037/13936-009>

- OPS Colombia. (n.d.). *Naciones Unidas, gobierno nacional y organizaciones indígenas se reúnen para acordar acciones que prevengan la muerte materna y neonatal*. https://www3.paho.org/col/index.php?option=com_content&view=article&id=2647:naciones-unidas-gobierno-nacional-y-organizaciones-indigenas-se-reunen-para-acordar-acciones-que-prevengan-la-muerte-materna-y-neonatal&Itemid=551#.YYovBZFGV78.link
- Noreña-Herrera, C., Leyva-Flores, R., Palacio-Mejía, L.S. & Duarte-Gómez, M.B. (2015). Inequidad en la utilización de servicios de salud reproductiva en Colombia en mujeres indígenas y afrodescendientes. *Cadernos de Saúde Pública*, 31, 2635-2648.
- Banco de la República de Colombia, & Portela Guarín, H. (2018, June). Partería: saber ancestral y práctica viva [Exposición]. Centro Cultural del Banco de la República de Buenaventura, Buenaventura, Valle del Cauca. <https://proyectos.banrepcultural.org/parteria/es>
- Robertson, D.S. (1991). Feedback theory and Darwinian evolution. *Journal of Theoretical Biology*, 152(4), 469-484.
- Ramírez, G.S. & Laako, H. (Eds.). (2019). *Parterías de Latinoamérica: Diferentes territorios, mismas batallas*. El Colegio de la Frontera Sur.
- Saa, T.H., Vargas, R.R. & Cobos, A.V. (2013). Servicios de salud, discriminación y condición étnica/racial: un estudio de caso de la problemática en México y Colombia. *Ra Ximhai: revista científica de sociedad, cultura y desarrollo sostenible*, 9(1), 135-151.
- Sarria Viáfara, K.A. (2019). *Análisis de la comunicación para el cambio social en la transmisión de saberes intergeneracionales en el oficio de la partería en el pacífico colombiano (periodo 2000 a 2010). Caso biográfico: Ana Polonia González, Puerto Tejada-Cauca* [Proyecto de Grado]. Fundación Universitaria Católica Lumen Gentium. <https://repository.unicatolica.edu.co/handle/20.500.12237/1708>
- U.S. Census Bureau for the Centers for Disease Control and Prevention's National Center for Health Statistics, Schiller, J. S., Lucas, J. W., & Peregoy, J. A. (2012, December). *Summary health statistics for u.s. Adults: national health interview survey, 2011* (PMID: 25116400). pubmed.ncbi.nlm.nih.gov. <https://pubmed.ncbi.nlm.nih.gov/25116400/>
- Starfield, B., Gérvas, J. & Mangin, D. (2012). Clinical care and health disparities. *Annual Review of Public Health*, 33, 89-106.
- Schwandt, T.A., Lincoln, Y.S. & Guba, E.G. (2007). Judging interpretations: But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Directions for Evaluation*, 114, 11-25.
- Sturmberg, J.P. & Martin, C.M. (Eds.). (2013). Complexity in health: an introduction. In *Handbook of Systems and Complexity in Health* (pp. 1-17). Springer.
- Triviño, A.F.R. (2013). Coyuntura del sistema de salud en Colombia: caracterización de una crisis desde las particularidades financieras de las EPS. *Gestión e Desarrollo*, 10(1), 103-116.
- Tsing, A.L., Bubandt, N., Gan, E. & Swanson, H.A. (Eds.). (2017). *Arts of living on a damaged planet: Ghosts and monsters of the Anthropocene*. University of Minnesota Press.
- van der Bijl-Brouwer, M. & Malcolm, B. (2020). Systemic Design Principles in Social Innovation: A Study of Expert Practices and Design Rationales. *She Ji: The Journal of Design, Economics, and Innovation*, 6(3), 386-407.
- Yáñez Pérez, K.J. & Medina Pérez, N.A. (2018). Retos para el actual sistema de salud en el marco de los acuerdos de paz y el post conflicto en Colombia. *Monografía en Salud Pública*. Universidad Nacional Abierta y a Distancia UNAD. <https://repository.unad.edu.co/handle/10596/20922>
- Zeiler, W. & Savanovic, P. (2009). General systems theory based integral design method. In *DS 58-5: Proceedings of ICED 09, the 17th International Conference on Engineering Design, Vol. 5, Design Methods and Tools (Part 1)* (pp. 1-12). ICED 09